

International



Eastern Mediterranean Family Medicine Congress



07 - 10 May 2026

**Mersin University
Ugur Oral Congress Center
Mersin, Turkey**

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CONGRESS PROCEEDINGS

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DAAHK2026 CONGRESS PROCEEDINGS BOOK

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Welcome Message

ear Colleagues,

It is with great pleasure and sincere honor that we warmly invite you to participate in the **25th International Eastern Mediterranean Family Medicine Congress (EMFMC2026)**, which will be held on 07–10 May 2026 at the Mersin University Uğur Oral Congress Center, Mersin, Türkiye.

Preparations for this important in-person gathering are progressing with great enthusiasm, and we are confident that EMFMC2026 will provide a scientifically rich, intellectually stimulating, and professionally rewarding experience for all participants. The congress is designed not only as a scientific meeting but also as a platform for collaboration, exchange of ideas, and strengthening of professional bonds across the global family medicine community.

The theme of this year's congress, ***“The Conundrum of Disasters and Technological Change: A Health Care System with Qualified Family Physicians to Unravel the Enigmatic Uncertainty”*** reflects the urgent and evolving challenges facing health systems worldwide. Within this framework, the program will address a broad spectrum of topics in family medicine and primary care, including disaster preparedness, digital transformation in healthcare, continuity of care, community-oriented practice, and the future role of the family physician in increasingly complex health environments. We are

proud to bring together distinguished experts, clinicians, researchers, and young colleagues from different countries, creating a vibrant academic environment that fosters learning, innovation, and meaningful dialogue.

The congress will feature keynote lectures, panel discussions, workshops, and interactive sessions aimed at bridging scientific knowledge with clinical practice. Beyond the scientific program, Mersin offers a unique opportunity to experience the warm hospitality of the Eastern Mediterranean region. With its rich cultural heritage, historical depth, and natural beauty, the city provides an inspiring backdrop for both academic engagement and personal connection. We sincerely hope that you will also have the opportunity to enjoy the unforgettable atmosphere of Mersin, especially during the enchanting season when the scent of orange blossoms fills the air.

We would be truly delighted to welcome you to EMFMC2026 and to share with you this valuable occasion for advancing family medicine together. Your presence will greatly contribute to the success and scientific richness of the congress. We kindly encourage you to mark the dates 07–10 May 2026 in your calendar and join us in this meaningful gathering that bridges science, practice, and human experience.

We look forward to welcoming you to Mersin with open arms and warm regards.

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*The Conundrum of Disasters and Technological Change:
A Health Care System with Qualified Family Physicians to Unravel the Enigmatic Uncertainty*



SCIENTIFIC PROGRAMME

07 May 2026 Thursday

Time	Hall A Face-to-Face	Hall B Face-to-Face	Hall C Face-to-Face	Hall D ONLINE	Hall E Face-to-Face	Hall F ONLINE
09.00 – 09.50	Treatment and Education of Tobacco Addiction – Smoking Cessation Course (Certified by Ministry of Health)	Holistic Approach and Critical Considerations in the Care of Older Patients in Family Medicine	Oral Presentations	Oral Presentations	Oral Presentations	Oral Presentations
09.50 – 10.30	Treatment and Education of Tobacco Addiction – Smoking Cessation Course (Certified by Ministry of Health)	Holistic Approach and Critical Considerations in the Care of Older Patients in Family Medicine	Oral Presentations	Oral Presentations	Oral Presentations	Oral Presentations
10.30 – 11.00	Coffee Break					
11.00 – 11.45	Treatment and Education of Tobacco Addiction – Smoking Cessation Course (Certified by Ministry of Health)	Holistic Approach and Critical Considerations in the Care of Older Patients in Family Medicine	Oral Presentations	Oral Presentations	Oral Presentations	Oral Presentations
11.45 – 12.30	Treatment and Education of Tobacco Addiction – Smoking Cessation Course (Certified by Ministry of Health)	Holistic Approach and Critical Considerations in the Care of Older Patients in Family Medicine	Oral Presentations	Oral Presentations	Oral Presentations	Oral Presentations
12.30 – 13.30	Lunch					
13.30 – 14.15	Treatment and Education of Tobacco Addiction – Smoking Cessation Course		Oral Presentations	Oral Presentations	Oral Presentations	Oral Presentations



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	(Certified by Ministry of Health)					
14.15 – 15.00	Treatment and Education of Tobacco Addiction – Smoking Cessation Course (Certified by Ministry of Health)		Oral Presentations	Oral Presentations	Oral Presentations	Oral Presentations
15.00 – 15.30	Coffee Break					
15.30 – 16.45	Treatment and Education of Tobacco Addiction – Smoking Cessation Course (Certified by Ministry of Health)		Oral Presentations	Oral Presentations	Oral Presentations	Oral Presentations
17.00 – 17.45	Treatment and Education of Tobacco Addiction – Smoking Cessation Course (Certified by Ministry of Health)		Oral Presentations	Oral Presentations	Oral Presentations	Oral Presentations

08 May 2026 Friday

Time	Hall A	Hall D ONLINE	Hall C Face-to-Face	Hall E ONLINE	Hall F ONLINE
09.00 – 09.40	Academic Advancement in Family Medicine: Research Design, Scientific Writing, and Publication Strategies - I Chair: Assoc. Prof. Dr. Hilal Aksoy	Chair: Assoc. Prof. Dr. Yücel Uysal	Oral Presentations	Oral Presentations	Oral Presentations



	Academic Concepts Prof. Dr. Onur Öztürk Scientific Research Methods and Research Design Assoc. Prof. Dr. İzzet Fidancı	Translating Evidence into Knowledge: Insights from the Turkish Contribution to EGPRN Prof. Dr. Radost Assenova - Medical University of Plovdiv Department of General Practice - Bulgaria			
09.50 – 10.25	Academic Advancement in Family Medicine: Research Design, Scientific Writing, and Publication Strategies - II Chair: Prof. Dr. Onur Öztürk Types of Manuscripts and Scientific Abstracts: Journal Selection and Essential Submission Documents Assoc. Prof. Dr. Hilal Aksoy	Chair: Prof. Dr. Esra Saatçı Back to Paper and Pencil: Teaching the Art of Medicine in Times of Artificial Intelligence Prof. Dr. Josep M. Vilaseca – University of Vic – Central Catalonia University- Spain	Oral Presentations	Oral Presentations	Oral Presentations
10.30 – 11.00	Coffee Break				
11.00 – 11.30	Opening Ceremony				



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MERSİN - TURKEY

07-10 MAY 2026



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11.30 – 12.15	Opening Lecture			
	Chair: Prof. Dr. Esra Saatçı Building Resilient Health Systems: The Central Role of Family Physicians Prof. Dr. Mehmet Ungan	Chair: Prof. Dr. Engin Burak Selçuk The Conundrum of Disasters and Technological Change: A Health Care System with Qualified Family Physicians to Unravel the Enigmatic Uncertainty Prof. Dr. Faisal AlNaser - WONCA EMR President - Elect and President of Bahrain Family Physicians Association, Arabian Gulf University – Bahrain		
12.15 – 13.30	Lunch			
13.30 – 14.30	Chair: Prof. Selçuk Mıstık Continuing Professional Development (CPD) , New System in Jordan Prof. Dr. Oraib AlSmadi – WONCA East Mediterranean - Honorary Treasurer – Jordan Accrediting Primary Healthcare Centers in Jordan: Journey to Improve Quality of Services Prof. Dr. Mohammed Tarawneh - WONCA East Mediterranean – Immediate -Past President –Jordan	Oral Presentations	Oral Presentations	Oral Presentations



14.30 – 15.00	Coffee Break				
15.00 – 15.40	Chair: Prof. Dr. Esra Saatçı The Evolving Art of Consultation in Family Medicine: Navigating Doctor-Patient Relationship and Human Care in an Era of a Rapidly Changing World and Technological Acceleration Prof. Dr. Spyros Klinis – University General Hospital of Heraklion – Greece		Oral Presentations	Oral Presentations	Oral Presentations
15.40 – 16.15	Chair: Assoc. Prof. Dr. Önder Sezer Motivational Interviewing–Based Behavior Change Strategies for Addressing Vaccine Hesitancy and Inappropriate Medication Requests Lecturer, M.D. F. Serdar Gürel	Chair: Prof. Dr. Ersin Akpınar Family Physicians as a Bridge between People, Science and Technology in Times of Uncertainty Prof. Dr. Zaim Jatic- Family Medicine Department at University of Sarajevo, Faculty of Medicine Bosnia and Herzegovina		Oral Presentations	Oral Presentations
16.20 – 17.00	Chair: Prof. Dr. Serpil Demirağ Positioning Family Medicine in Undergraduate Medical Education: Building the Future of Primary Care Prof. Dr. Esra Saatçı	Chair: Prof. Selçuk Mıstık Social Determinants of Health in Times of Crisis: Strengthening Family Medicine’s Role in Addressing Vulnerability		Oral Presentations	Oral Presentations



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		Prof. Dr. Mahasti Alizadeh - Community Medicine and Preventive Medicine, Faculty of Medicine, Tabriz University of Medical Sciences, Tabriz, Iran			
17.10 – 17.45		Chair: Assoc. Prof. Dr. Sanem Nemmezi Karaca Narrative Medicine in Times of Crisis: Healing Through Stories During Disasters and Uncertainty Prof. Dr. Roshanak Naseri Sis - Medical Education Development Center Tabriz University of Medical Sciences –Iran	Oral Presentations	Oral Presentations	Oral Presentations



09 May 2026 Saturday

Time	Hall A	Hall C	Hall B	Hall D ONLINE	Hall E ONLINE	Hall F ONLINE
08.45 – 09.30	Beyond the Symptom: Functional and Holistic Chronic Disease Management in Primary Care Chair: Prof. Dr. H. Nezh Dağdeviren The Underlying Causes of Poorly Controlled Chronic Patients in Primary Care Family Health Centers (FHCs) Assoc. Prof. Dr. Burkay Yakar A Functional Medicine Approach to Chronic Diseases: A Primary Care Experience Assoc. Prof. Dr. Bahar Ürün Ünal		Oral Presentation	Oral Presentation	Oral Presentation	Oral Presentation
09.30 – 10.10	Chair: Prof. Dr. Yeltekin Demirel Avoiding Polypharmacy and Optimal Prescription Assoc. Prof. Dr. Sanem Nemmezi Karaca		Oral Presentation	Oral Presentation	Oral Presentation	Oral Presentation



10.10 – 10.40	Coffee Break					
10.40 – 11.25	The Silent Risk Group in Disasters: Older Adults and Geriatric Syndromes Chair: Prof. Dr. Mehmet Kayhan Geriatric Health in Disasters: Preventive Medicine in Primary Care Assoc. Prof. Dr. Elif Deniz Şafak Geriatric Syndromes: Falls, Malnutrition, and Frailty Assoc. Prof. Dr. Ahmet Yılmaz		Oral Presentation	Oral Presentation	Oral Presentation	Oral Presentation
11.30 – 12.15	Session on Law and Medical Practice Chair: Uzm. Dr. Halil Volkan Tekayak Current Developments in Family Medicine Legislation and Malpractice Gülümser Uğurlu, Attorney at Law					
12.15– 14.00	Lunch					
14.00 – 15.00	Diagnostic and Treatment Adherence Problems in Chronic Disease Management					



	Chair: Prof. Dr. Süleyman Görpelioğlu Resistant Hypertension or Poorly Followed Hypertension? Prof. Dr. Yusuf Çetin Doğaner New-Generation Antidiabetic Agents: For Everyone or the Right Patient? Prof. Dr. Mustafa Kürşat Şahin COPD Exacerbation or Misdiagnosis: A Clinical Dilemma Prof. Dr. Umut Gök					
15.10 – 16.10	Clinical Assessment of Traditional and Complementary Medicine (T&CM): Efficacy, Safety, and Professional Boundaries Chair: Assist. Prof. Dr. Gülsen Ceyhun Peker Most Common Traditional and Complementary Medicine (T&CM) Practices and Their Clinical Applications Assist. Prof. Dr. Suat Sincan Levels of Evidence in Traditional and Complementary Medicine (T&CM) Practices Assist. Prof. Dr. Mehmet Akif Nas		Oral Presentation	Oral Presentation	Oral Presentation	Oral Presentation

	Physician Responsibility in Traditional and Complementary Medicine: Scope and Limits Assist. Prof. Dr. İdeal Beraa Yılmaz Kartal					
16.20– 16.45	Coffee Break					
16.45 – 17.30	The Social Dimension of Health: Social Prescribing in Primary Care Chair: Assoc. Prof. Dr. Nagihan Yıldız Çeltek The Invisible Page of the Prescription Pad: Social Interventions Assist. Prof. Dr. Elif Erdoğan Ceylan What Is Social Prescribing? A Family Medicine Framework Assist. Prof. Dr. Ufuk Ünlü Social Prescribing in Primary Care: Barriers and Opportunities Assist. Prof. Dr. Gülseren Oktay	Medicine Behind the Screen: Telemedicine in Primary Care – Risk or Opportunity? Chair: Assoc. Prof. Dr. Sanem Nemmezi Karaca Telemedicine and Remote Consultation: Safe Use in Primary Care Dr. Emre Sarı Diagnosing Behind the Screen: How Far Does the Family Physician's Responsibility Extend? Dr. Muhammed Mustafa Beyoğlu	Oral Presentation	Oral Presentation	Oral Presentation	Oral Presentation

17.30 – 18.30	Women's Health Management in Primary Care: Opportunities and Limitations Chair: Assist. Prof. Dr. Adem Yağan Diagnostic Blind Spots in Women's Health: A Primary Care Perspective Dr. Halil Volkan Tekayak Family Physician Responsibilities in Prenatal Care in Primary Care Dr. Çiğdem Akaydın	Early Awareness and Continuity in Autism Spectrum Disorder Chair: Assist. Prof. Dr. Suat Sincan Early Diagnosis of Autism Spectrum Disorder: When and How Should Family Physicians Suspect It? Assoc. Prof. Dr. Müslüm Kul Autism Spectrum Disorder: Myths, Facts, and Current Evidence Dr. Bengisu Özçivit Asfuroğlu Multidisciplinary Approach in Autism Spectrum Disorder: Treatment, Follow-Up, and Continuity of Care Dr. Pelin Dağ	Oral Presentation	Oral Presentation	Oral Presentation	Oral Presentation



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10 May 2026 Sunday

Time	Hall A	Hall B	Hall C
09.00 – 09.40	Chair: Assoc. Prof. Dr.Sanem Nemmezi Karaca Rational Drug Use in Primary Care: Balancing Patient Safety, Cost, and Effectiveness Merthan Tunay Senior Specialist Physician and Chief Resident	Oral Presentation	Oral Presentation
09.40 – 10.20	Chair: Prof. Dr. Yeltekin Demirel EV-Raxophobia: Electric Vehicle Range Anxiety as a Disorder of the New Mobility Era Prof. Dr. Ersin Akpınar	Oral Presentation	Oral Presentation
10.20– 10.50	Coffee Break		
10.50 – 11.30	Chair: Prof. Dr. Esra Saatçı Primary Care Perspectives on Implementing Cancer Screening: Challenges and Opportunities Prof. Dr. Engin Burak Selçuk		
11.30 – 12.30	Closing Session and Ceremony		

25th
Quarter Century

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Oral Presentation Scheduled Slots

08 May 2026 Friday

Time	Hall C (Face to Face)	Hall E ONLINE	Hall F ONLINE
09.00 – 10.30	Oral Presentations Chair: Assoc. Assoc. Prof. Dr. Burkay Yakar • Drug-Induced Anaphylaxis in Adults: Culprit Drugs, Multiple Drug Sensitivity and Reaction Severity - Susamber Dik, Güzin Özden • Prenatal Breastfeeding Self-Efficacy and Its Determinants Among Pregnant Women: A Cross-Sectional Study - İzzet Göker Küçük • Evaluation of the Relationship Between Birth Mode Preferences and Pregnancy Distress Among Pregnant Women: A Primary Care-Focused Cross-Sectional Study - Rana Baykan	Oral Presentations Chair: Assoc. Prof. Dr. Ahmet Yılmaz • Evaluation of Repeated Visits in The Healthcare System: A Cross-Sectional Analysis of Primary, Secondary, and Tertiary Healthcare Services in Mersin Province - Mustafa Ekici • Food Allergy Is Not a Barrier to MMR Vaccine: Safe Practice in Primary Care - Ozge Turkyilmaz Uçar	Oral Presentations Chair: Prof. Dr. Mehmet Kayhan • From Short Stature to Amenorrhea: The Importance of Primary Care Awareness and Missed Clinical Clues in Family Medicine in Patients with Late-Diagnosed Turner Syndrome - Zekiye Küpçü • Clinical and Laboratory Characteristics of Children with Congenital Solitary Kidney and Their Risk of Renal Complications - Buket Esen Ağar, Emine Sena Uzala



08 May 2026 Friday

Time	Hall C (Face to Face)	Hall E ONLINE	Hall F ONLINE
	Gürüz, Leyla Tekdemir, Semiha Zeynep Özsaydı - Immunization Status, Attitudes, and Unmet Needs in Adults with Chronic Diseases: Preliminary Findings - Sümeyra Gürgen, Süleyman Görpelioğlu - Knowledge Levels of Medical Faculty Clinical Term Students About Rabies Prophylaxis: An Observational Study - Aybüke Nisa Gerçek, Baki Derhem - The Effect of a Structured Educational Intervention on Influenza Vaccination Behavior and Health Beliefs Among Healthcare Workers: A Quasi-Experimental Study - Rana Baykan Gürüz, Semiha Zeynep Özsaydı, Leyla Tekdemir, Arda Borlu, Hasan Durmuş, Fevziye Çetinkaya - Attitudes Toward Schizophrenia Among Nurses and the General Public: A	- Clinical Expression of Olive Pollen Allergy: Seasonal Versus Perennial Symptom Patterns - Eray Yıldız - Prevalence and Distribution of Non-Allergic Rhinitis Phenotypes in Adults: A Retrospective Cohort Study - Eray Yıldız - Sensitivity Profile to Food Allergens in the Adult Population of Turkey: High Rates and Cross-Reactivity in Multicomponent Allergy Tests - Buket Basa Akdoğan - Can Digital Health Interventions Improve Maternal and Infant Health?: A Comprehensive Review - Güler Gizem Doğan, Hatice Tuba Akbayram, Hamit Sırrı Ketten - Evaluation of Obstetric and Neonatal Outcomes According to Maternal Age Groups: A Retrospective Study - Kübra Gündoğan, Hümeysra Yaka	- Evaluation of Family Physicians' Attitudes Towards Childhood Vaccinations Using the "Vaccine Attitude Scale" - Eren Güzelöğlu, Feyza Aydın Özgür, Emine Gözde Özdrampa Yıldız, Sevilay Kök, Belen Ateş, Mustafa Özdemir, Hüseyin Dağ, Vefik Arıca - Retrospective Investigation of Mothers and Infants Followed for Maternal Toxoplasmosis: A Single-Center Experience - Nisa Nur Tapaç, Özgül Tunç Akbaş - Effectiveness of Reservoir Mask versus Diffuser Mask Oxygen Therapy in Pediatric Bronchiolitis: A Propensity Score-Matched Comparative Study - Zeynep Tanyeli, Utku Özer, Şener Çınıçev, Sinem Sarı Gökay - Determination of The Risk of Developmental Delay in Children Aged 3 to 72 Months Registered at an Educational Family Health Center - Ezgi Solak, İbrahim Solak, Umut Durak

08 May 2026 Friday

Time	Hall C (Face to Face)	Hall E ONLINE	Hall F ONLINE
	Comparative Study - Selma Çilem Kızılpınar, Barış Kılıç-Demir - Evaluation of the relationship between pain and other symptoms with cortisol, C-reactive protein (CRP), and erythrocyte sedimentation rate (ESR) in patients with advanced-stage cancer experiencing pain, and assessment of changes in these parameters during the pain follow-up period - Sümeyye Doymuş, Ufuk Ünlü - Assessment of the Care Readiness of Relatives of Patients Receiving Home Care Services Using the Preparedness for Caregiving Scale - Meryem Betos Koçak, Mehmet Akif Nas - Evaluation of Graduate Theses on Cancer Screening in Turkey - Aslıhan Güven, Mehmet Akif Nas - Clinical Associations of Vitamin D Deficiency with Glycemic Control and Renal Function in		There Is Fever, There Is Concern: A Qualitative Study of Physicians' Clinical Decision-Making and Parental Anxiety in Managing Children with Fever - Mustafa Özgül, Benu Özeç, İlknur Fidancı, Medine Ayşin Taşar, İzzet Fidancı, Duygu Ayhan Başer



08 May 2026 Friday

Time	Hall C (Face to Face)	Hall E ONLINE	Hall F ONLINE
	Adults Attending Primary Care - Elif Alıcı Bıyık, Sanem Nemmezi Karaca, Yeltekin Demirel - Evaluation of the Shared Decision-Making in Individuals Diagnosed with Diabetes Mellitus: Turkish Adaptation and Validation of the CollaboRATE Scale - Merve Toçoğlu, Ayşe Gülsen Ceyhun Peker, Derya Gökmen, Rıfat Emral - Is There a Relationship between Cardiovascular Disease Risk Factors and Perceived Stress Levels among Primary Care Patients? - Yusuf Çetin Doğaner, Yusuf Kürşad Yağmur, Ebru Esra, Nilsu Atabay, Melih Karamuk, Ümit Aydoğan		
10.30 - 11.00	Coffee Break		
12.15 - 13.30	Lunch		

08 May 2026 Friday

Time	Hall C (Face to Face)	Hall E ONLINE	Hall F ONLINE
14.40 – 16.30	Oral Presentations Chair: Prof. Dr. Onur Öztürk - Clinical Value of Red Flags, Headache Burden, and Lifestyle Factors in Children Referred for Headache: A Retrospective Study From a Pediatric Neurology Outpatient Clinic - Burçin Gönüllü Polat, Aysun Albayrak - Impact of COVID-19-Related Mobility Restrictions on Osteoporotic Hip Fractures in the Elderly: A Retrospective Comparative Study - Ahmet Yılmaz - Pre-Discharge Transcutaneous Bilirubin and Risk Stratification to Prevent Severe Hyperbilirubinemia in Newborns - Ayşe Melike Adak, Musa Çelik, Ceren Oruç, Günay Mirzayeva, Damla Hazal Sucu, Ayşen Orman, Yalçın Çelik	Oral Presentations Chair: Assist. Prof. Dr. Elif Erdoğan Ceylan - Fever in Childhood: Parental Perceptions, Fever Phobia and Management Practices - Cihan Aydeniz, Asena Unal Tolunay - Psychiatric Evaluation Results and Associated Factors in Individuals Referred for Psychiatric Consultation for a Smoothbore Hunting Rifle License - Tunahan Sun - The Effect of Rational Drug Use Knowledge on Medical Treatment Adherence in Diabetic Patients: Preliminary Findings - Yusuf Bilal Çelenk, Mehmet Beler, Burkay Yakar - The Usability of Large Language Models in Patient Education: An Analysis of Diabetes	Oral Presentations Chair: Assist. Prof. Dr. Gülseren Oktay - Is Axillary Dissection Necessary in Malignant Papillary Neoplasms of the Breast? - Yusuf Arslan - Diagnostic Value of Ultrasonographic Features in Bethesda II Thyroid Nodules Undergoing Thyroidectomy - Mevlüt Yordanagil - Predictive Value of Preoperative Clinical Findings and Inflammatory Markers for Malignancy in Renal Masses - Ümit Uysal, Adem Altunkol, Ergün Alma - Evaluation of the Relationship Between Fear of Falling and Activities of Daily Living in Individuals- Hatice Nur Çapraz, Gülseren



08 May 2026 Friday

Time	Hall C (Face to Face)	Hall E ONLINE	Hall F ONLINE
	- Hematological Parameters and Procalcitonin in Early Detection of Late-Onset Neonatal Sepsis in Moderate Preterm Infants - Ayşen Orman, Ayşe Melike Adak, Yalçın Çelik - Postnatal Outcomes of Antenatal and Postnatal Hydronephrosis: A Two-Year Retrospective Cohort Study - Şenay Zırhlı Selçuk, Bülent Petik - Clinical and Epidemiological Characteristics of Respiratory Syncytial Virus Infections in Children: A Single-Center Retrospective Study - Gökçe Oğuz, Özlem Özgür Gündeşlioğlu, Ümmühan Çay, Derya Alabaz, Filiz Kibar - Psychiatric Comorbidities in Children and Adolescents with Autism Spectrum Disorder and Their Relationship with Maternal Psychological Symptoms - Bengisu Özçivit Asfuroğlu, Alihan Şahin, Saniye Tülin Fidan - Assessment of Knowledge About Electronic Cigarettes and the Prevalence of Electronic	- Mellitus Information Texts - Ahmet Öksüz, Nazan Karaoğlu, Nur Demirbaş, Hümeysra Yaka - Digital Epidemiology of Scabies: Seasonal, Periodic, and Regional Analysis of Search Behaviors in Turkey with Assessment of Disaster and Media Effects - Beytullah Nariçi, Hamit Sırrı Ketten, Hatice Tuba Akbayram - Evaluation of Fever Phobia Among Parents and Its Impact on Primary Care: A Cross-Sectional Study - Eren Güzeloğlu - Evaluation of Pediatric Patients with Mastoiditis in A Tertiary Care Hospital - Fatma Tugba Çetin, Ümmühan Çay, Özlem Özgür Gündeşlioğlu, Çağlar Eker, Derya Alabaz - The Future of Family Medicine in Türkiye, 2050: Demographic and Epidemiological Projections for Patient Load, Chronic Disease, and Geriatric Care - Aslıhan Çelik Çoban,	- Pamuk, Serap Öksüz, Esra Meltem Koç Aged 65 Years and Older Presenting to a Training and Research Hospital - Clinical Characteristics and Healthcare Burden of Surgically Treated Geriatric Maxillofacial Trauma Patients - Murat Çelik, Handan Derebaşınlioğlu - Determinants of Health-Promoting Lifestyle Behaviors in Older Adults: The Role of Sociodemographic and Health-Related Factors - Ayşen Mert, Emel Ceylan - The Impact of Graft Platelet Content on Transplantation Outcomes in Multiple Myeloma Patients Undergoing Autologous Peripheral Stem Cell Transplantation - Gülçin Miyase Sönmez, Melissa Bhupal, İnci Orhan, Güldane Cengiz Seval, Meltem Kurt Yüksel, Pervin Topçuoğlu, Önder Arslan, Muhit Özcan, Taner Demirel, Selami Koçak Toprak

08 May 2026 Friday

Time	Hall C (Face to Face)	Hall E ONLINE	Hall F ONLINE
	Cigarette Use Among Final-Year Medical Students - Selçuk Mıstık, Mehmet Yıldız - Effect Of Diaphragmatic Breathing Exercises On Lower Urinary Tract Symptoms In Adolescent Female Athletes: A Non-Randomized Controlled Study - Emine Doğan, Memnune Çiğdem Apaydın Kaya, Fatma Aybar - Knowledge, Attitudes, and Practices Regarding Breast Cancer Screenings Among Women Aged 20–69 Attending Zeynep Yahya Kiliçaslan Family Health Center - Selçuk Mıstık, Şeyma Atıcı Gün - The Evaluation of Patients' Thoughts and Attitudes Towards Polypharmacy in Family Medicine Polyclinic in the District Hospital - Selçuk Mıstık, Yasin Söylemez - Knowledge, Attitudes, and Behaviors Regarding Cervical Cancer Screenings Among Women Aged 30-65 Years Attending	Hatice Tuba Akbayram, Hamit Sırrı Keten, Tuba Saygılı - Synchronous Bilateral Breast Cancer: A Single-Center Case Series of Clinicopathological and Molecular Features - Mevlüt Yordanagil, Volkan Temi - Cholecystectomy in Octogenarians: Impact of Surgical Approach and Timing on Clinical Outcomes - Yusuf Arslan, İbrahim Ünlü - Evaluation of the Quality and Reliability of about test anxiety Videos for Exam Anxiety Management on YouTube - Şule Şirin Berk	- Association of Pan-Immune-Inflammation Value with Insulin Resistance (HOMA-IR) and Vitamin D in Subclinical Hypothyroidism - Vehbi Şirikçi - Comparison of ROCK1 and ROCK2 Gene Expression in Matched Tumor and Normal Breast Tissues in a Turkish Cohort Using Quantitative Real-Time PCR - Selçuk Arslan - Child Marriage in Turkey: An Examination of Changes Over the Last Decade - Hatice Tuba Akbayram, Güler Gizem Ölmez, Hamit Sırrı Keten - Factors Associated With Short-Term Smoking Cessation in a Smoking Cessation Outpatient Clinic - Murat Doğan - Vaccine Literacy and Attitudes Toward Immunization Among Adults in Primary Care - Birgül Deniz Doğan, Murat Doğan



08 May 2026 Friday

Time	Hall C (Face to Face)	Hall E ONLINE	Hall F ONLINE
	Fevzi Çakmak Family Health Center - Selçuk Mısıklı, Süreyya Güngör		
16.30 - 17.30	Oral Presentations Chair: Prof. Dr. Yusuf Çetin Doğaner • Parental awareness and knowledge about invasive meningococcal disease and meningococcal vaccines at a private hospital in Istanbul - Utkucan Uckun, Seda Gunhar Duman, Sueda Is, Ismail Yildiz • Evaluation of Psychiatric Consultations of Patients Hospitalized in Palliative Care Services - Sare Aydın, Burcu Eser, Elif Erdoğan Ceylan • Microbiological Spectrum and Clinical Outcomes of Diabetic Foot Infections in Hospitalized Patients - Özay Akyıldız • Evaluation of the Relationship Between Bone Mineral Density and Metabolic Syndrome and Quality of Life Index - Taha Halil Büyükcinal,		



08 May 2026 Friday

Time	Hall C (Face to Face)	Hall E ONLINE	Hall F ONLINE
	Yusuf Çetin Doğaner, Alev Çınar, Fatma Ülkünur Yağmur, Ümit Aydoğan, Nuri Arslan • Staphylococcus aureus in Skin and Soft Tissue Infections: A Four-Year Antimicrobial Resistance Analysis - Nevzat Ünal, Bedia Mutay Suntur • Correlation of Nocturnal Enuresis with Obstructive Sleep Apnea Syndrome in Adults: A Pilot Study - Ibrahim Solak, Osman Ergun, Alpay Sumer, Taha Tahir Bekci, Mehmet Ali Eryilmaz, Ayse Solak • Effects of Social and Cognitive Activities on Mental Status and Psychological Well-Being in Community-Dwelling Older Adults: An Intervention Study - Elif Deniz Şafak, Burak Yıldız, Saadet Beyza İşel		



09 May 2026 Saturday

Time	Hall D (Face to Face)	Hall E ONLINE	Hall F ONLINE
09.00 – 10.10	Oral Presentations Chair: Prof. Dr. Mustafa Kürşat Şahin - Is the Timed Up and Go Test More Than Just a Measure of Mobility? Its Associations with Functional, Cognitive and Psychological Status in Adults Aged 80 and Over - Zeynep Aslan Hişmioğulları, Feride Gülcüler, Umut Gök - A Comprehensive Scale for the Assessment of Elderly Patients in Primary Care: Easy-Care - Zeynep Aşık, Melahat Akdeniz - Assessment of Activities of Daily Living and Quality of Life Among Patients Receiving Home Healthcare Services - Mustafa Cihat Çeliköz, Ayşen Mert, Gamze Dur, Taner Akarsu - Evaluation of the Relationship Between Motivation to Change Health, Self-Efficacy, and Treatment Adherence in Hypertensive Patients Registered at Atatürk University	Oral Presentations Chair: Assist. Prof. Dr. Ufuk Ünlü - Breast Cancer Screening Behaviors and Associated Factors Among Female Healthcare Workers - Nurtaç Rojbin Keskin, Hatice Tuba Akbayram, Aslıhan Çelik Çoban - Evaluation of Bone Mineral Density Measurements in Individuals Admitted to the Healthy Aging Outpatient Clinic of Muğla Training and Research Hospital - Aynur Özdemir - The Relationship Between Psychosocial Health and Postpartum Depression in Pregnant Women - Ayça Demirözkan, Aynur Yıldırım, İbrahim Solak - Un-anticoagulated atrial fibrillation in primary care: are we missing opportunities	Oral Presentations Chair: Assist. Prof. Dr. İdeal Bera Yılmaz Kartal - Turkish Validity and Reliability Study of the Older Adults' Lifestyle Scale (OALS-TR) - Neslişah Gürel Köksal, Mustafa Köksal - Impact of Dietary Habits on Sleep Quality and Academic Performance in University Students - Fethi Sada Zekey, Kübra Uyar Zekey, İrem Küllü - Evaluation of Non-Adherence to Iron Prophylaxis Among Parents of Infants Aged 4-12 Months Presenting to Primary Care Family Health Centers in Van - Oguzhan Seleoglu, Adem Yagan - Epidermolysis Bullosa in the Context of Home Healthcare: A Single-Center Study - Tuğba Balık Kozak, Zeynep Aşık, Mehmet Özen

09 May 2026 Saturday

Time	Hall D (Face to Face)	Hall E ONLINE	Hall F ONLINE
	Education Family Health Centers - Betül Kübra Birişik, İdeal Beraa Yılmaz Kartal • Patterns of Referral and Clinical Decision-Making in Internal Medicine Outpatient Care: Evidence from Primary Care Referrals - Mehmet Erdevir, Ayşenur Ucar • Complexity of Care in Primary Care: A Cross-Sectional Study from a Family Medicine Clinic in Ankara - Mustafa Polat, Meşide Gündüzöz • Investigation of the Knowledge, Awareness, Concerns, and Attitudes of Adult Women Regarding the Problems Caused by Human Papilloma Virus (HPV) and the HPV Vaccine - Kadriye Karaduman, Hande Betül Ülker, Hasan Basri Kabakcı, Yücel Uysal, Ertan Mert • Assessment of Early Systemic Inflammation in Normoglycemic and Prediabetic Individuals According to Hemoglobin A1c Using Complete Blood Count-Based Indicators - Latife Uzun	for stroke prevention? - Burak Ozturk, Ian Wilkinson • Admission FIB-4 Independently Predicts Contrast-Induced Nephropathy in STEMI Patients Undergoing Primary PCI - Bektaş Murat, Selda Murat • Evaluation of the Implementation of the Quality Management System in Medical Laboratories for Service Quality in Kosovo - Gazmend Bojaj, Blerina Bojaj, Samir Ileshi, Valon Morina, Lirim Lani • Trends in Sex-Disaggregated Healthcare Utilization in Türkiye (2008–2022): A Repeated Cross-Sectional Study - Muhammed İnan, Cenk Aypak • Family Practice in the United Kingdom: System Structure, Comparison with Türkiye, and Experiences of Turkish Physicians - Burak Öztürk, Özge Öztürk	• A Systematic Review of Sleep Hygiene-Related Medical Residency Theses - Zeyneb İrem Yüksel Salduz • A Systematic Review of Nomophobia-Related Medical Residency Theses - Zeyneb İrem Yüksel Salduz • Positive Psychological Effects of Earthquakes: Post-Traumatic Growth - Tuba Saygılı, Hatice Tuba Akbayram

09 May 2026 Saturday

Time	Hall D (Face to Face)	Hall E ONLINE	Hall F ONLINE
	• The Association Between Sleep Disturbances, Quality of Life, and Diabetes Risk Among Adults Aged 18–65 in Primary Care Settings - Pakize İrem Kahramanoğlu, Burak Mete • Are Medical Students Ready for the Future? Evaluating Their Readiness and Acceptance of Artificial Intelligence in Clinical Practice - A Cross-Sectional Study - Beyza Akçal, Ersin Akpınar • Deep Hypokalemia and Paralytic Ileus Due to Diarrhea in an Elderly Patient with Dementia: Successful Conservative Management with a Palliative Approach - Şadi Dibe, Sibel Baktır Altuntaş, Hilal Özkaya • Pregnant Women's Experiences of Antenatal Care and Family Medicine Application in Şanlıurfa: A Qualitative Study - Afranur Mirat Damar, Dursun Barut		

09 May 2026 Saturday

Time	Hall D (Face to Face)	Hall E ONLINE	Hall F ONLINE
10.10 - 10.40	Coffee Break		
10.40 - 12.00	Oral Presentations Chair: Prof. Dr. Umut Gök - Evaluation of Cervical Smear Results and Associated Cytological Findings: A Single-Center Retrospective Study - Sezin Dik - Screening for Peripheral Arterial Disease Using the Edinburgh Claudication Questionnaire and Investigation of Associated Factors - Feruze Açıkalın Buluçer, Hasan Basri Kabakcı, Hande Betül Ülker, Yücel Uysal, Ertan Mert - Association Between Arsenic Exposure and Endocan and Fetuin-A Levels in Firefighters - Meşide Gündüzöz, Mustafa Polat - Evaluation of Treatment Adherence in Hypertensive Patients Using the Hill-Bone Compliance to High Blood Pressure Therapy	Oral Presentations Chair: Assist. Prof. Dr. Baki Derhem - Perceptions of Benefits and Barriers Regarding Colorectal Cancer Screening Among Individuals Registered at an Educational Family Health Center - Ali Kargı, İbrahim Solak - Evaluation of the Relationship Between Health Literacy and Environmental Tobacco Smoke Awareness Among Pregnant Women Registered at Atatürk University Training Family Health Center - Güzide Yılmaz Ulukaya, İdeal Beraa Yılmaz Kartal - Family Physicians' Approach to Infant and Child Vision Screening - Yusuf Bilal Çelenk, Murat Erdağ	Oral Presentations Chair: Assist. Prof. Dr. Mehmet Akif Nas - Evaluation of Changes in Motivation and Future Expectations Among Medical Students - Kubra Aslan, Gamze Dur, Aysen Mert, Zeynep Yalcinkaya - Impact of Regulatory Changes on Burnout Among Family Medicine Residents: A Cross-Sectional Study - Ahmet Günaydın, Serpil Demirağ - Association Between Body Weight and Levodopa-Induced Dyskinesia in Parkinson's Disease - Cemile Buket Tuğan Yıldız



09 May 2026 Saturday

Time	Hall D (Face to Face)	Hall E ONLINE	Hall F ONLINE
	Scale in a Family Medicine Setting: A Descriptive Cross-Sectional Analysis - Kübra Cengizler, Halil Volkan Tekayak, Ersin Akpınar - Assessment of Knowledge Levels Regarding Warfarin Among Home Health Care Patients with Long-term Warfarin Use - Merve Akan Durgay, Zeynep Aşık - Are Chest Pain Referrals from Primary Care Efficient? Diagnostic Yield and Cost Analysis in a Real-World Cohort - Emrah Yeşil - Blood Pressure Variations in 24-Hour Ambulatory Blood Pressure Monitoring Among Pregnant Women in Primary Care - Selçuk Mıstık, Zehra Okur Köse - The Effect of Storage Temperature and Waiting Time on Hematological and Biochemical Parameters in Blood Samples: A Standardization Approach for Family Health Centers - Adem Yağan, Zozan Akpolat, Hilal Şahin, Duygu Korkmaz Yalçın,	- The Clinical Significance of Preoperative Paranasal Sinus CT in Rhinoplasty Planning: A Comprehensive Analysis of 62 Cases - Sevinc Hepkarsi - Publication Trends in Specific Learning Disorder Research in Türkiye: A 10-Year PubMed Analysis - Aslıhan Çelik Çoban, Hatice Tuba Akbayram - Validity and Reliability of the Turkish Version of the Luxembourg Workplace Mobbing Scale (LWMS) Among Resident Physicians - İbrahim Eryılmaz, Özden Gökdemir, Olgu Aygün - Sociodemographic Characteristics and Psychiatric Evaluation Results of Driver's License Applications Referred from Family Medicine to Psychiatry - Tunahan Sun	- Association Between Pain Severity and Depression in Patients with Cervical Dystonia - Cemile Buket Tuğan Yıldız - Evaluation of Allied Health Professionals' Knowledge and Attitudes Regarding Epilepsy - Yasemin Alagöz, Seher Karahan - Association Between Restless Legs Syndrome and Calcaneal Spurs: A Cross-Sectional Radiological and Clinical Study - Sinan Eliacık - The Relationship Between Smoking, Prognostic Nutritional Index (PNI), and Overall Survival in Geriatric Small Cell Lung Cancer Patients: A Retrospective Study of 40 Cases - Yasemin Aydinalp Camadan, Halil İbrahim Ellez, Ertugrul Bayram, Tolga Köseci, Berksoy Şahin, İsmail Oğuz Kara - Clinical Outcomes of Radioactive Iodine Therapy in Differentiated Thyroid Cancer with Lung Metastases: A Comparative



09 May 2026 Saturday

Time	Hall D (Face to Face)	Hall E ONLINE	Hall F ONLINE
	Musa Yağan, Mehmet Emin Doğan, Zelal Yayla Kalay • The Relationship Between Chronotypic Characteristics, Academic Achievement, and Absenteeism Attitudes in Preclinical Medical Students - Emre Yılmaz, Yasemin Akşehirli Seyfali, Zeynep Baykan • Validity and Reliability Study of the Turkish Version of the Shame Frequency Questionnaire in Medical Students - Elif Aktı Çakır, Gülsüm Öztürk Emirali, Hüsna Sarıca Çevik, Mehmet Urgan • Artificial Intelligence vs. Clinician Expertise in TMD Diagnosis and Management: A Comparative Analysis - Aslı Çiftçi, Neslihan Güntekin, Sema Ateşalp İleri		Analysis of Pediatric and Adult Patients - Halim Özçevik
12.00 - 13.30	Lunch		



09 May 2026 Saturday

Time	Hall D (Face to Face)	Hall E ONLINE	Hall F ONLINE
13.30 - 15.30	Oral Presentations Chair: Assoc. Prof .Dr. İzzet Fidancı - Evaluation of Safety Measures Against Home Accidents and First Aid Self-Efficacy Among Mothers of Children Aged 0–6 Years - Sanem Nemmezi Karaca, Yaşam Deniz, İmran Şahin Düz - What Do People Really Know and Believe About HPV and Its Vaccine? Insights from a Cross-Sectional Study - Seher Zubari, Rabia Eroglu Kilac, Tuncay Dogru, Ersin Akpınar - Mind the Deficiency: Perceived Sensitivity and Health Beliefs Regarding Vitamin D Among Primary Care Patients - A Cross-Sectional Study - Nilay Talay, Rabia Eroglu Kilac, Halil Volkan Tekayak, Ersin Akpınar - Assessment of Knowledge, Attitudes, Behaviors, and Breast Cancer Risks Regarding Breast Cancer Screening in	Oral Presentations Chair: Assoc. Prof. Dr. Elif Deniz Şafak - MRI Evaluation of the Olfactory Bulb Volume in Alzheimer's Patients - Feride Fatma Görgülü, Orhan Görgülü - Can Ultrasound Elastography Provide an Objective Measure to Support Tonsillectomy Indications - Feride Fatma Görgülü, Orhan Görgülü - Use of Musculoskeletal Ultrasonography by Physical Medicine and Rehabilitation Physicians - Asiye Gülsüm Kaki - Hospital Admission and Inpatient Status of Chronic Obstructive Pulmonary Disease Patients Based on Home Oxygen Use: A Single-Center Experience with 282 Cases - Imren Mutlu Hayat - Evaluation of Polysomnographic Findings in Individuals Referred to a Sleep Laboratory Due to Driver's License	Oral Presentations Chair: Assist .Prof. Dr. Adem Yağan - The Effect of Tobacco Control Policies on Smoking Cessation Interest and Shift to Alternative Products: A Google Trends-Based Infodemiological Analysis in Turkey (2008–2025) - Beytullah Nariçi, Hamit Sırrı Keten, Hatice Tuba Akbayram - Tobacco Use Among Hospital Staff: A Cross-Sectional Study - Hüseyin Nejat Küçükdağ, Fatma Gökşin Cihan - Comparison of Smoking Behaviors and Smoking Cessation Motivations by Sex Among Patients Attending a Smoking Cessation Outpatient Clinic - Emine Tugce Sahin, İmran Sahin Duz - Does Smoking Cessation Reduce Anxiety? A Prospective Study - İsmail Güneş, Serpil Demirağ



09 May 2026 Saturday

Time	Hall D (Face to Face)	Hall E ONLINE	Hall F ONLINE
	Women Aged 20-69 - Bahar Ürün Ünal, Emine Nur Onaran Ulurmak, Hüseyin Ulurmak • Indications and Outcomes of Thyroid Function Testing Among Children: A Primary Care Study - Nuriye Dinç, Sanem Nemmezi Karaca • YouTube as a Source of Information on Creatine Monohydrate Supplementation: Analysis of the Quality, Reliability, and Scientific Accuracy of Turkish-Language Videos - Gulnihal Gunhan, Fatma Zehra Arslan, Nagihan Yıldız Çeltek, Selma Kaya, Gülsüm Almak, Süheyla Kanlıdağ, Buket Şahin • Sources of Information on the Rotavirus Vaccine: An Analysis of YouTube Videos - Selma Kaya, Süheyla Kanlıdağ, Nagihan Yıldız Çeltek, Gülsüm Almak, Buket Şahin, Gülnehal Günhan • Effectiveness of Family Physician-Led Follow-Up in Obesity Management: One-Year	Application and Their Possible Association with Previous Traffic and Occupational Accidents - Ayşe Solak, Hasibe Yemenici • How Ready Are We for Artificial Intelligence?- Vakıf Özgür Toz, Serpil Demirağ • Hearing Screening in School-Age Children: A Single-Center Evaluation - Merve Koşucu, Aksanur Gökçe • Early Pulmonary Function Impairment in Relation to Nicotine Dependence Among Young Smokers - Imren Mutlu Hayat • Smoking Behavior: Addiction or Emotional Coping? A Cross-Sectional Study - Hümeysra Yaka, Hatice Küçükceran, Nazan Karaoğlu, Nur Demirbaş, Meltem Saruhan	• Evaluation of the Relationship between Health Literacy Level and Health Anxiety in Individuals with Chronic Diseases Registered at Atatürk University Education Family Health Centers - Muhammet Doğan, İdeal Beraa Yılmaz Kartal • Use of Artificial Intelligence in Family Medicine Specialty Theses and the Change in Related Themes: A Descriptive Analysis of National Thesis Center Data - Ahmet Öksüz, Nazan Karaoğlu, Nur Demirbaş, Hatice Küçükceran, Hümeysra Yaka • Evaluation of the Relationship Between Serum Magnesium, Body Mass Index, and Serum Lipid Profile in Patients Aged 18 and Above Admitted to a Training Family Health Center - Selman Duran, İbrahim Solak

09 May 2026 Saturday

Time	Hall D (Face to Face)	Hall E ONLINE	Hall F ONLINE
	Outcomes from a Tertiary Obesity Center - Buket Şahin, Elif Erdoğan Ceylan, Nagihan Yıldız Çelteç, Gülsüm Almak, Selma Kaya, Süheyla Kanlıdağ, Gülnihal Günhan • The Relationship Between Late-Night Sleeping Habits and Daily Water Intake and Anthropometric Measurements in Patients Presenting to the Obesity Clinic - Gülsüm Almak, Elif Erdoğan Ceylan, Nagihan Yıldız Çelteç, Osman Demir, Selma Kaya, Süheyla Kanlıdağ, Buket Şahin, Gülnihal Günhan • The Relationship Between Perceived Professional Value and Exposure to Violence Among Residents - İraz Ay, Hatice Küçükceran, Nazan Karaoğlu • Comparison Of Plate Fixation And Elastic Nail Applications In Pediatric Forearm Shaft Fractures - Hakan Uslu, Oğuzhan Çiçek		



09 May 2026 Saturday

Time	Hall D (Face to Face)	Hall E ONLINE	Hall F ONLINE
	• Comparison of Taping and Local Wound Care in Heifetz Stage 2 Ingrown Toenails - Oğuzhan Çiçek, Hakan Uslu		
15.30- 16.00	Coffee Break		
16.00 - 17.30	Oral Presentations Chair: Assoc. Prof. Dr. Bahar Ürün Ünal • Comparison of Night Wrist Splinting and Local Corticosteroid Injection in Mild-to-Moderate Carpal Tunnel Syndrome: A Clinical Outcome Study - Ahmet Yılmaz • Effectiveness of Embolization Therapy in Patients with Venous Malformations and Hemangiomas and Raising Awareness on Primary Care Utilization - Serkan Sevgi, Zehra Nur Sevgi, Ahmet Turan Kaya, Zeynep Gül Ekli, Engin Burak Selçuk		



09 May 2026 Saturday

Time	Hall D (Face to Face)	Hall E ONLINE	Hall F ONLINE
	• Beyond Treatment: Mapping the Follow-Up Burden of Pediatric Epilepsy in Primary Care - Aysun Albayrak, Burçin Gönüllü Polat • The Effect of Cancer Information Overload on Attitudes Toward Cancer Screening - Tuğçe Kıratlı Sökmen, Fadime Deniz, Sanem Nemmezi Karaca • Analysis of Family Health Centers in Erzurum via Google Maps - İdeal Beraa Yılmaz Kartal, Ertuğrul Çoruh, Mehmet Akif Nas • Evaluation of the Effect of Participation Level in a Hybrid Smoking Cessation Clinic on Quit Rates: Real-World Data - Sanem Nemnezi Karaca, İmran Şahin Düz, Yaşam Deniz, Emine Tuğçe Şahin • Awareness and Beliefs Regarding Third-Hand Smoke Among Medical Students: A Cross-Sectional Study - Süreyya Güngör Köylü, Hamit Sırrı Keten, Beytullah Nariçi		



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09 May 2026 Saturday

Time	Hall D (Face to Face)	Hall E ONLINE	Hall F ONLINE
	- Tobacco Use, Dependence Levels, and Associated Factors Among Medical Students at Dicle University Faculty of Medicine - Eyyüp Çelik, Ahmet Yılmaz - Evaluation of the Relationship Between the Factors Affecting Cigarette Use, Smoking Cessation Behaviors and Perceived Stress Level of Research - Selçuk Mıstık, Seda Nur Ongun Anıl		

Poster Presentations

Title	Author(s)
Post-PTC Hepatic Arterial Hemorrhage Managed with NBCA Embolization	Zeynep Gül Ekli, Serkan Sevgi, Zehra Nur Sevgi
Bilateral Temporal Arachnoid Cysts as an Unusual Radiologic Feature in Glutaric Aciduria Type I	Zeynep Gül Ekli, Serkan Sevgi, Zehra Nur Sevgi
Early Integration of Palliative Care in Chronic Diseases: Advancing Patient-Centered Outcomes and Healthcare Efficiency	Furkan Can Keskin, Melike Karabulut Özer, Özgür Enginyurt
A Rare Cause of Chronic Wrist Pain: A Case Report of Kienböck Disease	Emrehan Türkmen, Rabia Çeliköz, Mustafa Cihat Çeliköz
A Rare Cause of Abdominal Pain and Mass in Adolescence: Isolated Hematocolpos	Aleyna Çoban, Rabia, Mustafa Cihat Çeliköz
A Rare Cause of Resistant Headache and Hypertension in a Young Adult: Cushing's Syndrome	Betül Karaağaç, Mustafa Cihat Çeliköz
Leriche Syndrome: A Rare Cause of Claudication	Rabia Çeliköz, Mustafa Cihat Çeliköz
Pregnancy-related Uncontrolled Chronic Hypertension: The Critical Role of Patient Adherence and Preconception Care	Eyyüp Alan, Saliha Barutçu
An Occupational Hepatitis B Virus Exposure of a Healthcare-Worker with Incomplete Immunization History: After 14 Years in Clinical Practice	Sanem Nemmezi Karaca, Sena Dilek Şen, Yeltekin Demirel
Acute Dyspnea in Family Medicine: The Importance of Clinical Decision-Making and Thorough Differential Diagnosis in Identifying Hypertensive Pulmonary Edema	Feyza Kabak, Saliha Barutçu
Recurrent Urticaria Triggered by Smoking Cessation and Resolving with Smoking Resumption: A Rare Clinical Paradox	Birgül Deniz Doğan
Isolated Headache Leading to a Rare Diagnosis: A Case of Graves' Disease Highlighting Low-Prevalence Medicine	Yasemin Özkan Aksungur, Zeliha Haytoğlu, Eda Mengen Uçaktürk, Ersin Akpınar

The Role of Primary Care Services in the Diagnosis and Follow-up of Metabolic Syndrome During Adolescence: An Evaluation in the Context of the Rising Burden of Obesity	Burcu Kılıç
Central Obesity, Atherogenic Dyslipidemia, and Marked Insulin Resistance Detected in Primary Care: A Case Report	Murat Kılıç, Burcu Kılıç, Hamit Sırrı Ketten
Ethical Challenges of Artificial Intelligence in Medicine: Implications for Clinical Practice and Scientific Writing	Ersin Akpınar
Chronic Wound Management in Primary Care: Evidence-Based Approaches and Common Clinical Errors	Furkan Can Keskin, Melike Karabulut Özer
Heterogeneous Evolution Of Multisite Pressure Injuries In A Bedridden Palliative Care Patient: A Case Report	Gulnihal Gunhan, Gülsüm Almak, Selma Kaya, Buket Şahin, Süheyla Kanlıdağ, Nagihan Yıldız Çeltak
A Rare Cause of Hyperinsulinemia: Beckwith-Wiedemann Syndrome	Günay Mirzayeva, Ayşe Melike Adak, Ayşen Orman, Yalçın Çelik
Fournier Gangrene Developing in a Paraplegic Patient Followed in a Palliative Care Unit: A Case Report	Latife Merve Yıldız, Mert Kılıç
Biological False-Positive VDRL in Pediatric Epstein-Barr Virus Infection: A Diagnostic Pitfall	Nisa Nur Tapaç, Cihan Aydeniz, Merve Koca, Doğan Hotlar
Importance Of Mentzer Index In The Differential Diagnosis Of Persistent Microcytosis: A Case Of Beta-Thalassemia Trait	Hümeýranur Kızılköy, Göksel Vatansever
Turkish Validity and Reliability Study of WaLIDD Score	İzzet Fidancı, Büşra Yılmaz Demiralay, Hilal Aksoy, Duygu Ayhan Başer
Gastric Adenocarcinoma Diagnosed Based on Alarm Symptoms in Primary Care: A Case Report	Burcu Kılıç, Murat Kılıç, Mehmet Akif Büyükbeşe
Reframing Longevity: The Central Role of Primary Care in Healthy Ageing Trajectories	Ersin Akpınar
Functional Foods as Nutritional Strategies for Brain Health and Cognitive Function: An Updated Review	Rumeysa Çilenti, Ahmet Yılmaz
Acute Kidney Function Deterioration and Hyperkalemia Associated with Ramadan Intermittent Fasting in Patient with Metabolic Risk Factors: A Case Report from Primary Care	Mehmet Akif Büyükbeşe, Murat Kılıç, Burcu Kılıç

The Importance of Family Physicians in the Early Recognition of Metabolic Syndrome Components and Possible Non-Alcoholic Fatty Liver Disease in Adolescence: A Case Report	Burcu Kılıç, Murat Kılıç, Hamit Sırrı Ketten
Periorbital Eczema Herpeticum: A Case Developing on the Basis of Atopic Dermatitis	Göksu Başargan, Doğa Can Eroğulları İltemiş, Ümmühan Çay, Özlem Özgür Gündeşlioğlu, Fatma Tuğba Çetin, Asena Ünal Tolunay, Gökçe Oğuz, Derya Alabaz
A Hidden Cause of Hip Pain: Osteoid Osteoma Presenting with Synovial Inflammation	Göksu Başargan, Ümmühan Çay, Özlem Özgür Gündeşlioğlu, Fatma Tuğba Çetin, Asena Ünal Tolunay, Gökçe Oğuz, Derya Alabaz
Anti-Aging Nutrition and Functional Foods	Tuğçe Nur Özbek, Ahmet Yılmaz
Celiac Disease in a Turner Syndrome Patient with Inadequate Growth Response to Growth Hormone Therapy: A Case Report	Ahmet Rauf Göktepe, Yasin Şahin
Persistent Vomiting in Infancy: A Diagnostic Challenge Revealing an Underlying Cranial Fracture	Ahmet Rauf Göktepe, Yasin Şahin
Duchenne Muscular Dystrophy Diagnosed Through Elevated Transaminases in a 2-Year-Old Male: A Case Report	Ahmet Üzger, Yasin Şahin
Cefdinir-Induced Pseudobleeding in a 1-Year-Old Male: A Case Report	Ahmet Üzger, Yasin Şahin
Gut Microbiota, Probiotics, Prebiotics, and Synbiotics: Mechanisms, Clinical Implications, and Future Perspectives	Merve Ceylan Üren, Ahmet Yılmaz
Atypical Postprandial Abdominal Pain Revealing Gallstone Disease: A Case of “Turkish Delight-Like” Morphology	Serkan Sevgi, Zehra Nur Sevgi
Interventions for Osteonecrosis in Patients with Sickle Cell Disease: A Five-Case Series Involving Femoral and Humeral Heads	Iftime Maria, Goksel Leblebisatan
From Screening to Diagnosis: Breast Cancer in Primary Care	Elif Aktı Çakır
Incidental Glucosuria in Primary Care: A Case-Based Evaluation of a Patient Without Known Diabetes	Murat Kılıç, Hamit Sırrı Ketten, Mehmet Akif Büyükbeşe
Cardiovascular Effects of Functional Nutrition	Ramazan Dağ, Ahmet Yılmaz



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A Health Care System with Qualified Family Physicians to Unravel the Enigmatic Uncertainty*

A Rare Diagnosis in A Child: Linear Dermatosis
Lichen Striatus

Fatma Tugba Çetin, Ümmühan Çay, Özlem
Özgür Gündeşlioğlu, Bilge Fettahlioğlu
Karaman, Gökçe Oğuz, Göksu Başargan,
Derya Alabaz

Atypical Localization of Cystic Echinococcosis: A
Case with Renal and Psoas Muscle Involvement

Ahmet Yüce, Ahmet Anıl Acet



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KEYNOTE PRESENTATIONS

The Conundrum of Disasters and Technological Change: A Health Care System with Qualified Family Physicians to Unravel the Enigmatic Uncertainty

Faisal Abdullatif Alnaser

Prof. Dr. MBBS, FPC, MICGP, FRCGP, FFPH, FAM(USA), PhD President, WONCA EMR
President, Bahrain Family Physicians Association
Faculty, Imperial College London, Chairman; Home Health Care Centre, Bahrain

Modern healthcare is increasingly challenged by two converging forces: the growing frequency of global disasters and the rapid pace of technological change. Pandemics, climate crises, conflicts, and economic instability place major pressure on health systems, while advances such as artificial intelligence, telemedicine, and digital health create both opportunities and new risks, including inequity, ethical concerns, and workforce stress. Together, these forces create an enigmatic uncertainty that traditional hospital-centered systems cannot adequately address.

This presentation argues that resilient, equitable, and sustainable healthcare systems must be built on strong Primary Health Care (PHC) supported by qualified family physicians. Evidence shows that PHC-based systems achieve better health outcomes, lower costs, greater equity, and stronger crisis response. Family physicians are uniquely positioned to provide comprehensive, continuous, and community-centered care, especially during disasters and periods of disruption. Rather than competing with primary care, technology should be integrated within it. Family physicians can use digital tools and artificial intelligence to improve access and decision-making while preserving continuity, trust, and patient-centered care.

In conclusion, investment in family medicine and PHC is essential for building future-ready health systems capable of responding effectively to modern global challenges.

Keynote Presentation



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Resilient health systems require more than technological advancement; they require robust primary care led by qualified family physicians. Strengthening Family Medicine is fundamental to addressing the conundrum of disasters and technological change.

Building Resilient Health Systems: The Central Role of Family Physicians

Mehmet Ungan

Prof. Dr., Family Medicine – Ankara University School of Medicine Past President, WONCA Europe, EGPRN

We are gathered at a remarkable moment in history—an era marked by extraordinary scientific advancement, yet also profound global uncertainty. Humanity can now sequence genomes within hours, communicate instantaneously across continents, and deploy artificial intelligence at unprecedented scale. And yet, despite these achievements, millions of people still lack access to essential health services.

We are living through a paradox: the more technologically advanced our world becomes, the more fragile many health systems appear. This is the conundrum of our time.

My central message today is straightforward: In an age defined by disasters and technological disruption, resilient health systems will depend not only on hospitals, machines, or algorithms, but fundamentally on qualified family physicians embedded within strong primary care systems.

A World of Overlapping Crises

We once believed that crises would occur sequentially. Today, they overlap and interact.

Pandemics intersect with forced migration. Climate change exacerbates chronic disease burdens. Armed conflicts disrupt immunization programs. Economic instability fuels mental health disorders. Meanwhile, technological innovation accelerates faster than regulatory and ethical frameworks can adapt.

Keynote Presentation

For the first time in modern history, health systems are no longer responding to isolated emergencies—they are operating under conditions of permanent uncertainty.

Systems designed for stability often fail when instability becomes the norm.

The Fragile Health Workforce

Nowhere is this vulnerability more evident than in the global health workforce.

The World Health Organization projects a global shortage of more than **11 million health and care workers by 2030**, with the greatest burden falling on low- and middle-income regions, particularly Africa and the Eastern Mediterranean.

At the same time, several concerning trends are emerging:

- One in six health professionals works outside the country in which they were trained, with more than 67% of migrant health workers being women.
- Burnout has intensified following the COVID-19 pandemic and has been further exacerbated by natural disasters, armed conflicts, and humanitarian crises.
- Many countries continue to rely on short-term recruitment strategies rather than sustainable workforce planning.
- In several health systems, the number of physicians approaching retirement exceeds those entering practice.

This is not merely a human resources issue. It is a **system survival issue**.

No health system can remain resilient if its workforce is exhausted, unstable, and unsustainably distributed.

Global Mobility and Ethical Responsibility

Health worker migration is a reality of our interconnected world and, fundamentally, a human right. Clinicians move in search of safety, opportunity, and professional dignity.

However, when high-income countries systematically address their workforce shortages by recruiting from lower-resource settings, global inequities are reinforced rather than reduced.

No country should indefinitely outsource its workforce planning. Equally, no health system should lose its primary care foundation because another has failed to train sufficient professionals.

This reality demands urgent ethical global dialogue, fair international agreements, and sustained domestic investment in workforce development.

Changing Expectations in the Medical Workforce

The structure and expectations of the medical workforce are also changing:

- The proportion of physicians aged over 55 is increasing rapidly, in some regions exceeding those under 35.
- Younger generations increasingly prioritize work-life balance and sustainable working conditions.
- Workforce data from medical schools remain insufficiently transparent in many countries, with attrition rates often underreported.
- High-income countries continue to recruit internationally when domestic supply is insufficient, raising ethical concerns about dependency on external systems.
- Attractive recruitment packages offered to migrant physicians—covering relocation, housing, and family support—may further accelerate workforce depletion in lower-income countries.

- Frequent turnover of political leadership in health ministries undermines continuity in long-term workforce planning and reform.

These dynamics collectively contribute to systemic instability in health service delivery.

What Disasters Reveal

Every disaster exposes what health systems often prefer not to see.

Yet in every crisis, patients with chronic diseases, mental health conditions, pregnancy-related needs, and preventive care requirements do not disappear. Their needs persist.

The critical question becomes:

Who knows these patients?

Who can reach them?

Who can maintain continuity of care?

Who can provide reassurance in moments of uncertainty?

The answer is rarely found in distant institutions.

It is found in the **family physician**.

Why Family Physicians Matter in Crisis

During times of crisis, family physicians provide a form of care that is both highly sophisticated and often invisible: **continuity under conditions of chaos**.

They know which elderly patients are most likely to deteriorate first.

They recognize children who have missed critical vaccinations.

They understand families under financial and psychological stress.

They identify migrants who may avoid seeking care due to fear or uncertainty.

They decide who requires a telephone call, who needs a home visit, and who must be urgently referred.

Hospitals save lives at the peak of crisis.

Family physicians preserve the integrity of health systems before, during, and after crises.

Hospitals Save Lives. Primary Care Saves Systems.

This distinction is often misunderstood.

Hospitals are essential for acute, high-intensity interventions. They are indispensable in trauma, surgery, and critical care.

However, without strong primary care systems, hospitals become overwhelmed by conditions that could have been prevented, managed earlier, or monitored longitudinally.

For example, in systems with weak primary care:

- Diabetic patients present late with avoidable complications.
- Hypertensive crises overwhelm emergency departments.
- Asthma exacerbations lead to repeated hospital admissions.
- Mental health conditions escalate without early intervention.
- Cancer diagnoses occur at advanced stages due to delayed detection.

In contrast, robust primary care systems—anchored by qualified family physicians—reduce hospital dependency, improve population health outcomes, and strengthen system resilience.

Primary care is not a peripheral service. It is the structural foundation of effective health systems.

Artificial Intelligence: Replace or Empower?

We now turn to technology.

Artificial intelligence is often described as a transformative force in medicine. Some even suggest it may replace physicians.

I respectfully disagree.

AI can process vast datasets.

It can identify patterns.

It can summarize clinical records.

It can support diagnostic triage.

It can reduce administrative burden.

However, it cannot replace:

- trust
- moral judgment
- relational continuity
- cultural understanding
- human presence in moments of vulnerability

Technology scales information.

Family physicians scale wisdom.

What AI Should Do

The future of medicine should not be framed as “doctor versus machine,” but rather as “doctor with machine.”

When appropriately integrated, AI can support family physicians through:

- automated clinical documentation
- early warning systems for clinical deterioration
- enhanced chronic disease monitoring
- population health analytics
- real-time translation services
- medication safety alerts

If designed responsibly, technology can restore what modern health systems have progressively eroded: **time**.

Time to listen.

Time for prevention.

Time for empathy.

Time for community engagement.

This is the future we should collectively defend.

What Humans Must Do

Despite technological progress, the core responsibilities of healthcare remain fundamentally human.

We must continue to:

- build trust within communities
- maintain continuity of care across the life course
- ensure equity in access to services
- protect vulnerable populations during crises
- uphold ethical standards in medical practice
- invest in the training and retention of family physicians

No algorithm can substitute for sustained human relationships in healthcare. No system can achieve resilience without professionals who understand people not only as patients, but as individuals embedded in families, cultures, and communities.

Conclusion

In conclusion, we are entering an era defined simultaneously by technological acceleration and increasing global instability.

In such a world, resilient health systems will not be built solely on infrastructure or innovation. They will be built on people—specifically, on well-trained, well-supported, and well-distributed family physicians.

If we are to navigate the conundrum of disasters and technological change, we must reaffirm a simple truth: Strong primary care systems, led by qualified family physicians, are not optional. They are essential for the survival of modern health systems.

Family Physicians as a Bridge between People, Science and Technology in Times of Uncertainty

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Background: Family physicians play a central role in maintaining healthcare delivery during times of crisis. Their position at the interface between communities, healthcare systems, and emerging technologies makes them essential for system resilience.

Aim: To explore the role of family physicians as a bridge between people, science, and technology in conditions of uncertainty, drawing on experiences from war and the COVID-19 pandemic.

Methods: This presentation is based on a narrative reflection combining firsthand clinical experience during the war in Bosnia and Herzegovina with observations from primary care practice during the COVID-19 pandemic, supported by relevant literature on health system resilience and primary care.

Results: Despite fundamentally different contexts, both crises revealed common principles underlying effective primary care: adaptability, accessibility, continuity, and trust. In wartime conditions, family physicians provided care with minimal resources, relying on clinical judgement and strong community relationships. During the COVID-19 pandemic, they rapidly adapted to new organisational models, including parallel systems for COVID and non-COVID care, and integrated digital tools into practice. In both settings, trust emerged as the key determinant of patient engagement and system stability.



Conclusion: Future global challenges, including climate-related crises, migration, pandemics, and conflicts, will increase uncertainty in healthcare systems. Strengthening primary care and investing in the education and professional formation of future family physicians are essential for building resilient systems. Family physicians do not only deliver care. They translate complexity into practice and remain a trusted presence in times of crisis.

Keywords: Primary Care, Family Medicine, Resilience, Crisis, Uncertainty, COVID-19

EV-Raxophobia: Electric Vehicle Range Anxiety as a Disorder of the New Mobility Era

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Introduction

The rapid transition toward electric mobility is reshaping not only transportation systems but also human–technology interaction patterns. As electric vehicles (EVs) become increasingly integrated into daily life, a new form of anticipatory concern has emerged: **range anxiety**. In the era of electrified mobility, anxiety may increasingly reflect not internal threat perception, but dependence on external technological infrastructure.

While traditionally described as a rational barrier to EV adoption, accumulating behavioral observations suggest that in a subset of users this concern may evolve into a persistent cognitive and behavioral pattern. We propose the construct of **EV-Raxophobia (Electric Vehicle Range Anxiety)** as a potential **mobility-related anxiety phenotype of the new era of electrified transport systems**.

From situational concern to behavioural construct

Range anxiety has been widely framed as a contextual response to infrastructural uncertainty, including limited charging availability, variable energy consumption, and environmental influences on battery performance. However, emerging behavioural

patterns suggest a subgroup of EV users demonstrate features that extend beyond adaptive vigilance.

These include:

- Persistent fear of battery depletion despite sufficient charge levels
- Repetitive monitoring of range and energy indicators
- Reassurance-driven and often unnecessary charging behaviour
- Avoidance of longer routes or over-planning based on charging infrastructure

Such patterns indicate a transition from **situational concern** to a **structured and potentially maladaptive anxiety construct**.

Conceptualising EV-Raxophobia

We define **EV-Raxophobia** as:

A multidimensional mobility-related anxiety construct characterised by persistent anticipatory fear of electric vehicle battery depletion, compulsive monitoring of range status, and maladaptive behavioural adaptations despite objectively sufficient energy availability.

EV-Raxophobia is conceptualised as comprising four interrelated domains:

1. **Anticipatory range anxiety** (fear of imminent depletion)
2. **Compulsive monitoring behaviour** (repetitive checking of range and battery status)
3. **Behavioural adaptation** (route restriction, premature or excessive charging)
4. **Contextual sensitivity** (amplification of anxiety under environmental stressors such as temperature extremes, traffic, or terrain)

This framework aligns conceptually with established models of anticipatory anxiety, while introducing a distinct dimension of **infrastructure-dependent psychological stress**.

EV-Raxophobia-7: A brief screening framework

To support early recognition in both research and primary care settings, a brief screening instrument (EV-Raxophobia-7) is proposed. It assesses:

- Persistent worry about battery depletion
- Anxiety despite adequate charge levels
- Repetitive monitoring of battery percentage or range estimates
- Excessive attention to charging infrastructure during travel
- Avoidance of longer journeys due to charging concerns
- Environmental sensitivity affecting perceived range reliability
- Over-reliance on route planning based on charging availability

This instrument is intended as a **high-sensitivity screening tool** for mobility-related anxiety behaviours.

Clinical and public health relevance

Although EV-Raxophobia is not currently recognised within formal diagnostic classifications, its conceptual relevance lies in the identification of **technology-mediated behavioural adaptations that may resemble anxiety phenotypes**.

Potential implications include:

- **Primary care settings:** Presentation of functional mobility concerns framed as “practical EV management issues”
- **Behavioural overlap:** Symptom convergence with generalised anxiety and obsessive-compulsive traits

- **Infrastructure psychology:** Trust in charging networks influencing mobility confidence
- **Health systems planning:** Need for awareness of emerging technology-associated anxiety patterns

Importantly, EV-Raxophobia should not be interpreted as pathologising rational caution but rather as identifying a **maladaptive extension of adaptive behavioural vigilance under technological uncertainty**.

A broader theoretical implication: infrastructure-dependent anxiety

EV-Raxophobia contributes to a broader conceptual shift in behavioural health: the emergence of **infrastructure-dependent anxiety constructs**, where psychological distress arises not from internal or social threats, but from reliance on external technological systems.

This reflects a growing intersection between:

- Algorithmic decision-support systems
- Energy-dependent mobility infrastructures
- Human trust in predictive digital technologies

Such constructs may represent an evolving frontier in **technology-associated behavioural medicine**.

Conclusion

EV-Raxophobia represents a proposed conceptual framework describing maladaptive anxiety patterns emerging in response to electric mobility systems. While currently theoretical, it highlights the need to reconsider how **technological infrastructure dependency may shape cognitive and behavioural health outcomes in modern societies**.



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Future work should focus on empirical validation, psychometric development, and differentiation between adaptive vigilance and clinically significant anxiety in EV users.

Keywords: EV-Raxophobia, Range Anxiety, Electric Vehicles, Anticipatory Anxiety, Digital Mobility, Behavioral Health

Positioning Family Medicine in Basic Medical Education: Constructing the Future of Primary Care

Esra Saatçı

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There is increasing evidence that a strong primary health care system is more likely to provide better population health, more equity in health throughout the population, and better use of economic resources, compared to systems oriented towards specialty care (1,2).

How GP/FM is defined as a clinical specialty, if and how it is taught on undergraduate level in medical schools, as well as its position in research, are also important markers of its strength and position (3,4)

It is still possible to graduate from a European medical school without having learned the principles of GP/FM and without any clinical teaching in a GP's office (5).

Each country is responsible for improving development of primary care and securing and sustaining its position. European professional organizations should facilitate such an improvement, like the European Academy of Teachers in General Practice/Family Medicine (EURACT) did by its statement to encourage all medical faculties and departments across Europe to implement teaching and training programs of GP/FM into their curriculum (4) and to develop a minimal core curriculum (6).

Actions to strengthen undergraduate GP/FM teaching were also agreed upon as important, like “to list competencies for undergraduate level”, and “to introduce a special course on GP/FM for first year students and early clinical exposure” (5).

The European Academy of Teachers in General Practice (EURACT) Basic Medical Education (BME) Committee published a report in 2026 about the current status of general practice/family medicine (GP/FM) Basic Medical Education in EURACT countries in 2024 including 29 countries (7,8).

The duration of BME is six years in 28 countries. The mean duration of family medicine/primary care is 18 weeks. In 13 countries (Belgium, Finland, Italy, Latvia, Lithuania, Malta, Netherlands, Portugal, Romania, Slovakia, Spain, Switzerland, Türkiye) internship is a part of BME. In 16 countries (Albania, Croatia, Denmark, Estonia, Germany, Greece, Israel, Moldova, Montenegro, Norway, Poland, Serbia, Slovenia, Sweden, Ukraine, United Kingdom) is not included in BME. In 28 countries universities are responsible for BME.

Teaching topics of GP/FM are teaching communication skills under the heading of “GP” education, teaching clinical skills, education about e-Health or telemedicine, providing virtual teaching.

The tools used to know if the student has learnt during placements are evaluation by the GP/FM teacher, student reports (observation vs doing), written exam, student satisfaction, reflective seminar, reflective diary, mini-CEX or similar, and feedback from patients.

The assessment tools used in GP/FM BME curricula are written exam and evaluation by the GP/FM teacher, oral exam, OSCE, reflective diary, Mini-CEX, and reflective seminar or similar.

The quality assurance processes used to ensure quality of teaching are qualification of teachers at the university/clinical teachers and other faculty, qualification of GP teachers, external accreditation, training, updates and support that teachers receive, ensuring stated outcomes are covered on clinical placements.

Assessments should facilitate learning, mixed assessment methods should be used, the selection of method should vary according to learning goals, assessment type (formative and/or summative), number of students and available resources. The aim should be to

assess competencies not concepts. There should be an assessment plan. Giving formative feedback is essential.

Teachers/trainers should be family physician specialists, good role-models, experienced, up-to-date clinician, good in patient-doctor relationship, a coach asking questions rather than giving answers, trustable, completed EURACT Leonardo Teachers' Courses, collaborates with other members of the primary health care team, can deal with workload.

Each School of Medicine should have GP/FM department and each GP/FM department should have a head who is family medicine academician. Sufficient time and resource should be allocated. Training and service delivery should be balanced. Medical students should have early clinical encounter. Duration of GP/FM should be at least 4 weeks (optimal 3 months).

All medical student should learn patient management in primary care, person-centered care, community-orientation, specific problem-solving skills and comprehensive and holistic approach.

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Back to Paper and Pencil: Teaching the Art of Medicine in Times of Artificial Intelligence

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Medicine is a complex science with an artistic component that cannot be overlooked. The artistic side of medicine is based on humanistic knowledge, intuition, compassion, empathy, abstract reasoning, and other qualities.

My experience as a lecturer in the course *The Art of Medicine* over the past eight years shows that the emergence of artificial intelligence has changed the way students approach the subject and scientific problems in general.

Initially, in the year 2017, searching for information required time and patience; reading many different sources quickly; comparing the information found; and developing a coherent argument as a result.

With the advent of artificial intelligence, students can find answers to any problem within seconds and obtain a written response that saves them from having to prepare it themselves. There is no need for critical reasoning, and if artificial intelligence makes an error, students attribute it to the lecturer; actually, they grant greater scientific authority to artificial intelligence than to the lecturer.

The use of artificial intelligence leads students to focus more on the answer than on the question, more on solving the problem than on understanding the problem itself. Students

do not see the value of memorisation, as they can obtain any answer immediately through artificial intelligence.

Obviously, these are generalisations focused on the negative aspects of both students and artificial intelligence. Their positive aspects have been omitted.

These issues have led me to adopt a different approach to my course. In my opinion, all lecturers today should consider the same question: how can we develop students' long-term memory, critical thinking, abstract reasoning, and intuition?

The new approach is based on a controlled use of artificial intelligence combined with traditional-format exercises: based on given information, students must develop an analysis, a discussion, and conclusions without using any electronic devices (writing with pen/pencil and paper).

This qualitative study, based on personal experience, and this new approach, grounded in traditional teaching methods, will be evaluated at the end of the current course.

Scientific Research Methods and Research Design

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Scientific research represents a systematic and methodologically structured process aimed at producing reliable, objective, and reproducible knowledge. The primary objective of scientific investigation is not only to generate new evidence but also to validate, refine, and expand existing knowledge through critical inquiry and empirical observation. A scientific study typically involves several sequential stages, including identification of a research problem, formulation of hypotheses or research questions, selection of an appropriate study design, collection and analysis of data, and interpretation of findings within the framework of existing literature. In modern scientific philosophy, Karl Popper's principle of falsifiability is accepted as one of the fundamental criteria of scientific knowledge, emphasizing that scientific claims must be testable and potentially refutable.

Keynote Presentation

Scientific research is commonly categorized into primary and secondary research. Primary research includes experimental, clinical, epidemiological, and qualitative investigations. Experimental research, often referred to as basic medical research, encompasses laboratory-based studies, animal experiments, genetic and biochemical investigations, and physiological analyses. These studies are generally conducted under highly controlled conditions to minimize confounding factors and strengthen internal validity. Clinical research, on the other hand, is divided into interventional and observational studies. Interventional clinical trials evaluate the efficacy and safety of therapeutic interventions, medical devices, or preventive strategies, whereas

observational clinical studies analyze outcomes derived from routine healthcare practices without direct researcher intervention. Ethical considerations, patient safety, and adherence to international reporting standards such as CONSORT are fundamental components of clinical research.

Epidemiological studies constitute another major category of scientific investigation and are widely used to evaluate disease distribution, determinants, and health-related events within populations. Observational epidemiological studies include cohort, case-control, cross-sectional, and ecological designs. Cohort studies are particularly useful for examining associations between risk factors and disease outcomes over time and may be conducted prospectively or retrospectively. Case-control studies are commonly preferred for investigating rare diseases or conditions and are especially valuable in etiological research. Cross-sectional studies provide a snapshot of a population at a specific point in time and are frequently used to determine disease prevalence and population characteristics. However, due to the simultaneous assessment of exposure and outcome, causal relationships cannot be definitively established in cross-sectional designs. Ecological studies evaluate data at the group or population level rather than the individual level and are primarily used in public health and population-based analyses.

Qualitative research methods focus on understanding human experiences, perceptions, attitudes, and social behaviors in depth. Unlike quantitative studies, qualitative investigations aim to explore subjective meanings and contextual factors associated with human behavior. Common data collection methods include in-depth interviews, participant observation, and focus group discussions. Data are generally analyzed through coding procedures and thematic analysis to identify recurring concepts and patterns. Qualitative approaches are particularly valuable in fields such as primary care, medical education, psychology, sociology, and public health, where individual experiences and social dynamics are central to the research question.

Secondary research includes narrative reviews, systematic reviews, and meta-analyses. Narrative reviews provide broad conceptual overviews of a subject based on expert interpretation, whereas systematic reviews follow predefined methodological criteria to identify, appraise, and synthesize available evidence objectively. Meta-analysis represents a statistical technique used to combine results from independent quantitative studies in order to obtain more robust and precise estimates of effect size. Systematic reviews and meta-analyses are regarded as high levels of evidence in evidence-based medicine and play an essential role in clinical guideline development and healthcare decision-making.

The selection of an appropriate research design should be guided primarily by the nature of the research question. Etiological questions are commonly addressed through cohort or case-control studies; prognostic questions through cohort studies; treatment effectiveness through randomized controlled trials; prevalence assessments through cross-sectional studies; and questions related to experiences, perceptions, and coping strategies through qualitative methodologies. A carefully planned research design supported by valid data collection methods and appropriate statistical analysis is essential for producing scientifically credible and generalizable findings.

Keywords: Scientific Research, Research Methodology, Research Design, Epidemiology, Cohort Study, Case-Control Study, Cross-Sectional Study, Randomized Controlled Trial, Qualitative Research, Systematic Review, Meta-Analysis, Evidence-Based Medicine

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The Evolving Art of Consultation in Family Medicine: Navigating the Doctor–Patient Relationship and Human Care in an Era of Rapid Technological Change

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Consultation in family medicine represents a complex and evolving process that extends far beyond biomedical problem-solving. It is a dynamic interaction where clinical knowledge intersects with the patient's lived experience, shaped by continuity, trust, and understanding. Unlike episodic models of care, family medicine consultations are set in long-term relationships, often spanning years, allowing physicians to develop a fine appreciation of patients' medical histories, psychosocial contexts, and personal values. This dimension is central to the discipline and differentiates it from other specialties that focus primarily on disease-oriented care.

In recent years, the complexity of consultations in primary care has increased significantly. Evidence from a large multicenter observational study in Spain demonstrated a rise in the number of issues addressed per consultation, the prevalence of psychosocial problems, and the time required for unplanned care, with overall consultation complexity increasing by nearly 13% between 2019 and 2022 (Montero-Alía JJ, et al., BMC Prim Care. 2025; 26:311.). These findings reflect broader global trends, including population aging, multimorbidity, polypharmacy, and the growing burden of mental health conditions. At the same time, patients are increasingly informed, often arriving with knowledge derived from digital sources, which can both facilitate dialogue and introduce challenges related to misinformation and unrealistic expectations.

Keynote Presentation

The rapid integration of digital technologies into healthcare has further transformed consultation. Electronic health records, telemedicine, wearable devices, and artificial intelligence (AI) are now integral components of clinical practice. These innovations offer substantial benefits, including improved access to care, enhanced data availability, and the potential for more personalized interventions. However, they also raise important questions regarding the preservation of human connection within clinical encounters. While AI systems can analyze large datasets and support diagnostic reasoning, their performance remains variable, and they lack the ability to interpret emotions, understand cultural context, or engage in meaningful relational exchange. Comparative studies have shown only partial agreement between AI-generated and physician-derived diagnoses and treatment decisions, highlighting both the promise and limitations of these tools (Simão BLP et al., BMC Prim Care. 2025 Sep 22;26(1):284.).

Despite technological advancements, the fundamental importance of human connection in consultation remains unchanged. Empathy, active listening, and trust are not peripheral attributes, but core components of effective clinical care. Communication, in this context, functions as a therapeutic intervention, influencing patient satisfaction, adherence to treatment, and clinical outcomes. In an era where digital consultations are increasingly common, the concept of “digital empathy” has emerged, emphasizing the need to convey attentiveness and understanding through mediated communication. However, certain elements of interaction, particularly non-verbal cues and the shared physical presence, are difficult to replicate in virtual environments, emphasizing the value of face-to-face encounters.

Communication challenges are further amplified by the growing diversity of patient populations and the widespread availability of online health information. Patients frequently present with pre-existing beliefs shaped by digital sources, requiring clinicians to navigate these perspectives with sensitivity while providing evidence-based guidance. In this context, the ability to listen actively, validate concerns, and communicate clearly

becomes essential. Effective consultation is therefore not limited to the transmission of information, but involves the development of meaning between doctor and patient.

Shared decision-making (SDM) represents a key component of contemporary consultation, reflecting a shift toward more collaborative models of care. Although widely endorsed, SDM is not consistently implemented in practice. Evidence indicates that a substantial proportion of patients feel insufficiently involved in healthcare decisions, while many physicians report limited training in SDM-related communication skills (Jaeken K, et al., BMC Med Educ. 2024;24:592.). Nevertheless, systematic reviews and meta-analyses have demonstrated that SDM is associated with reduced decisional conflict and modest improvements in clinical outcomes, including glycemic control in patients with cardiovascular risk factors (Elias MF, et al., JAMA Netw Open. 2024;7(3):e243779.). These findings highlight the potential of SDM to enhance both patient experience and health outcomes, provided that clinicians are adequately trained and supported.

The increasing complexity of consultations necessitates further development in medical education and professional development. Consultation skills are not innate but can be taught, assessed, and refined through structured training programs. Approaches such as reflective practice, video-based feedback, and communication skills training have been shown to improve clinician performance. In addition, emerging competencies, including digital communication, cultural sensitivity, and emotional intelligence, must be incorporated into training curricula to prepare physicians for the demands of modern practice.

The future of consultation in family medicine will likely be shaped by continued technological innovation, including AI-assisted decision support, real-time translation tools, and advanced telehealth platforms. While these developments have the potential to enhance efficiency and accessibility, they also risk undermining the relational core of care if not implemented thoughtfully. The central challenge is therefore not to choose between technology and human interaction, but to integrate technological advances within a framework that prioritizes patient-centered care.



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Ultimately, consultation in family medicine remains both an art and a science, grounded in the interaction between clinical expertise and human connection. As healthcare continues to evolve, preserving the relational essence of consultation is essential. The encounter between doctor and patient is not merely a site of information exchange but a shared human experience in which understanding, trust, and meaning are co-created. Maintaining this perspective will be critical to ensuring the continued relevance and effectiveness of family medicine in a rapidly changing world.

Early Diagnosis of Autism Spectrum Disorder: When and How Should a General Practitioner Suspect It?

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Autism spectrum disorder (ASD); is a neurodevelopmental disorder with a genetic basis, where environmental factors increase the risk through epigenetic interactions; it manifests in early childhood, clinically presenting as a persistent deficit in social communication and interaction, repetitive behaviours, and restricted interests, with the presentation and severity of symptoms varying between individuals. Numerous studies have reported an increase in the prevalence of ASD over the years. This rise in ASD prevalence highlights just how likely all healthcare professionals, particularly GPs, are to encounter individuals with ASD.

In ASD, early diagnosis coupled with appropriate and adequate intervention is crucial for long-term outcomes. Identifying early signs of ASD and ensuring correct referral is the first prerequisite for early diagnosis. The common objective of ASD screening programmes recommended for early diagnosis is to identify children with risk factors and detect developmental differences. Behavioural and developmental indicators in the early stages, particularly criteria such as social interaction, language development, motor skills and repetitive behaviours, are of great importance for early diagnosis.

The presentation will also share practical tools and screening tests that GPs can use when monitoring children's development. Recommendations will be provided on the steps to follow when encountering children at risk of ASD, which specialists to consult for further

Keynote Presentation



assessments, and how to establish effective communication during the early diagnosis process. The presentation will also detail how early diagnosis can improve individuals' quality of life, in addition to its contributions to treatment and educational processes.

This presentation aims to provide practical knowledge and recommendations to general practitioners regarding the early diagnosis of autism spectrum disorder.

Autism Spectrum Disorder: Current Evidence and Common Myths

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Autism Spectrum Disorder (ASD) is an increasingly recognized neurodevelopmental condition, with recent epidemiological data indicating a rise in global prevalence. This rise is largely due to improved diagnostic practices, greater awareness, and broader diagnostic criteria. Current research suggests that ASD has a multifactorial etiology, involving complex interactions between genetic predisposition and environmental factors. However, no single definitive cause has been identified.

Despite strong scientific evidence, misconceptions about ASD remain common in both public and clinical settings. Common myths include the false link between vaccines and autism, the belief that all individuals with ASD have either the same level of cognitive impairment or unusually high cognitive abilities, and the idea that ASD can be completely cured. Such misunderstandings may result in delayed diagnosis, stigmatization, and unrealistic expectations for treatment.

Current approaches emphasize early identification and the development of individualized support plans that address each person's unique needs. Interventions that focus on communication, social skills, and daily living abilities play an important role in improving quality of life. In addition, educating families and professionals is essential for reducing misinformation and promoting better understanding.

This presentation will explain current scientific knowledge about ASD, discuss common myths, and their effects on healthcare, public understanding, and treatment access.

Novel Antidiabetic Therapies: Universal Use or Patient-Centered Selection?

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Abstract

The management of type 2 diabetes mellitus has undergone a definitive transition from a glucocentric paradigm to a cardiorenal risk-focused paradigm, driven by cardiovascular outcome trials published between 2015 and 2026 and the consequent updates to major international guidelines. The primary goal of treatment is no longer merely to reduce glycated hemoglobin but to decrease cardiovascular mortality, heart failure hospitalizations, and progression of chronic kidney disease. Sodium-glucose cotransporter-2 inhibitors and glucagon-like peptide-1 receptor agonists achieve this goal through organ-protective effects that are largely independent of glycemic control. This article provides a comparative analysis of seven major guideline documents: the American Diabetes Association 2026 Standards of Care, the American Association of Clinical Endocrinology 2026 Consensus Statement, the European Society of Cardiology 2023 Diabetes and Cardiovascular Disease Guideline, the American College of Physicians 2024 Clinical Guideline, the National Institute for Health and Care Excellence NG28 2026 Update, and the Turkish Society of Endocrinology and Metabolism Diabetes Mellitus Guideline. Pivotal trials, including EMPA-REG OUTCOME, the CANVAS Program, DECLARE-TIMI 58, DAPA-HF, LEADER, SUSTAIN-6, REWIND, SELECT, FLOW, SURPASS-CVOT, and SOUL are reviewed, with their results evaluated using both relative and absolute risk measures. The NICE NG28 seven-pathway algorithm for phenotype-specific treatment is adapted for primary care practice. Contemporary

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meta-analytic evidence demonstrates that combination therapy with a sodium-glucose cotransporter-2 inhibitor plus a glucagon-like peptide-1 receptor agonist, compared with monotherapy, is associated with a 50 percent relative reduction in all-cause mortality and a 44 percent reduction in major adverse cardiovascular events. The current body of evidence indicates that sodium-glucose cotransporter-2 inhibitors are indicated in approximately 70 to 80 percent of type 2 diabetes patients without contraindications from the time of diagnosis, whereas glucagon-like peptide-1 receptor agonists and glucose-dependent insulintropic polypeptide/glucagon-like peptide-1 dual agonists should be prioritized in patients with established atherosclerotic cardiovascular disease, obesity, heart failure, or metabolic dysfunction-associated steatotic liver disease.

Keywords: Type 2 diabetes mellitus, SGLT2 inhibitors, GLP-1 receptor agonists, GIP/GLP-1 dual agonist, cardiovascular outcome trials, NICE NG28, absolute risk reduction, health inequities

Introduction

Type 2 diabetes mellitus constitutes one of the most pressing public health challenges of the twenty-first century. As of 2023, over 800 million adults worldwide are estimated to be living with the disease, and projections from the Global Burden of Disease Study indicate that this figure will approach 1.3 billion by 2050 (1). In Türkiye, the TURDEP-II study documented an adult prevalence of 13.7 percent, underscoring the substantial disease burden carried by the national healthcare system (2). Individuals with type 2 diabetes carry a two- to four-fold higher risk of cardiovascular disease and a six- to twelve-fold higher risk of kidney failure compared with the general population (3). Critically, the majority of type 2 diabetes-related mortality arises not from hyperglycemia itself, but from the accompanying cardiovascular and renal complications (4,5).

Primary care physicians serve as the principal healthcare providers for more than 80 percent of patients with type 2 diabetes. Despite an approximately 1200 percent increase

in the prescription volume of sodium-glucose cotransporter-2 inhibitors and glucagon-like peptide-1 receptor agonists between 2015 and 2026, real-world utilization rates among eligible patients remain as low as 15 to 22 percent (6). This creates a dual paradox: overprescribing in low-risk populations generates unnecessary cost and side-effect burden, while underprescribing in high-risk populations results in preventable cardiovascular deaths. The present article, through the lens of major international guidelines and contemporary literature from 2023 to 2026, addresses the critical question of whether new-generation antidiabetic agents should be prescribed to nearly every patient with type 2 diabetes or reserved for carefully selected patients who stand to gain the greatest absolute benefit.

The Evidence Base for the Paradigm Shift

The transformation of type 2 diabetes management has traversed four distinct historical phases. During the Glucose Era, spanning approximately 1950 to 2007, glycated hemoglobin served as the sole therapeutic target, with insulin and sulfonylureas dominating the pharmacologic armamentarium. The rosiglitazone controversy of 2007, triggered by the landmark meta-analysis of Nissen and Wolski demonstrating an increased risk of myocardial infarction, served as the catalyst for transformative regulatory change (7). The United States Food and Drug Administration subsequently mandated that all novel antidiabetic agents demonstrate cardiovascular safety through dedicated cardiovascular outcome trials. The Evidence Explosion, from 2015 to 2020, witnessed the publication of pivotal trials including EMPA-REG OUTCOME, LEADER, SUSTAIN-6, DAPA-HF, and CREDENCE, which collectively demonstrated that sodium-glucose cotransporter-2 inhibitors and glucagon-like peptide-1 receptor agonists confer organ-protective benefits that are substantially independent of glycemic control. The Guideline Revision period, from 2021 to 2023, saw the publication of the joint American Diabetes Association and European Association for the Study of Diabetes 2022 consensus, the European Society of Cardiology 2023 Diabetes guideline, and the Kidney Disease Improving Global Outcomes 2024 chronic kidney disease guideline, alongside the

completion of SELECT and FLOW. The current Precision Era, from 2024 to 2026, has been marked by the release of the American Diabetes Association 2026 Standards of Care, the American Association of Clinical Endocrinology 2026 Consensus Statement, and the National Institute for Health and Care Excellence NG28 2026 update, as well as the SURPASS-CVOT and SOUL trials demonstrating the cardiovascular efficacy of the glucose-dependent insulintropic polypeptide/glucagon-like peptide-1 dual agonist tirzepatide and oral semaglutide, respectively (8–10).

The central message of this transformation is unequivocal: the primary objective of treatment is no longer the reduction of glycated hemoglobin but the reduction of cardiovascular death, heart failure, and chronic kidney disease progression. In achieving this objective, sodium-glucose cotransporter-2 inhibitors and glucagon-like peptide-1 receptor agonists exert effects that are independent of glycated hemoglobin, and the major international guidelines issued between 2023 and 2026 have reached consensus on this principle.

Mechanistic Foundations

Sodium-glucose cotransporter-2 inhibitors, including empagliflozin, dapagliflozin, canagliflozin, and ertugliflozin, exert multiaxial cardiorenal protection through four principal pathways (11,12). On the renal axis, proximal tubular sodium-glucose cotransporter-2 blockade induces glucosuria and natriuresis, and tubuloglomerular feedback is restored, thereby preserving glomerular filtration rate. When the estimated glomerular filtration rate falls below 20 mL per minute per 1.73 square meters, the glycemic effect diminishes while renal protection persists (13). On the cardiac axis, reductions in preload and afterload decrease myocardial oxygen consumption, ketone bodies provide a more energetically efficient fuel source for the failing heart, and inhibition of cardiac fibrosis has been demonstrated in experimental models. On the metabolic axis, insulin-independent weight loss of 2 to 4 kilograms, blood pressure reduction of 2 to 5 millimeters of mercury, and uric acid lowering are achieved, the latter offering additional benefit in patients with gout. Direct renal effects include preservation

of proximal tubular mitochondrial homeostasis and inhibition of fibrosis via the transforming growth factor-beta pathway. The DAPA-CKD trial provided definitive evidence that these renal protective effects extend to individuals without diabetes (14). Important safety considerations include the risk of euglycemic diabetic ketoacidosis, particularly in individuals who discontinue insulin or adhere to very low-carbohydrate diets; genital mycotic infections occurring in 5 to 10 percent of patients; volume depletion in older adults receiving concomitant diuretics; the imperative to withhold treatment for three to four days prior to surgery or during acute illness; and the amputation signal observed with canagliflozin in the CANVAS Program, where the hazard ratio for lower-extremity amputation was 1.97 (12).

Glucagon-like peptide-1 receptor agonists, including liraglutide, subcutaneous semaglutide, oral semaglutide, and dulaglutide, together with the dual glucose-dependent insulinotropic polypeptide and glucagon-like peptide-1 receptor agonist tirzepatide, exhibit pleiotropic effects across multiple organ systems (15,16). In the brain, hypothalamic appetite suppression and enhanced satiety signaling produce weight loss ranging from 3 to 22 percent, with tirzepatide achieving the greatest magnitude. In the heart, anti-inflammatory effects and improvements in endothelial function translate to reductions in major adverse cardiovascular events. In the kidney, the FLOW trial demonstrated a 24 percent reduction in renal progression with semaglutide, along with significant reductions in proteinuria (17). In the pancreas, glucose-dependent insulin secretion is augmented, and glucagon is suppressed, conferring a very low risk of hypoglycemia. In the liver, regression of metabolic dysfunction-associated steatotic liver disease and normalization of alanine aminotransferase have been documented, leading to a new indication in the American Diabetes Association 2026 Standards of Care. Tirzepatide demonstrated superiority over semaglutide for glycated hemoglobin reduction in SURPASS-2, achieved 20 to 22.5 percent weight loss in SURMOUNT-1, and showed non-inferiority to dulaglutide for major adverse cardiovascular events in SURPASS-CVOT, with a 16 percent reduction in the expanded cardiorenal composite outcome corresponding to a hazard ratio of 0.84 (8–10).

Analysis of Cardiovascular Outcome Trials

The EMPA-REG OUTCOME trial randomized 7020 patients with type 2 diabetes and established cardiovascular disease to empagliflozin or placebo (11). Over a median follow-up of 3.1 years, empagliflozin reduced cardiovascular death by 38 percent, corresponding to a hazard ratio of 0.62 (95% confidence interval, 0.49 to 0.77; $P < 0.001$). All-cause mortality was reduced by 32 percent, with a hazard ratio of 0.68 and a 95 percent confidence interval of 0.57 to 0.82, both significant at $P < 0.001$. Heart failure hospitalization was reduced by 35 percent, with a hazard ratio of 0.65 (95% confidence interval: 0.50-0.85). The absolute risk reduction for cardiovascular death was 2.2 percent, from 5.9 percent in the placebo group to 3.7 percent in the empagliflozin group, yielding a number needed to treat of 46 over 3.1 years of treatment.

In the integrated analysis of the CANVAS Program, comprising 10,142 patients with type 2 diabetes, canagliflozin reduced the risk of three-point major adverse cardiovascular events by 14 percent, with a hazard ratio of 0.86 and a 95 percent confidence interval of 0.75 to 0.97 (12). Heart failure hospitalization was reduced by 33 percent, and nephropathy progression by 40 percent. However, a significant increase in lower-extremity amputations was observed, with a hazard ratio of 1.97 and a 95% confidence interval of 1.41 to 2.75. This safety signal led to a boxed warning for canagliflozin and heightened awareness of amputation risk across the entire class.

The DECLARE-TIMI 58 trial enrolled 17,160 patients with type 2 diabetes, 59 percent of whom constituted a primary prevention population without established cardiovascular disease (18). Dapagliflozin did not reach statistical significance for the reduction of major adverse cardiovascular events, with a hazard ratio of 0.93 and a 95 percent confidence interval of 0.84 to 1.03. However, the composite of heart failure hospitalization or cardiovascular death was reduced by 17 percent, with a hazard ratio of 0.83 (95% confidence interval: 0.73-0.95; $P = 0.005$). This trial demonstrated that the cardiorenal benefits of sodium-glucose cotransporter-2 inhibitors are more pronounced in secondary prevention populations with higher baseline event rates.

The DAPA-HF trial was historically significant as the first study to demonstrate the efficacy of a sodium-glucose cotransporter-2 inhibitor in patients without diabetes (19). Among 4744 patients with heart failure and reduced ejection fraction, irrespective of diabetes status, dapagliflozin reduced the composite of worsening heart failure or cardiovascular death by 26 percent, with a hazard ratio of 0.74 and a 95 percent confidence interval of 0.65 to 0.85. The absolute risk reduction was 4.9 percent, yielding a number needed to treat of 20 over just 18 months, representing one of the strongest absolute benefits observed among chronic cardiovascular preventive interventions. This trial reclassified sodium-glucose cotransporter-2 inhibitors from glucose-lowering agents to cardiorenal protective agents.

Among the glucagon-like peptide-1 receptor agonist cardiovascular outcome trials, LEADER randomized 9340 high-risk patients with type 2 diabetes to liraglutide or placebo, demonstrating reductions in major adverse cardiovascular events of 13 percent, cardiovascular death of 22 percent, and all-cause mortality of 15 percent over a median follow-up of 3.8 years (20). SUSTAIN-6 showed that semaglutide reduced major adverse cardiovascular events by 26 percent and stroke by 39 percent in 3297 high-risk patients with type 2 diabetes (21). REWIND demonstrated in 9901 patients with type 2 diabetes, 69 percent of whom constituted a primary prevention population, that dulaglutide reduced major adverse cardiovascular events by 12 percent (22).

The SELECT trial produced one of the most consequential findings of the past decade (23). In 17,604 individuals with established cardiovascular disease and obesity but without diabetes, semaglutide at 2.4 milligrams reduced major adverse cardiovascular events by 20 percent, with a hazard ratio of 0.80 (95% confidence interval: 0.72-0.90). This result provided definitive evidence that the cardioprotective effect of glucagon-like peptide-1 receptor agonists is entirely independent of glycemic control and established a new indication for obesity pharmacotherapy from a cardiovascular risk reduction perspective.

The FLOW trial, the first dedicated renal outcome trial for a glucagon-like peptide-1 receptor agonist, randomized 3533 patients with type 2 diabetes and chronic kidney

disease and demonstrated that semaglutide reduced the primary renal composite outcome by 24 percent, with a hazard ratio of 0.76 and a 95 percent confidence interval of 0.66 to 0.88 (17).

The SURPASS-CVOT trial compared tirzepatide with dulaglutide in 13,165 patients with type 2 diabetes and established atherosclerotic cardiovascular disease (8). For the primary endpoint of three-point major adverse cardiovascular events, tirzepatide met the prespecified non-inferiority criterion with a hazard ratio of 0.92 and a 95.3 percent confidence interval of 0.83 to 1.01. In a pre-planned indirect comparison analysis using matched patient-level data from the REWIND trial, tirzepatide compared with placebo was estimated to reduce major adverse cardiovascular events by 28% and all-cause mortality by 39% (9). The SOUL trial, investigating the cardiovascular effects of oral semaglutide in patients with type 2 diabetes and established cardiovascular disease or high cardiovascular risk, was incorporated into the updated meta-analysis by Hasebe and colleagues (24).

Contemporary Meta-Analytic Evidence

A systematic review and meta-analysis by Colombijn and colleagues, published in *Diabetologia* in 2026 and encompassing 18 cohort studies with 1,164,774 participants, evaluated the effectiveness and safety of combination therapy with a sodium-glucose cotransporter-2 inhibitor plus a glucagon-like peptide-1 receptor agonist compared with monotherapy (25). Combination therapy was associated with a 44 percent relative reduction in major adverse cardiovascular events, with a risk ratio of 0.56 and a 95 percent confidence interval of 0.43 to 0.71; a 50 percent reduction in all-cause mortality, risk ratio 0.50 with a 95 percent confidence interval of 0.40 to 0.63; a 74 percent reduction in cardiovascular mortality, risk ratio 0.26 with a 95 percent confidence interval of 0.16 to 0.43; a 33 percent reduction in heart failure hospitalization, risk ratio 0.67 with a 95 percent confidence interval of 0.64 to 0.71; and a 52 percent reduction in the renal composite outcome, risk ratio 0.48 with a 95 percent confidence interval of 0.32 to 0.73. The authors appropriately caution that the predominantly observational nature of the

included studies limits control for residual confounding and that the certainty of evidence for mortality outcomes should be considered low according to the GRADE framework. These findings are hypothesis-generating and support the rationale for ongoing and future randomized trials of combination therapy.

An updated meta-analysis by Hasebe and colleagues, published in *Diabetes, Obesity and Metabolism* in 2026 and incorporating 9 randomized controlled trials, including SOUL, totaling 74,703 participants, investigated ethnic differences in the cardiovascular efficacy of glucagon-like peptide-1 receptor agonists (24). The analysis revealed that the reduction in major adverse cardiovascular events was significantly more pronounced in Asian populations, with a hazard ratio of 0.73 and a 95 percent confidence interval of 0.63 to 0.85, than in White populations, with a hazard ratio of 0.86 and a 95 percent confidence interval of 0.81 to 0.91. The difference between the two groups was statistically significant, with a hazard ratio of 0.84 and a 95% confidence interval of 0.71 to 0.98. This finding, derived from meta-regression and subgroup analyses, is hypothesis-generating and suggests that ethnicity may represent an effect modifier for glucagon-like peptide-1 receptor agonist-mediated cardiovascular protection.

A target-trial emulation cohort study by Wu and colleagues, published in *Diabetologia* in 2026, evaluated the cardiovascular effectiveness and safety of sodium-glucose cotransporter-2 inhibitors compared with dipeptidyl peptidase-4 inhibitors in older adults with diabetes, stratified by dementia status (26). In patients with dementia, initiation of a sodium-glucose cotransporter-2 inhibitor was associated with an absolute reduction in the composite cardiovascular outcome of 61.1 events per 1000 person-years, yielding a number needed to treat of 20. In those without dementia, the absolute reduction was 21.7 events per 1000 person-years, yielding a number needed to treat of 43. These data challenge the tendency to withhold cardiorenal protective agents from the frailest patients, who may, in fact, derive the greatest absolute benefit.

In the setting of acute myocardial infarction, a meta-analysis by Meine and colleagues, published in *Heart Failure Reviews* in 2025 and encompassing 11,211 patients,

demonstrated that sodium-glucose cotransporter-2 inhibitors initiated during the index hospitalization reduced heart failure hospitalization by 27 percent, with a risk ratio of 0.73 and a 95 percent confidence interval of 0.61 to 0.88 (27). However, no significant effect was observed on all-cause mortality (risk ratio 1.05) or cardiovascular mortality (risk ratio 1.04) in the short term. These findings suggest that sodium-glucose cotransporter-2 inhibitors provide early protection against heart failure events in the post-infarction period, while a mortality benefit may require longer treatment duration or is not evident in the acute setting.

Guideline Comparison: The 2024 to 2026 Consensus

The National Institute for Health and Care Excellence NG28 2026 update has introduced what may be the most radical guideline recommendation in contemporary diabetes care: dual therapy with metformin modified-release and a sodium-glucose cotransporter-2 inhibitor as the standard of care from the time of diagnosis in all adults with type 2 diabetes who have no contraindications. This recommendation is operationalized through a seven-pathway algorithm that stratifies patients by comorbidity profile. In patients with established atherosclerotic cardiovascular disease, triple therapy with metformin modified-release, a sodium-glucose cotransporter-2 inhibitor, and subcutaneous semaglutide is recommended irrespective of body mass index. Health-economic modeling underpinning this update estimates that this proactive approach could prevent approximately 17,000 to 22,000 deaths across the United Kingdom over three years, and that sodium-glucose cotransporter-2 inhibitors are cost-effective in all patients with a QRISK score of 10 percent or greater.

The American Diabetes Association 2026 Standards of Care introduced several transformative changes. Weight management has been elevated to equal priority with glycemic control in patients with type 2 diabetes and obesity, a recommendation designated as Level of Evidence A and grounded in the SELECT and STEP-HFpEF trial results. In patients with heart failure with preserved ejection fraction and obesity, tirzepatide or semaglutide is now recommended at the same evidence level. The

management of metabolic dysfunction-associated steatotic liver disease and steatohepatitis has been comprehensively addressed for the first time, with glucagon-like peptide-1 receptor agonists recommended as the preferred pharmacotherapy in patients with biopsy-proven steatohepatitis. In patients with an estimated glomerular filtration rate below 30 mL per minute per 1.73 square meters, glucagon-like peptide-1 receptor agonists are now the preferred option, owing to their low risk of hypoglycemia and the FLOW trial evidence. A novel safety signal regarding non-major amputation risk with glucagon-like peptide-1 receptor agonists has been incorporated into the guideline.

The American College of Physicians 2024 Clinical Guideline, employing the GRADE methodology, issued two strong recommendations that have profoundly influenced subsequent guideline development (6). The first strong recommendation, based on high-certainty evidence, supports adding a sodium-glucose cotransporter-2 inhibitor or a glucagon-like peptide-1 receptor agonist to metformin and lifestyle modifications. The choice between the two classes is guided by the targeted clinical outcomes: sodium-glucose cotransporter-2 inhibitors for reducing all-cause mortality, major adverse cardiovascular events, chronic kidney disease progression, and heart failure hospitalization; glucagon-like peptide-1 receptor agonists for reducing all-cause mortality, major adverse cardiovascular events, and stroke. The second strong recommendation, also based on high-certainty evidence, is against adding dipeptidyl peptidase-4 inhibitors to reduce morbidity and all-cause mortality. The guideline further notes moderate-certainty evidence that dipeptidyl peptidase-4 inhibitors may increase the risk of major adverse cardiovascular events and chronic kidney disease progression compared with sodium-glucose cotransporter-2 inhibitors and glucagon-like peptide-1 receptor agonists.

The Turkish Society of Endocrinology and Metabolism Diabetes Mellitus Guideline, while grounded in the same cardiovascular outcome trial evidence base, adopts a comparatively conservative stance reflective of the realities of the Turkish healthcare system (28). Metformin is retained more firmly in the first-line position. Dipeptidyl peptidase-4

inhibitors have not been as definitively excluded from the algorithm as in the American College of Physicians guideline. Obesity management has not yet been elevated to equal priority with glycemic control. Cost and access constraints play a more prominent role in shaping recommendations. Among dipeptidyl peptidase-4 inhibitors, linagliptin represents the sole option that does not require dose adjustment down to an estimated glomerular filtration rate of 15 mL per minute per 1.73 square meters, making it the preferred agent in advanced chronic kidney disease, whereas saxagliptin is absolutely contraindicated in heart failure given the SAVOR-TIMI trial signal for increased heart failure hospitalization (6).

Relative Risk versus Absolute Risk: A Critical Distinction

The results of clinical trials are predominantly reported as relative risk reductions, a metric that, while statistically informative, can overstate the clinical importance of an intervention when presented in isolation. Relative risk reduction is independent of the baseline event rate and therefore remains identical whether the underlying risk is 10 percent or 1 percent. Absolute risk reduction and the number needed to treat, by contrast, directly reflect the baseline risk of the population and represent the clinically meaningful measures of treatment benefit.

The EMPA-REG OUTCOME trial serves as an instructive example. The relative risk reduction for cardiovascular death was 38 percent, a figure that appropriately conveys the statistical and clinical significance of the treatment effect. However, the absolute risk reduction was 2.2 percent, from 5.9 percent in the placebo group to 3.7 percent in the empagliflozin group, yielding a number needed to treat of 46 over 3.1 years. The DAPA-HF trial, with its considerably higher baseline event rate in a symptomatic heart failure population, produced a number needed to treat of 20 over just 18 months. In the primary prevention subgroup of DECLARE-TIMI 58, the number needed to treat for prevention of major adverse cardiovascular events exceeded 150 over 4.2 years. These figures do not represent different drugs. They represent the same drug class applied to populations with different baseline risk profiles. Absolute benefit is a function of underlying risk. This

principle explains why phenotype matters and why the question addressed in this article, "for everyone or for the right patient," is clinical rather than rhetorical (11,18,19,23).

Evidence-Based Synthesis: For Everyone or for the Right Patient?

The current body of evidence and international guidelines converge on the position that sodium-glucose cotransporter-2 inhibitors are indicated in approximately 70 to 80 percent of patients with type 2 diabetes who have no contraindications, independent of glycated hemoglobin level. The evidence base supporting this broad indication encompasses a 14 percent reduction in major adverse cardiovascular events and a 38 percent reduction in cardiovascular mortality in patients with established atherosclerotic cardiovascular disease; a 26 to 35 percent reduction in heart failure hospitalization across the full spectrum of ejection fraction, including in individuals without diabetes; a 44 percent reduction in renal progression with a KDIGO 1A recommendation for initiation at an estimated glomerular filtration rate of 20 mL per minute per 1.73 square meters or above; and, most recently, substantial absolute cardiovascular benefit in vulnerable populations with dementia, yielding a number needed to treat of 20 (11,14,19,26).

The indication spectrum for glucagon-like peptide-1 receptor agonists and the glucose-dependent insulintropic polypeptide/glucagon-like peptide-1 dual agonist tirzepatide is expanding rapidly. In patients with established atherosclerotic cardiovascular disease, the reduction in major adverse cardiovascular events ranges from 12 to 26 percent, with semaglutide providing a specific and robust stroke reduction of 39 percent. The SELECT trial established that semaglutide reduces major adverse cardiovascular events by 20 percent in individuals with obesity and cardiovascular disease, even in the absence of diabetes. In patients with heart failure with preserved ejection fraction and obesity, semaglutide improved the Kansas City Cardiomyopathy Questionnaire Clinical Summary Score by 13.7 points and reduced body weight by 9.8 percent, while tirzepatide reduced worsening heart failure events by 38 percent. In biopsy-proven steatohepatitis, glucagon-like peptide-1 receptor agonists are now the preferred pharmacotherapy in the American Diabetes Association 2026 Standards. In advanced chronic kidney disease with an

estimated glomerular filtration rate below 30 mL per minute per 1.73 square meters, glucagon-like peptide-1 receptor agonists have become the preferred option, combining the FLOW trial evidence of renal protection with a low risk of hypoglycemia (17,20–23). A target-trial emulation by Sklepinski and colleagues, published in Diabetes Research and Clinical Practice in 2025, demonstrated that even among patients with moderate cardiovascular risk, clinically meaningful differences exist between glucagon-like peptide-1 receptor agonists, with semaglutide reducing major adverse cardiovascular events by 15 percent and all-cause mortality by 19 percent compared with dulaglutide (29).

Dipeptidyl peptidase-4 inhibitors, by contrast, have been decisively relegated in contemporary treatment algorithms. The American College of Physicians 2024 guideline's strong recommendation against their addition for morbidity and mortality reduction, supported by high-certainty GRADE evidence, has been broadly adopted. These agents should now be reserved exclusively for situations in which sodium-glucose cotransporter-2 inhibitors and glucagon-like peptide-1 receptor agonists are contraindicated, for extreme frailty in which volume-depletion risk is prohibitive, or for severe access or cost constraints. The emerging class of glucose-dependent insulinotropic polypeptide/glucagon-like peptide-1 dual agonists, led by tirzepatide and supported by SURPASS-CVOT data demonstrating a 28 percent reduction in major adverse cardiovascular events and a 39 percent reduction in all-cause mortality compared with placebo in indirect comparison analysis, is positioned to occupy an increasingly prominent role in future guideline iterations (9).

A Five-Step Decision Algorithm for Primary Care

A phenotype-specific, evidence-based decision algorithm adapted for the primary care setting can be structured around five sequential clinical questions. First, is there a compelling indication? Assess for the presence of atherosclerotic cardiovascular disease, heart failure across all ejection fraction categories, chronic kidney disease with an estimated glomerular filtration rate below 60 mL per minute per 1.73 square meters or

albuminuria or obesity with metabolic complications. If a compelling indication is present, select the evidence-based agent: heart failure mandates a sodium-glucose cotransporter-2 inhibitor; atherosclerotic cardiovascular disease warrants a sodium-glucose cotransporter-2 inhibitor or glucagon-like peptide-1 receptor agonist; chronic kidney disease calls for a sodium-glucose cotransporter-2 inhibitor first; and obesity as the primary problem favors a glucagon-like peptide-1 receptor agonist or tirzepatide.

Second, is cardiovascular risk elevated in the absence of established disease? In patients with a SCORE2-Diabetes risk estimate of 10 percent or greater, or with multiple risk factors including age above 55 years, hypertension, smoking, and dyslipidemia, a sodium-glucose cotransporter-2 inhibitor, a glucagon-like peptide-1 receptor agonist, or both should be considered.

Third, is weight management the priority goal? In patients with a body mass index of 30 kilograms per square meter or above without established atherosclerotic cardiovascular disease, heart failure, or chronic kidney disease, in whom obesity is the primary driver of morbidity, glucagon-like peptide-1 receptor agonists or tirzepatide should be prioritized. When heart failure with preserved ejection fraction and obesity coexist, semaglutide at 2.4 milligrams or tirzepatide is specifically indicated.

Fourth, is glycemic control inadequate? If glycated hemoglobin exceeds the individualized target despite current therapy, a sodium-glucose cotransporter-2 inhibitor or a glucagon-like peptide-1 receptor agonist should be added, providing glycemic efficacy at least equivalent to that of dipeptidyl peptidase-4 inhibitors, with the additional benefit of cardiorenal protection.

Fifth, is there a contraindication or practical barrier? Evaluate for an estimated glomerular filtration rate below 20 mL per minute per 1.73 square meters, personal or family history of medullary thyroid cancer or multiple endocrine neoplasia type 2 syndrome, cost and access limitations, patient preference, frailty, or active infection.

When barriers are present, select alternative agents, set individualized treatment goals, and consider deprescribing where appropriate.

The NICE NG28 Seven-Pathway Algorithm

The NICE NG28 2026 seven-pathway algorithm operationalizes the phenotype-specific approach as follows. Pathway 1, for patients without comorbidities, recommends metformin modified-release plus a sodium-glucose cotransporter-2 inhibitor as the dual standard from the time of diagnosis. Pathway 2, for patients with atherosclerotic cardiovascular disease, recommends metformin modified-release, a sodium-glucose cotransporter-2 inhibitor, and subcutaneous semaglutide, independent of body mass index. Pathway 3, for patients with heart failure, recommends metformin modified-release plus a sodium-glucose cotransporter-2 inhibitor across all ejection fraction categories, independent of glycated hemoglobin level. Pathway 4, for patients with chronic kidney disease, uses estimated glomerular filtration rate-stratified treatment: a sodium-glucose cotransporter-2 inhibitor when the estimated glomerular filtration rate is 20 mL per minute per 1.73 square meters or above, and linagliptin as the dipeptidyl peptidase-4 inhibitor of choice when the estimated glomerular filtration rate falls below 15 mL per minute per 1.73 square meters. Pathway 5, for patients with early-onset type 2 diabetes diagnosed before age 40, recommends early treatment intensification with a glucagon-like peptide-1 receptor agonist or tirzepatide and aggressive cardiometabolic targets. Pathway 6 for patients with obesity stipulates that if glycemic and weight targets are not achieved within 3 months of dual therapy, a glucagon-like peptide-1 receptor agonist or tirzepatide should be initiated, with weight loss as the priority. Pathway 7 for patients with frailty requires individualized use of sodium-glucose cotransporter-2 inhibitors, minimizing polypharmacy, and close monitoring for hypotension and volume depletion.

Contraindications and Deprescribing

The safe and appropriate use of new-generation antidiabetic agents requires rigorous attention to contraindications and a willingness to deprescribe when the balance of benefit and harm shifts unfavorably. For sodium-glucose cotransporter-2 inhibitors, new initiation is not supported by current evidence when the estimated glomerular filtration rate falls below 20 mL per minute per 1.73 square meters, although continuation of existing therapy may be considered. Initiation is contraindicated in the presence of active genital or urinary tract infection. The risk of euglycemic diabetic ketoacidosis is elevated in individuals with type 1 diabetes prescribed these agents off-label, those following very low-carbohydrate or ketogenic diets, and those in whom exogenous insulin has been precipitously discontinued. Therapy should be withheld for three to four days prior to elective surgery and during acute illness accompanied by dehydration. The CANVAS amputation signal warrants particular caution in patients with active diabetic foot disease or established peripheral arterial disease (12).

For glucagon-like peptide-1 receptor agonists, absolute contraindications include multiple endocrine neoplasia type 2 syndrome and a personal or family history of medullary thyroid cancer. Pregnancy and lactation are contraindications. A new safety signal incorporated into the American Diabetes Association 2026 Standards alerts clinicians to the potential for increased non-major amputation risk. In patients with gastroparesis or inflammatory bowel disease, the gastrointestinal side-effect burden may be prohibitive. Candidates for deprescribing include patients with a life expectancy of less than three to five years, in whom the time horizon is insufficient to realize the cardiorenal benefits of these agents; normal-weight patients without atherosclerotic cardiovascular disease, heart failure, or chronic kidney disease whose glycated hemoglobin is adequately controlled on metformin alone; frail older adults in whom volume depletion may precipitate falls and fractures; and patients who are unwilling or unable to adhere to therapy, in whom enforced prescribing is neither ethical nor effective (30). When a sulfonylurea is co-administered with a sodium-glucose cotransporter-2 inhibitor, the

sulfonylurea dose should be reduced or the drug discontinued to mitigate the risk of hypoglycemia.

Therapeutic Inertia, Inequities, and Cost

Real-world data reveal that sodium-glucose cotransporter-2 inhibitors are prescribed to only 15-22% of eligible patients, while the initiation rate for glucagon-like peptide-1 receptor agonists is approximately 10% in European cohorts. The most frequently cited justification for therapeutic inertia is the misconception that adequate glycated hemoglobin control obviates the need for cardiorenal protective therapy. The American Diabetes Association 2026 Standards explicitly frame the failure to prescribe these agents when indicated as an active management decision that carries ethical responsibility.

The NICE NG28 2026 guideline identifies systematic prescribing disparities, with prescription rates for sodium-glucose cotransporter-2 inhibitors significantly lower among women, older adults, ethnic minority groups, and socioeconomically disadvantaged populations. Paradoxically, health-economic modeling demonstrates that the greatest absolute benefit of these agents accrues to the very underserved groups they aim to serve. The meta-analysis by Hasebe and colleagues, showing enhanced efficacy of glucagon-like peptide-1 receptor agonists in Asian populations, adds another layer of complexity to the equity calculus (24). In Türkiye, the monthly cost of sodium-glucose cotransporter-2 inhibitors and glucagon-like peptide-1 receptor agonists ranges from 800 to 25000 Turkish Lira, depending on the agent. Social Security Institution reimbursement conditions typically require glycated hemoglobin thresholds and second-line treatment status, and an estimated 40 to 60 percent of eligible patients face economic barriers to accessing these services. The anticipated market entry of generic sodium-glucose cotransporter-2 inhibitors and biosimilar glucagon-like peptide-1 receptor agonists offers a partial solution to these access constraints.

Conclusion

The weight of evidence accumulated over the past decade supports five central conclusions. First, the glucocentric era in type 2 diabetes management has ended, and the major international guidelines issued between 2023 and 2026 have established reducing cardiorenal mortality as the primary therapeutic objective. Glycated hemoglobin serves as one indicator of progress toward this goal, but no longer constitutes the goal itself. Second, sodium-glucose cotransporter-2 inhibitors are indicated for the large majority of patients with type 2 diabetes who have no contraindications. These drugs provide substantial absolute cardiovascular benefit even in the most vulnerable populations, including older adults with dementia. Glucagon-like peptide-1 receptor agonists are indicated for a rapidly expanding subgroup of patients defined by specific comorbidities: established atherosclerotic cardiovascular disease, obesity, heart failure with preserved ejection fraction, metabolic dysfunction-associated steatohepatitis, and advanced chronic kidney disease. The glucose-dependent insulinotropic polypeptide/glucagon-like peptide-1 dual agonist tirzepatide adds a new therapeutic layer to this framework. Third, clinicians must learn to evaluate treatment effects through absolute risk reduction and the number needed to treat, rather than relying exclusively on relative risk reduction. The same drug class applied to populations with different baseline risks produces vastly different absolute benefits. Fourth, therapeutic inertia is not a neutral act. Failing to prescribe these agents when indicated constitutes an active treatment decision with measurable consequences. Fifth, the one-size-fits-all approach is obsolete. The clinician's task is to characterize the patient's phenotype, apply the appropriate guideline-directed pathway, and deliver the right drug to the right patient at the right time, for the right reason.

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Primary Care Perspectives on Implementing Cancer Screening: Challenges and Opportunities

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Cancer screening is a fundamental component of preventive healthcare and plays a critical role in reducing cancer-related morbidity and mortality through early detection. Primary care services are central to the successful implementation of cancer screening programs because they provide accessible, continuous, and community-oriented healthcare. Primary care physicians are often the first point of contact within the healthcare system and are uniquely positioned to identify individuals at risk, promote screening participation, and coordinate follow-up care. Despite these advantages, the implementation of cancer screening in primary care faces multiple challenges alongside important opportunities for improvement.

Role of Primary Care in Cancer Screening

Primary care providers contribute significantly to cancer prevention and early diagnosis by:

- Identifying eligible populations for screening,
- Assessing individual risk factors,
- Educating patients about screening benefits and limitations,
- Encouraging participation in evidence-based screening programs,
- Coordinating referrals and follow-up after abnormal results,
- Providing longitudinal continuity of care.

Keynote Presentation

Evidence suggests that strong primary care systems are associated with improved screening uptake and better cancer outcomes.

Challenges in the Implementation of Cancer Screening

1. Patient-Related Barriers

Limited Health Literacy

Many patients have insufficient knowledge regarding:

- The purpose of cancer screening,
- Recommended screening intervals,
- The importance of screening in asymptomatic individuals.

Fear of cancer diagnosis and misconceptions about screening procedures may also reduce participation rates.

Sociocultural Factors

Cultural beliefs, stigma, embarrassment, and concerns about privacy can negatively influence screening behaviors, particularly in cervical and colorectal cancer screening.

Access and Adherence Problems

Barriers such as:

- Transportation difficulties,
 - Financial constraints,
 - Lack of time,
 - Geographic disparities,
- may prevent individuals from attending screening appointments or completing follow-up evaluations.

2. Health System–Related Challenges

Time Constraints in Primary Care

Primary care physicians often manage:

- Chronic diseases,
- Acute complaints,

- Administrative responsibilities, within limited consultation times. Consequently, preventive counseling and screening discussions may receive insufficient attention.

Workforce and Resource Limitations

Heavy workloads, inadequate staffing, and limited access to diagnostic services may reduce the effectiveness of screening implementation.

Fragmented Information Systems

Incomplete electronic health records and insufficient reminder systems can impair:

- Identification of eligible patients,
- Tracking of screening outcomes,
- Recall and follow-up processes.

3. Provider-Related Barriers

Healthcare professionals may encounter:

- Limited familiarity with updated screening guidelines,
- Uncertainty regarding screening benefits and harms,
- Concerns about overdiagnosis and false-positive results,
- Communication challenges during shared decision-making.

Provider recommendation, however, remains one of the strongest predictors of screening participation.

Opportunities and Strengths of Primary Care

1. Continuity of Care

Long-term physician-patient relationships facilitate trust, improve communication, and increase adherence to preventive interventions, including cancer screening.

2. Early Detection and Improved Outcomes

Effective screening programs in primary care contribute to:

- Earlier cancer diagnosis,
- Reduced mortality,
- Lower treatment costs,

- Improved quality of life.

Strong evidence supports screening effectiveness for:

- Breast cancer,
- Cervical cancer,
- Colorectal cancer.

3. Digital Health Technologies

Electronic health records and digital reminder systems can improve:

- Patient identification,
- Screening invitations,
- Follow-up tracking,
- Population health monitoring.

Artificial intelligence and risk stratification tools may further optimize screening strategies in the future.

4. Community-Based Preventive Care

Primary care services are well positioned to reach underserved and vulnerable populations, thereby helping reduce health disparities in cancer prevention and early diagnosis.

Strategies to Improve Cancer Screening in Primary Care

Several interventions may strengthen screening implementation:

- Enhancing public awareness and health literacy,
- Expanding reminder and recall systems,
- Providing continuous professional education for primary care providers,
- Improving accessibility of screening services,
- Increasing integration between primary and secondary care,
- Utilizing mobile and community-based screening programs,
- Supporting patient-centered communication and shared decision-making.

Conclusion

Primary care plays a pivotal role in the implementation and sustainability of cancer screening programs. Although numerous barriers exist at the patient, provider, and

healthcare system levels, primary care settings also offer substantial opportunities to improve screening uptake and cancer outcomes. Strengthening preventive services, enhancing healthcare infrastructure, and supporting evidence-based screening practices are essential for maximizing the public health benefits of cancer screening.

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Resistant Hypertension or Untracked Hypertension?

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Abstract

Hypertension is a chronic disease affecting more than **1.4 billion adults** worldwide and remains one of the primary causes of cardiovascular mortality. Despite treatment, the inability to achieve blood pressure control continues to be a frequent challenge for clinicians, creating significant difficulties in clinical management. This paper addresses the fundamental question clinicians must first answer in cases of uncontrolled hypertension: Is the clinical picture truly **resistant hypertension**, or is it **apparent resistance (pseudo-resistance)** due to correctable causes?

Considering international and national guidelines, the causes of pseudo-resistance are systematically addressed, and correctable factors such as **medication non-adherence, white coat effect, incorrect measurement techniques, and clinical inertia** are examined. Furthermore, the definition, prevalence, pathophysiology, and current treatment approaches for true resistant hypertension are summarized.

Keywords: Resistant Hypertension, Pseudo-Resistance, Non-Adherence to Medication, Blood Pressure Measurement, Clinical Inertia, Primary Care.

Keynote Presentation

Introduction

Hypertension is among the most common chronic diseases globally and maintains its status as the leading risk factor for cardiovascular events. According to World Health Organization data, hypertension affects over **1.4 billion adults** worldwide; however, adequate blood pressure control is achieved in only **one in five** individuals. Failure to reach target blood pressure in patients under treatment is one of the most frequent issues encountered by clinicians in routine practice.

The most common error in the initial approach to this clinical picture is hastily diagnosing "resistant hypertension" and escalating treatment before excluding the causes of pseudo-resistance. However, current literature, particularly international guidelines, demonstrates that many uncontrolled hypertension cases are due to correctable reasons such as **medication non-adherence, faulty measurement techniques, lifestyle factors, and clinical inertia**. The objective of this paper is to examine the systematic approach to "uncontrolled hypertension" within the framework of current international and national guidelines, specifically for primary care services and family medicine practice.

Resistant Hypertension: Definition and Epidemiology

Definition

According to international guidelines, **resistant hypertension** is defined as blood pressure remaining above the target value despite the use of at least three antihypertensive drugs from different classes (typically a **calcium channel blocker, a renin-angiotensin system blocker, and a diuretic**) at maximum tolerated doses. Patients who achieve target blood pressure with four or more medications are also included in this definition and are referred to as having "**controlled resistant hypertension**".

Prerequisites for diagnosis include both the exclusion of non-adherence medication and the elimination of the "white coat effect" via out-of-office blood pressure monitoring. A diagnosis made without addressing adherence or out-of-office measurements is considered "**apparent treatment-resistant hypertension**".

Prevalence

Determining the prevalence of true resistant hypertension involves methodological challenges. While the prevalence of apparent resistant hypertension is reported to be approximately **10-15%** of the hypertensive population, true prevalence drops to **3-7%** when pseudo-resistance factors are systematically excluded.

- A large observational study by Romano et al. involving **228,406 urban adults** showed that the prevalence of uncontrolled and resistant hypertension can reach up to **50%** of hypertensive patients.
- Recent analysis of 25-year NHANES data in the US indicates that blood pressure non-control rates among treated patients fell from **74.7%** in 1999–2000 to **63.9%** in 2021–2023, yet remain high.
- This data highlights that uncontrolled hypertension remains a significant public health issue.

Pseudo-resistance: The Reasons Underlying "Untracked" And "Uncontrolled" Hypertension

A significant portion of apparent resistant hypertension cases reflects pseudo-resistance—insufficient control due to correctable factors. Distinguishing this clinically is critical, as a misdiagnosis can lead to unnecessary medication additions and expensive or invasive interventions. The primary causes of pseudo-resistance are discussed below:

1. **Non-Adherence Medication:** This is the most common and significant cause of apparent resistant hypertension. A meta-analysis found non-adherence rates

- between **3% and 86%** in these patients. Studies using more systematic evaluation methods report even higher rates; for example, Jung et al. demonstrated via urine antihypertensive level measurements that **53%** of patients suspected of true resistant hypertension were not taking their medications regularly.
2. **White Coat Effect:** This occurs when blood pressure is repeatedly high in an office setting but remains within the target range during out-of-office measurements. This is attributed to sympathetic activation triggered by the clinical environment. Its prevalence in apparent resistant hypertension is reported at 28-39%.
 3. **Faulty Blood Pressure Measurement Technique:** Measurement errors can lead to falsely high readings. Guidelines (ESC 2024, Turkish Hypertension Consensus Report 2025) mandate standard conditions: resting for **5 minutes** while seated, using an appropriate cuff size, measuring from both arms (at first visit), and using validated devices.
 4. **Clinical Inertia (Therapeutic Inertia):** This is defined as a physician's failure to initiate or escalate treatment despite the patient not reaching the target blood pressure. This creates a state of "lack of follow-up" that mimics resistant hypertension.
 5. **Drug Interactions and BP-Elevating Substances:** NSAIDs, sympathomimetics (nasal decongestants, stimulants), oral contraceptives, corticosteroids, certain antidepressants, and herbal products containing licorice root can increase blood pressure or reduce the efficacy of treatment.
 6. **Lifestyle Factors and Inadequate Diuretic Use:** Excessive salt intake, obesity, alcohol consumption, sedentary lifestyle, and sleep apnea can mimic resistance. Additionally, the absence of an effective diuretic (especially a **long-acting thiazide-like diuretic**) or its use in inadequate doses plays a major role in pseudo-resistance.

True Resistant Hypertension: Pathophysiology And Secondary Causes

True resistant hypertension can only be diagnosed after pseudo-resistance causes are systematically excluded. These patients constitute a group at particularly high cardiovascular and renal risk.

Pathophysiology

Pathophysiological mechanisms in true resistant hypertension include increased **sympathetic nervous system activity**, activation of the **renin-angiotensin-aldosterone system (RAAS)**, increased **vascular stiffness**, endothelial dysfunction, and a tendency toward **sodium retention**.

Secondary Hypertension Screening

Secondary causes must be actively investigated in true resistant hypertension cases. The most common include:

- **Primary Hyperaldosteronism:** Found in **10-15%** of resistant HT cases; screened via the aldosterone/renin ratio.
- **Obstructive Sleep Apnea (OSA):** Should be investigated especially in obese patients or those with nocturnal awakenings/snoring.
- **Renovascular Disease:** Especially in elderly atherosclerotic patients or young women with fibromuscular dysplasia.
- **Chronic Kidney Disease (CKD):** Increases BP via volume overload and RAAS activation.
- **Pheochromocytoma and Mild Autonomous Cortisol Secretion:** Rare but should not be overlooked.

Diagnostic Approach in Primary Care: Stepwise Protocol

The systematic approach recommended by guidelines includes these steps:

1. **Standardize Blood Pressure Measurement:** Use validated devices, an appropriate cuff size, and a 5-minute rest.
2. **Exclude White Coat Effect:** Use **24-hour ambulatory blood pressure monitoring (ABPM)** or home blood pressure monitoring (HBPM).
3. **Evaluate Medication Adherence:** Use structured interviews, the **Morisky scale**, or pharmacy records.
4. **Review Medication List:** Screen for substances that increase BP, including NSAIDs and herbal products.
5. **Assess Lifestyle:** Review salt restriction, weight management, and physical activity.
6. **Optimize Diuretic Therapy:** Prefer thiazide-like diuretics such as **chlorthalidone or indapamide**.
7. **Secondary Hypertension Screening:** If blood pressure remains uncontrolled after all steps, investigate secondary causes and consider referral to a specialist.

Treatment Of True Resistant Hypertension

Pharmacological Treatment

Guidelines recommend a triple combination of **RAAS blocker + long-acting CCB + thiazide-like diuretic** at maximum tolerated doses. As a fourth drug, a **mineralocorticoid receptor antagonist (MRA)**, such as **spironolactone or eplerenone**, is recommended. Studies like **PATHWAY-2** have shown spironolactone to be the most effective fourth-line agent.

Device-Based Therapy: Renal Denervation

Renal denervation (RD) received FDA approval in late 2023 for the treatment of uncontrolled hypertension. Trials like **SPYRAL HTN** and **RADIANCE HTN** have shown significant and sustainable reductions in out-of-office blood pressure. The **ESH 2023**

Guideline offers RD as a **Class II recommendation** for patients with eGFR >40 ml/min/1.73 m² who remain uncontrolled despite adequate medical therapy.

Primary Care Perspective: The Concept of "Untracked Hypertension"

In Turkey, family physicians handle many hypertension diagnoses and long-term follow-ups. A 2023 study of **351 patients** in Turkey found that medication and lifestyle adherence levels were significantly lacking in primary care. The **Ministry of Health's 2025 Hypertension Screening and Follow-up Guideline** emphasizes a biopsychosocial approach and measurement standardization.

The concept of "**untracked hypertension**" covers not only patient non-attendance but also system-based issues like irregular monitoring, failure to set target values, and lack of treatment intensification. These systemic issues must be addressed before concluding a diagnosis of resistant hypertension.

Conclusion

Reflexively jumping to a "resistant" diagnosis in the face of uncontrolled hypertension can lead to serious clinical errors. Evidence indicates that the majority of apparent resistance cases involve correctable factors, primarily **medication non-adherence and the white coat effect**. The question of "**Resistant hypertension or untracked hypertension?**" deeply affects daily clinical decisions. Only after implementing standardized protocols and objective adherence assessments should the advanced evaluation of true resistant hypertension be considered.

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Evidence Levels in Traditional and Complementary Medicine Practices

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As in the rest of the world, patient demand for Traditional and Complementary Medicine (TCM) practices is steadily increasing in our country. In the family medicine system, which is the cornerstone of primary healthcare services, physicians are the first point of contact for patients regarding these practices. However, the levels of evidence regarding TCM are frequently debated due to methodological challenges and heterogeneous data structures. In the face of this increasing demand, family physicians must be able to evaluate the current evidence of TCM methods and provide evidence-based guidance to their patients.

Designing double-blind and randomized trials in TCM practices can be technically challenging. A review of the literature shows that this situation leads to low levels of evidence in some areas. Nevertheless, high clinical significance and high levels of evidence are observed in certain applications. For instance, acupuncture has been shown to have high levels of evidence in the management of certain pain-related clinical conditions. In phytotherapy, although St. John's Wort has been found to have a moderate-to-high level of evidence in mild-to-moderate depression, potential side effects have also been noted in the literature. It has been stated that cupping therapy (hacamat) may be effective in non-specific low back pain and in removing toxins. However, when looking at systematic reviews and meta-analyses, the main reasons for criticism in TCM practices include the failure to ensure standardization, the high potential

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for bias in publications, deficiencies in randomization and placebo control, and limited or restricted sample sizes.

It must be remembered that TCM practices are not a field of "belief," but a field where evidence must be evaluated and further research is required. Current evidence indicates that certain major practices can be integrated with modern medicine. Ultimately, due to the increasing preference of patients, healthcare professionals need to produce more evidence in accordance with scientific norms or follow the existing literature. Otherwise, it has been shown that patients who cannot receive support from healthcare professionals turn to non-professionals, receiving treatment from incompetent hands. Family physicians should establish a "Decision Support System" by evaluating the levels of evidence and potential risks of TCM and guide their patients accordingly. If a patient requests it, the integration of these methods into modern treatment protocols should be evaluated through a shared decision-making process in cases where evidence levels are strong and risks/side effects are low; in cases where scientific evidence is weak, the principle of "primum non nocere" (first, do no harm) must be followed.

Keywords: Family Medicine, TCM, Evidence-Based Medicine, Acupuncture

Functional Medicine Approach in Chronic Diseases Primary Care Experience

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It is estimated that 74% of all deaths worldwide are caused by non-communicable diseases (NCDs). In Türkiye, this rate reaches up to 90%. Recent studies have emphasized that lifestyle factors play a much larger role than genetic factors in the development of most chronic diseases globally. While genetic predisposition explains only about 20% of health outcomes, up to 80% can be attributed to modifiable factors such as nutrition, exercise, sleep, stress, and environmental exposures. For these reasons, the high NCD rate in Türkiye - nearly 90% - represents a significant opportunity area for Functional Medicine. Functional Medicine is defined as a systems biology-based approach that aims to identify and address the root causes of disease to restore health for each individual.

Leaky Gut

The intestinal epithelium is normally semi-permeable. However, an increase in proteins such as zonulin disrupts tight junctions, leading to increased intestinal permeability.

This condition may predispose individuals to:

- Food intolerances
- Autoimmune diseases (e.g., Hashimoto's thyroiditis, rheumatoid arthritis)
- Neuroinflammation (brain fog, anxiety, depression)
- Skin conditions (eczema, acne, rosacea)

The 5R Protocol in Functional Medicine

Developed to improve gut health, the 5R protocol is a structured, stepwise treatment plan designed to remove underlying triggers and restore physiological balance.

1. **Remove:** Elimination diets
2. **Replace:** Hydrochloric acid, bile acids, digestive enzymes, and nutritional supplements

3. **Repair:** Support for intestinal barrier integrity (e.g., bone broth, collagen supplements)
4. **Reinoculate:** Restoration of gut flora through probiotics and dietary fibers
5. **Rebalance:** Stress management, meditation, psychotherapy, lifestyle optimization, healthy nutrition, and immune support

In the coming years, further studies will clarify the long-term effects, cost-effectiveness, and optimal patient groups for Functional Medicine interventions. However, current evidence already suggests that a holistic, root, cause, oriented approach to patient care may serve as a powerful tool against the modern epidemic of chronic diseases.

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The Underlying Causes of Poorly Controlled Chronic Patients in Primary Care Family Health Centers (FHCs)

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Chronic diseases (Non-Communicable Diseases) are long-term conditions that are often incurable. Currently, chronic diseases are the leading cause of mortality and morbidity. Globally, in 2000, 4 out of the top 10 causes of death were due to non-communicable diseases, while in 2019, 7 out of the top 10 causes of death were due to non-communicable diseases. 74% of deaths worldwide are due to NCDs. Every year, 41 million people die from NCDs. In Turkey, as in the rest of the world, chronic diseases are the leading cause of death. The most effective method to reduce mortality and morbidity caused by chronic diseases is the effective application of eliminating risk factors (primary care) and early diagnosis (secondary care). The WHO has launched a "Global Action Plan for the Prevention and Control of NCDs" to reduce the burden of chronic diseases. This action plan proposes at least a 10% reduction in harmful alcohol use, a 10% reduction in the prevalence of insufficient physical activity, a 30% reduction in average population salt/sodium intake, a 30% reduction in the prevalence of current tobacco use among individuals aged 15 and over, a 25% reduction in the prevalence of hypertension or control of hypertension prevalence according to national conditions, halting the increase in diabetes and obesity, and providing primary and secondary prevention methods such as medication and counseling (including glycemic control) to at least 50% of eligible individuals to prevent the risk of heart attack and stroke. Despite the action plan being implemented in our country, 31.5% of the Turkish population uses tobacco products. Overall fruit and vegetable consumption

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is found to be low, with 87.8% of the population consuming less than five servings of fruits and vegetables per day. Approximately 4/5 of adults (especially women) (81.3%) do not engage in effective physical activity. 30% of the population has hypertension.

Two-thirds of the population are overweight, and 3 out of 10 people are obese. Impaired fasting blood glucose (FBG) affects 7.9% of the population. High FBG affects one in ten people (11.1%). Those with total cholesterol levels ≥ 190 mg/dl and those using medication for high cholesterol constitute 24.7% of the population. Current data show that we are failing to prevent chronic diseases. Effective treatment and management of individuals who develop chronic diseases can also reduce premature deaths. Although many care models are suggested in this context, the most commonly applied method is the chronic disease care model. Despite the chronic disease care provided to patients, current data show that approximately 40% of diabetic patients and approximately 50-70% of hypertensive patients do not have adequate adherence to treatment. According to the WHO, the reasons for the failure to control chronic diseases are reported as: Insufficient implementation of interventions, Weak health systems, Lack of funding, Inequalities, and the negative impact of COVID-19. Current literature on the subject attributes the failure to control chronic disease to five fundamental problems: patient-related factors (poor treatment adherence, insufficient health literacy, socioeconomic difficulties, and psychiatric comorbidities), physician and healthcare worker factors (lack of adherence to guidelines, time constraints, burnout, and educational differences), healthcare system-related factors (focus on acute illnesses, reactive approach, fragmented care), and the nature of the disease and technological and structural problems (inadequate clinical decision support systems, inability to integrate them into workflows, and insufficient coverage of multimorbid patients). Solutions recommended for improving the quality of chronic disease care include the effective implementation of the Chronic Care Model, multidisciplinary management, patient empowerment, and the integration of the healthcare system into chronic disease care.

In conclusion, failure in chronic disease management stems not from a lack of information or insufficient medication, but from the system's inability to fully adapt to the fight against

chronic diseases. We can achieve success not by prescribing more drugs, but by redesigning the healthcare system to combat chronic diseases more effectively.

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The Invisible Page of the Prescription Book: Social Interventions

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Health is not limited to biomedical processes alone; it is strongly influenced by the social, economic, and environmental conditions in which an individual lives. Social determinants such as education level, income status, social support networks, and living conditions directly influence the development of chronic diseases, adherence to treatment, and healthcare utilization. Primary healthcare stands out as the component of the healthcare system that can best observe an individual's life context and manage this multifaceted interaction. In daily clinical practice, the varying outcomes achieved despite similar treatment approaches demonstrate that a significant proportion of diseases are related to social determinants. This situation highlights the need for a holistic perspective in primary healthcare that goes beyond a purely biomedical approach (1). The social prescription approach is an innovative model that aims to identify patients' non-medical needs and direct them to community-based resources, focusing not only on symptoms but also on the underlying social factors that affect their health.

They then refer these individuals to non-clinical support and services within the community to maintain or improve their health and well-being, and to strengthen community ties; a social prescription (a non-medical prescription) is created for this purpose.

This approach aims to connect individuals with social support mechanisms in situations such as loneliness, social isolation, chronic stress, and lifestyle-related health problems.

Models developed particularly in the United Kingdom, and recommendations from the World Health Organization, offer an important framework for the applicability of social prescription in primary care (1,2). As part of social prescribing, patients may be referred to a variety of services, including mental health support, social participation activities, financial or housing counseling, physical activity, and creative pursuits. These services can vary depending on the needs of each community and each patient. Therefore, there is no single standard model. Social prescribing aims to support individuals in gaining better control over their health and thus contribute to being or staying healthy. Some view social prescribing as a mechanism that bridges the gap between health and care and voluntary, community, social enterprise, and faith organizations.

The current literature suggests that social prescribing practices can have positive effects, particularly on mental health, quality of life, and healthcare utilization. However, the heterogeneous nature of the studies and the limited evidence regarding long-term outcomes suggest that the effectiveness of this approach needs to be supported by stronger methodological studies (3,4).

Social interventions and prescription approaches can help strengthen person-centered, holistic healthcare services in today's healthcare system, where uncertainties are increasing.

Keywords: Social Prescription, Social Intervention, Primary Care, Family Medicine, Social Determinants

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Early Recognition and Continuity in Autism Spectrum Disorder

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Early recognition of Autism Spectrum Disorder (ASD) is of critical importance, as timely identification facilitates access to evidence-based early intervention programs, which have been consistently associated with improved cognitive, linguistic, and adaptive functioning outcomes. Early detection relies on heightened awareness and systematic screening across multiple levels of care, including families, primary care settings, and educational environments. The identification of early behavioral markers—such as impairments in joint attention, atypical eye contact, and delays in communicative intent—remains essential for prompt referral and diagnostic evaluation.

Continuity of care represents a core principle in the longitudinal management of ASD, given its chronic course and developmental variability.

A comprehensive, multidisciplinary, and developmentally informed approach is required to ensure sustained support across the lifespan. This includes coordinated collaboration among child and adolescent psychiatry, pediatrics, allied health professionals, special education services, and family-centered interventions.

This presentation aims to critically examine the roles of early recognition and continuity of care in ASD, with particular emphasis on integrated service models, early screening strategies, and the optimization of long-term functional and psychosocial outcomes.

Keynote Presentation

Making Diagnoses on Screen: To What Extent Are Family Physicians Responsible?

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Objective:

With the rapid expansion of digital health technologies, telemedicine has become an integral component of primary care services. This study aims to critically examine the boundaries of professional responsibility, ethical obligations, and the legal framework governing family physicians' practices in remote assessment and diagnosis.

Materials and Methods:

This presentation provides a comprehensive overview of the historical evolution of telemedicine, its global implementations, and the digital health transformation in Türkiye. The analysis is conducted within the framework of current legislation, international conventions, and ethical principles. In particular, desk-based diagnostic processes are evaluated in light of the Regulation on the Provision of Remote Healthcare Services and recent updates in family medicine practice.

Results:

Telemedicine serves as a powerful tool that enhances accessibility in chronic disease management, risk assessment, preventive care, and psychosocial support. In family medicine practice, digital systems such as e-Nabız, the Family Medicine Information System, and the Disease Management Platform have substantially improved remote monitoring, data-driven decision-making, and early intervention capabilities. However,

the absence or limitation of physical examination, reliance on incomplete clinical data, and increased dependence on patient-reported information significantly raise the risk of diagnostic errors and associated legal liability. Although current regulations clearly state that telemedicine does not constitute an equivalent alternative to face-to-face care, they define physician responsibility independently of the modality of service delivery, thereby preserving professional obligations in full. This situation introduces a novel domain that may be conceptualized as an “expansion of responsibility” in clinical practice. Key components of physician responsibility include accurate patient identification, expanded scope of informed consent, protection of data privacy and confidentiality, appropriate patient selection, and timely referral for in-person evaluation when necessary.

Conclusion:

Telemedicine is an indispensable tool that transforms family medicine practice and strengthens access to healthcare; however, it does not provide an unlimited diagnostic domain. Rather, it represents a paradigm that increases clinical uncertainty while redefining physician responsibility. In this context, the role of the family physician extends beyond clinical decision-making to include determining the appropriateness of remote evaluation, anticipating potential risks, and avoiding delays in necessary face-to-face assessment. Ensuring the safe and sustainable integration of telemedicine requires the establishment of clear standards, enhancement of professional training, and increased legal awareness.

Keywords: Telemedicine, Family Medicine, Remote Diagnosis, Medical Liability, Digital Health

Social Prescription in Primary Care: Obstacles and Opportunities

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Social prescribing is a concept of growing importance. It is based on the role of health determinants in improving health. It serves as a means of referring patients to various non-clinical services within the community (1). Over the past decade, various social prescribing organisations and networks have been established worldwide (2). The World Health Organization recently published a social prescribing toolkit (1).

Many factors, such as biological, psychological and environmental factors, influence health. These factors, referred to as health determinants, affect treatment outcomes. This highlights the importance of the biopsychosocial approach (3).

Primary care centres form the foundation of healthcare services. Given their role as the first point of contact, their ability to adopt a holistic approach, and the continuity of care they provide, healthcare professionals working in primary care hold a particularly significant position regarding social prescribing. In this context, primary care doctors can adopt a holistic approach towards patients and refer them to "link worker". Link workers collaborate with patients to design personalised plans (1).

Social prescribing offers opportunities for improvements in health and well-being, the appropriate use of medical resources, increased trust in the healthcare sector, and enhanced patient satisfaction. However, evaluating its outcomes is challenging. Factors such as a lack of evidence, differences between countries, a lack of knowledge on the

Keynote Presentation

subject among both patients and doctors, patient expectations and acceptance, sustainability, and funding present various barriers to social prescribing (3).

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Most Common Complementary and Alternative Medicine (CCAM) Practices and Application Areas

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CCAM practices have become not only a field of increasing public interest in recent years, but also an important topic that reopens the discussion on the clinical boundaries of modern healthcare services. The increasing burden of chronic diseases, rising expectations focused on quality of life, individuals' desire to take a more active role in their health decisions, and the search for solutions to long-standing symptoms are among the main reasons for this trend. In Turkey, patients seek CCAM practices not only for disease treatment but also for pain control, stress reduction, improved sleep quality, alleviation of functional complaints, and as additional support to standard treatments.

In Turkey, CCAM practices are defined within the framework of the Regulation on Traditional and Complementary Medicine Practices published by the Ministry of Health of the Republic of Turkey; training, certification, practitioner qualifications, and center standards have been determined. This approach aims to prevent the uncontrolled continuation of the field and to increase patient safety. However, the level of scientific evidence is not the same for every Complementary and Alternative Medicine (CAM) method. While some practices may provide supportive benefits in specific clinical areas, the evidence for others is limited or debatable. Therefore, the fundamental approach is to evaluate each method individually and in accordance with the principles of evidence-based medicine.

Keynote Presentation

Acupuncture is one of the most widely used CAM methods in Turkey and worldwide. Current meta-analyses and international guidelines show that acupuncture can provide supportive benefits, especially in the areas of chronic lower back pain, knee osteoarthritis-related pain, migraine prophylaxis, tension-type headaches, and chemotherapy-induced nausea. Although the level of effectiveness is often moderate, it is considered as part of multimodal treatment programs, especially in chronic pain management.

Phytotherapy is one of the most frequently used areas in society. Peppermint oil preparations may be beneficial in irritable bowel syndrome, ginger in pregnancy and postoperative nausea, some fiber and herbal combinations in constipation management, and some standardized preparations in mild anxiety and sleep problems. However, not all herbal products are safe. Liver toxicity, kidney damage, interactions with anticoagulant drugs, and lack of content standardization are significant problems. Therefore, its use without medical supervision is inappropriate.

Hypnosis can be used supportively, especially in procedural anxiety, dental phobia, some chronic pain conditions, irritable bowel syndrome, and smoking cessation processes. It may be beneficial in selected patients with accompanying psychological complaints. Similarly, music therapy can offer supportive contributions, particularly in reducing stress levels, lowering perioperative anxiety, increasing comfort in palliative care patients, reducing agitation in dementia patients, and in rehabilitation processes. In Turkey, music therapy also has historical significance. It is known that rhythm and sound were used in ancient healing centers such as the Asklepion of Pergamon; and in later periods, spiritual balance was aimed at with specific musical modes in hospitals such as the Sultan Bayezid II Darüşşifa.

Cupping therapy and leech therapy (hirudotherapy) are well-known traditional methods in society. Cupping therapy is mostly preferred for muscle tension, myofascial pain, and general relaxation. However, clinical evidence is limited, and the number of high-quality studies is small. Hirudotherapy, on the other hand, can be used in modern medicine with

selected indications, especially for relieving venous congestion, in some reconstructive surgery cases, and in limited circulatory disorders. Beyond this, strong evidence is lacking for its widespread use. Both methods present concerns regarding infection, bleeding, and sterility.

Mesotherapy and prolotherapy are particularly relevant for musculoskeletal complaints. While some studies have reported pain reduction in knee osteoarthritis and chronic tendon complaints with prolotherapy, the quality of evidence is heterogeneous. Mesotherapy is used for local pain and cosmetic purposes, but more studies are needed regarding its clinical effectiveness. While there is limited positive data for ozone therapy in chronic wound care and some pain conditions, strong evidence is not yet sufficient for many areas of use.

Practices such as osteopathy, chiropractic, and reflexology are also frequently encountered areas. Spine-based manual therapies can provide short-term symptom relief in mechanical lower back and neck pain; however, caution should be exercised in cases of neurological deficits, osteoporosis, trauma, or suspected malignancy. Reflexology, on the other hand, is primarily used for relaxation, stress reduction, and quality of life support. Its clinical effects are generally at the level of symptom control and subjective relief. Homeopathy, while preferred by some individuals for chronic complaints and functional symptoms, has not shown consistent efficacy beyond placebo in current high-quality systematic reviews. Therefore, recommending it as an alternative to standard treatments is not scientifically appropriate. Larva therapy, however, has a more specific and evidence-based application as a biological debridement method for removing necrotic tissue in chronic wound care.

The fundamental principle in Complementary and Alternative Medicine (CAM) practices is that no method should be presented as a substitute for malignancy treatment, or as an alternative to standard treatment in acute infections, acute coronary syndromes, stroke, or situations requiring emergency intervention. In clinical practice, it is crucial that patients inform their physicians about the Complementary and Alternative Medicine

(CAM) methods they use or are considering using; and that physicians, without judgment, question these methods and evaluate the potential benefits, harms, and interactions.

In conclusion, the field of CAM in Turkey is a defined and delimited area of practice according to official legislation. However, each method has a different level of evidence, safety profile, and clinical suitability. While acupuncture, some phytotherapy applications, hypnosis, music therapy, and selected manual approaches may provide supportive benefits in certain situations, many other methods require stronger scientific studies. Healthy integration is only possible with an evidence-based approach, effective supervision, the protection of ethical boundaries, and a medical practice that prioritizes patient safety.

What is Social Prescribing: A Framework from the Perspective of Family Medicine

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Health is a state of complete physical, mental, and social well-being. However, social factors have long been neglected within modern biomedical, disease-centered systems. Today, individuals face complex, multi-layered problems that may not fall under the category of “disease” in a medical sense, yet significantly impair quality of life. Loneliness, social isolation, loss of meaning, chronic stress, digital addiction, sedentary lifestyle, and unhealthy dietary habits are among the leading issues. In addition, low socioeconomic status, insecurity, and weakening social bonds profoundly affect both physical and mental health. Although modern medicine often attempts to address these complex problems with pharmacological solutions, this approach frequently proves insufficient.

From the perspective of family medicine—a discipline grounded in a person-centered and holistic approach—social prescribing emerges as a powerful tool in managing these challenges. Social prescribing is a structured approach that recognizes health problems as being influenced not only by biomedical factors but also by social determinants, and it connects patients to community-based resources. This approach does not reduce the patient to a “diagnosis”; instead, it considers the individual within their social environment, living conditions, and personal meaning framework.

The WONCA tree, which forms the foundation of family medicine, systematically defines the core competencies and values of the discipline. Social prescribing is directly linked to many components of this framework. The core values of comprehensiveness, person-

centeredness, community orientation, and holistic care—as well as continuity and coordination—are among the key factors that highlight the role of family medicine in social prescribing practices.

At the center of social prescribing lies comprehensiveness. The family physician evaluates patients not only in terms of biological disease but also in terms of psychological and social needs. Therefore, rather than prescribing solely pharmacological treatment for a lonely individual, referring them to community groups that offer social interaction becomes a natural extension of comprehensive care.

This approach is also inherently person-centered. Social prescribing goes beyond standardized algorithms and takes into account the individual's values, life circumstances, and sense of meaning. The guiding question is not merely “What is the most appropriate treatment?” but rather “What is meaningful and sustainable for this person?”

The community-oriented role of the family physician is also closely aligned with the philosophy of social prescribing. The physician is familiar with local social resources, community dynamics, and needs within the population they serve. Accordingly, they can refer patients to walking groups, volunteering activities, art workshops, or support groups. In this sense, social prescribing extends healthcare beyond the boundaries of clinical settings.

Holistic care constitutes the theoretical backbone of this model. As one of the most concrete applications of the biopsychosocial model in practice, social prescribing focuses not on disease alone but on the person, taking into account all dimensions of an individual's life.

In line with the principle of continuity, social prescribing is not a one-time referral. The family physician monitors how the patient benefits from the intervention, receives feedback, and adjusts the plan when necessary. This transforms the process into a dynamic and continuously evolving partnership with the patient.

Similarly, coordination is a critical determinant of the effectiveness of social prescribing. The family physician acts as a bridge between the healthcare system and community resources, collaborating with social services, local authorities, and non-governmental organizations to activate appropriate support networks. This multi-stakeholder structure enhances both the sustainability and the impact of social prescribing.

In summary, one of the greatest challenges facing modern medicine is responding to problems arising from the complexity of being human beyond biomedical boundaries. Social prescribing is an innovative and powerful approach that fills this gap. Fully aligned with the core principles of the WONCA tree, it brings the essence of family medicine into clear focus once again.

Geriatric Syndromes: Falls, Malnutrition, and Frailty

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We will address three key geriatric syndromes that are most frequently encountered in our clinical practice and significantly impact mortality and morbidity: falls, malnutrition, and frailty. These three conditions often coexist in elderly individuals, triggering each other and creating a clinical vicious cycle. Unlike classical disease definitions, geriatric syndromes refer to multifactorial and complex clinical conditions that cannot be reduced to a single organ system. These syndromes generally arise from the interaction of multiple systems and are one of the primary causes of functional loss in elderly individuals. One of the most important characteristics of these syndromes is atypical presentation. In elderly individuals, diseases often manifest not with classic symptoms, but with non-specific findings such as falls, confusion, or loss of appetite. Furthermore, comorbidities and polypharmacy further complicate this picture. With the increase in the elderly population, the prevalence of geriatric syndromes is also rapidly increasing. For example, approximately one-third of individuals over 65 years of age fall at least once a year. The rate of malnutrition in hospitalized elderly patients can reach up to 50%. Frailty is seen in 10-25% of the population. A fall is defined as an involuntary descent from a lower level than one's original position. This often occurs due to multifactorial reasons and can lead to serious complications. Falls cause serious trauma, particularly hip fractures, in elderly individuals. Furthermore, the development of a fear of falling leads to limited mobility and social isolation. All of these are significant factors that increase mortality. Among the intrinsic causes of falls, sarcopenia, balance disorders, and

Keynote Presentation

neurological diseases are particularly prominent. Decreased muscle strength and delayed reflex responses significantly increase the risk of falls.

Environmental factors are just as important as intrinsic factors. Disorder within the home, inadequate lighting, and slippery floors are key elements that increase the risk of falls. Polypharmacy is one of the most important causes of falls in geriatric patients. Sedatives and antihypertensives, in particular, increase the risk by causing orthostatic hypotension and altered consciousness. Muscle weakness, proprioceptive loss, and central nervous system integration disorders play a significant role in the pathophysiology of falls. The simultaneous disruption of these systems results in a loss of postural stability. Clinical evaluation must begin with a detailed history. The type and time of the fall, and accompanying symptoms should be inquired about. This should be followed by a systematic physical examination. Decreased walking speed is also an important indicator of frailty.

A systematic approach is necessary in fall management. First, risk factors should be identified, and then an individualized intervention plan should be created. Preventing falls is more effective than treating them. Exercise programs and environmental adjustments, in particular, have strong evidence in this regard. Malnutrition is a complex condition encompassing not only calorie deficiency but also protein and micronutrient deficiencies. Malnutrition is particularly common in hospitals and nursing homes and is often overlooked.

In elderly individuals, factors such as decreased appetite, dental problems, and depression predispose to malnutrition. As a result of malnutrition, protein catabolism increases and muscle mass decreases. This directly leads to sarcopenia. Weight loss and muscle atrophy are the most prominent findings. However, it often progresses insidiously. Protein and energy support forms the basis of treatment.

A multidisciplinary approach increases success. Frailty is the decrease in the organism's resistance to stress. These criteria are the most commonly used diagnostic tools in the clinic. Frailty is a dynamic process and is reversible in the early stages. Chronic

inflammation is one of the fundamental mechanisms of frailty. Frailty independently increases mortality. Different scales can be used in clinical practice. Exercise and nutrition are the most effective interventions. These three syndromes form a cycle that triggers each other. A holistic approach is essential. Exercise and nutrition interventions are supported by strong evidence. This is not a condition that can be managed by a single specialty. This patient is a typical example of a geriatric syndrome. Early diagnosis and prevention are vital.

Aging is a process observed in all living beings that causes decline in mental, physiological, and social aspects, encompassing all structural and functional changes in cells, tissues, and systems over time. Aging is also defined as "irreversible, progressive changes in the performance of the entire body or organs, tissues, and cells over time." It refers to individuals who have completed a certain chronological period and the point reached after this period due to certain losses. Aging, a significant process with physiological, economic, social, and psychological aspects, refers to the period in which the organism's ability to respond to internal and external stimuli decreases (Kaptan). Although significant deficiencies are observed during the aging process, aging is not considered a disease or disorder.

Theories Related to the Concept of Aging. In the literature, the subject of aging is mostly examined in two parts: biological and psychosocial. According to biological approaches, the aging process is described by physical and psychological changes. In psychological approaches, the aging period is attempted to be explained by changes in social communication and behavior. "Geriatric syndromes, unlike classical disease definitions, refer to multifactorial and complex clinical conditions that cannot be reduced to a single organ system. These syndromes usually arise as a result of the interaction of multiple systems and are one of the main causes of functional loss in elderly individuals." "One of the most important characteristics of these syndromes is atypical presentation. In elderly individuals, diseases may not manifest with classic symptoms, but often with findings ranging from falls, confusion, loss of appetite, and nutritional problems to malnutrition.

Furthermore, comorbidities and polypharmacy further complicate this picture.” “One of the most important characteristics of these syndromes is atypical presentation. In elderly individuals, diseases may not manifest with classic symptoms, but often with findings ranging from falls, confusion, loss of appetite, and nutritional problems to malnutrition.

Furthermore, comorbidities and polypharmacy further complicate this picture.” The Concept of Falls in Old Age. A fall is defined as a person unconsciously or consciously falling to a lower position than their original position without paralysis, fainting, or external impact/trauma. In other words, a fall is defined as "an individual unexpectedly becoming immobile at a lower level than their original position without stroke or syncope".

Falls, one of the most common problems faced by elderly individuals, occur as a result of decreased functionality in all bodily systems due to dizziness, weakened vision, sensory disturbances, and blood pressure changes, leading to irreversible changes and an increased tendency to fall.

On the other hand, descending stairs, being at a doorstep, lacking a handhold in the toilet, bathroom, and bedside, and trying to get up suddenly and quickly are all contributing factors. Insufficient ambient light, very dim or very bright light, wet surfaces, weather conditions (bumpy/snowy/icy roads), sleep problems, high curbs, and choosing the wrong shoes are all external risk factors that can cause falls.

Malnutrition

Malnutrition, the most commonly accepted definition worldwide, is inadequate nutrition and is defined as follows:

A nutritional state in which a deficiency or excess of energy, protein, and micronutrients causes measurable adverse effects on tissue/body form (body shape, size, and composition) and function, as well as clinical outcome.

Physical activity decreases with age, generally leading to lower calorie intake, which in turn reduces the intake of essential nutrients.

Taste and smell senses decrease with age, and changes in dental condition further affect taste perception, leading to decreased appetite and reduced ability to chew some foods.

The decline in visual and auditory senses with advancing age, osteoarthritis affecting mobility, can reduce an elderly person's ability to consume food. These conditions put older people at a higher risk of malnutrition. Another factor that can affect changes in nutrient intake in the elderly is the development of changes in hormone regulation. Peripheral satiety signals consist of several hormones, including glucagon, leptin, cholecystokinin, ghrelin, and glucagon-like peptide-1 (GLP-1). As we age, brain functions develop adaptation and control processes in relation to these hormone regulation, potentially leading to decreased perception of these hormones and resulting in nutritional deficiencies.

Anthropometric Measurements

There are no contraindications to applying anthropometric measurements to individuals. It is the process of taking physical measurements of individuals of different ages and nutritional statuses. These measurements include physical dimensions such as height, body weight, and circumference of various body parts, while also covering the determination of body composition and fat distribution. Anthropometric measurements, which are indicators of protein and fat stores, play an important role in determining nutritional status. These measurements, performed regularly, can be applied in any environment and will be beneficial in the healthy assessment of a person's nutritional level. They are generally easy to apply, reliable, simple, non-invasive, objective, able to measure the desired parameters, sensitive, fast, and based on numerical data. Commonly used methods for measuring physical dimensions include measurements such as body weight, height, and Body Mass Index (BMI), as well as circumference measurements such as waist, hip, upper mid-arm, and calf circumference.

Weight, height, BMI

Body weight (BW); VA is an indicator of fat mass, muscle mass, bone, and water content, but does not provide specific information about all components. VA measurement should be taken as much as possible in the morning, on an empty stomach, after defecation, and with light clothing and no shoes. Falls, malnutrition, and frailty are fundamental geriatric syndromes that not only occur together in the geriatric population but also progress through a common pathophysiological basis, mutually reinforcing each other and exponentially aggravating clinical outcomes.

Geriatric syndromes are known to arise from the interaction of age-related physiological changes, multiple comorbidities, and environmental factors; this necessitates a multidimensional approach to these syndromes, unlike classical disease models. The relationship between malnutrition and frailty is much stronger than we thought. According to systematic review and meta-analysis data published in 2024, the risk of developing frailty is significantly increased (OR $\approx$ 3.7) in elderly individuals with malnutrition, and more than half of frail individuals have concomitant malnutrition.

Similarly, community-based studies have shown a complex and bidirectional relationship between malnutrition, sarcopenia, and frailty; evaluating these three together is more powerful in predicting clinical outcomes.

In terms of preventive approaches, interventions such as resistance exercises, adequate protein and energy intake, vitamin D supplementation, reduction of polypharmacy, and environmental adjustments are understood to not only reduce symptoms but also modify the underlying pathophysiological process.

The ability to slow the progression of frailty and malnutrition, especially when recognized early, with appropriate interventions is considered one of the most critical achievements of geriatric care.

In conclusion, falls, malnutrition, and frailty; Geriatric syndromes are clinically significant and increasingly prevalent, directly associated with loss of independence,

institutionalization, and mortality in older individuals. Current evidence clearly demonstrates that early recognition, systematic screening, and management of these syndromes through multidisciplinary, individualized approaches improve patient outcomes and reduce the burden on healthcare systems. Future research focusing on biomarker-based early diagnosis methods, digital health-supported monitoring systems, and personalized intervention strategies will be crucial in achieving healthy aging goals.

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Telemedicine and Remote Consultation: Safe Use in Primary Care

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The World Health Organization defines telemedicine as the delivery of healthcare services through information and communication technologies in situations where access to care is limited. In a broader sense, the WHO also describes digital health as a force that is reshaping health systems.

In recent years, the use of telemedicine in primary care has increased, particularly due to global crises such as the COVID-19 pandemic and the rapid pace of digital transformation. In some countries, it has even become a routine component of healthcare delivery.

In primary healthcare services, telemedicine can be used for:

- Monitoring chronic diseases
- Reviewing laboratory results
- Supporting treatment adherence and medication adjustments
- Providing health education and preventive services
- Reducing contact in situations with a risk of infection
- Following up patients with limited mobility, those living in rural areas, or individuals with restricted access to healthcare
- Managing certain behavioral and mental health conditions such as anxiety, depression, and sleep disturbances

Clinical experience suggests that telemedicine can be beneficial in these areas. However, its increasing use brings certain challenges as well, particularly regarding patient safety

and limitations in the quality of care. The absence of a physical examination may introduce uncertainty into clinical decision-making and can increase the risk of misdiagnosis or delayed intervention. For this reason, patient selection becomes a key step in remote consultations. The limits of clinical assessment should be clearly recognized, and patients should be invited for in-person evaluation whenever necessary.

Data security and patient confidentiality are just as important as clinical safety in telemedicine practice. It is essential to implement appropriate technical and administrative measures to protect personal health data, ensure secure communication systems, and maintain proper documentation of the entire process. Healthcare professionals should also remain aware of their ethical and legal responsibilities in this context.

In Türkiye, telemedicine practices gained a formal legal framework with the “Regulation on the Provision of Remote Health Services,” which came into force in 2022 in response to increased demand following the pandemic. This regulation clearly defines the scope of telemedicine, the roles and responsibilities of healthcare providers, and the requirements related to data security and record-keeping.

Furthermore, an amendment to the Family Medicine Practice Regulation on April 9, 2026 introduced a new provision stating that family physicians may provide remote health services in accordance with procedures determined by the Ministry of Health. With this change, telemedicine has been formally integrated into primary care practice. At the same time, the use of Ministry-approved digital systems became mandatory, and the necessary technological infrastructure was defined.

Conclusion

Telemedicine is a powerful tool that can improve accessibility in primary care. However, to use it safely and effectively, attention must be given to clinical appropriateness, patient safety, data privacy, and compliance with legal regulations. In this context, hybrid care

models—combining remote and face-to-face services—appear to be the most balanced and practical approach in current practice.

Keywords: Telemedicine, Remote Consultation, Primary Care, Patient Safety, Digital Health

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Elderly Health in Disasters: The Role of Preventive Care in Primary Health Care

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Abstract

Disasters affect entire populations; however, their impact is not evenly distributed. Older adults are among the most vulnerable groups due to reduced physiological reserve, a higher burden of chronic diseases, functional dependence, and limited social support. This study addresses elderly health in disasters from a primary care and preventive medicine perspective, with a particular focus on the role of comprehensive geriatric assessment.

The effects of disasters on older individuals are multifaceted, encompassing physical, psychological, and social dimensions. Exacerbation of chronic conditions, interruptions in medication access, increased risk of trauma, and the development of anxiety, depression, or post-traumatic stress are commonly observed. In addition, individuals with limitations in activities of daily living (ADL) and instrumental activities of daily living (IADL) face greater challenges during evacuation, access to care, and recovery processes.

Comprehensive geriatric assessment provides a structured approach to evaluating the medical, functional, cognitive, and psychosocial status of older adults. It plays a key role

Keynote Presentation

in identifying at-risk individuals before disasters and in guiding individualized care planning. Furthermore, geriatric syndromes such as malnutrition, sarcopenia, falls, delirium, and polypharmacy may worsen under disaster conditions, contributing to increased morbidity and mortality.

Primary care services are central to disaster preparedness and response for older populations. Early identification of high-risk individuals, continuity of chronic disease management, development of individualized emergency plans, and strengthening of home-based care services are essential components of this approach. Current evidence also highlights the importance of shifting from age-based to function-based assessments in disaster planning.

In conclusion, protecting the health of older adults in disasters requires a proactive, multidisciplinary, and primary care-oriented approach. Integrating comprehensive geriatric assessment into routine practice may help reduce adverse outcomes and improve resilience among older populations.

Keywords: Disaster; Elderly; Primary Care; Preventive Medicine; Comprehensive Geriatric Assessment; Frailty; Geriatric Syndromes

Introduction

Disasters are events with wide-ranging impacts that place sudden and substantial strain on health systems. Although all individuals are affected to some extent, certain groups experience disproportionately greater harm. Older adults are among the most vulnerable, largely due to reduced physiological reserve, a higher burden of chronic conditions, and limitations in social support systems.

The global increase in the aging population has led to a corresponding rise in the number of individuals at risk during disasters. This trend makes it necessary to address elderly health as a distinct component of disaster management. In this context, primary health

care services play a critical role, particularly in disaster preparedness and risk reduction efforts.

Vulnerability of the Elderly Population in Disasters

The increased impact of disasters on older adults cannot be explained by chronological age alone; rather, the concept of frailty plays a central role. Frail older individuals are characterized by reduced physiological reserves and a diminished ability to cope with stressors, making them more susceptible to rapid functional decline in acute situations such as disasters.

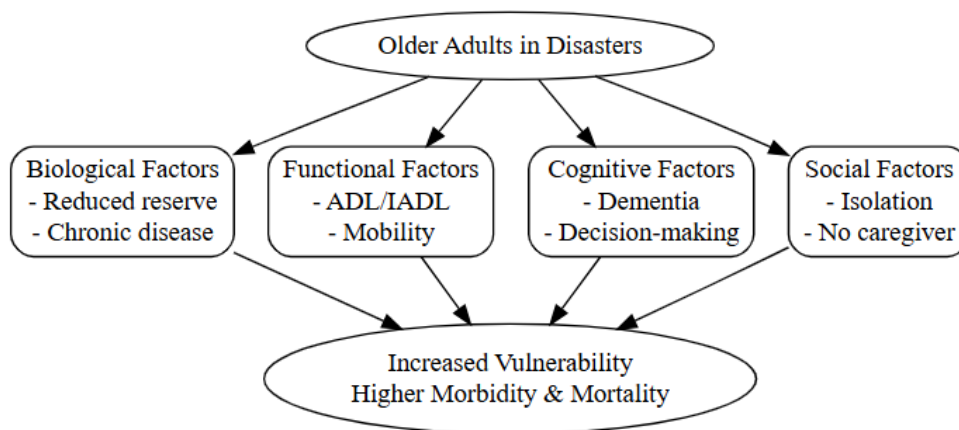


Figure 1. Determinants of vulnerability among older adults in disasters.

Frailty is a multidimensional condition shaped by the interaction of physical, cognitive, social, and economic factors, as outlined in Figure 1. Limited mobility, sensory impairments, dementia, chronic diseases, and social isolation are among the key contributors to increased vulnerability. In particular, individuals who depend on home care services represent one of the highest-risk groups in disaster settings.

Impact of Disasters on the Health of Older Adults

The effects of disasters on older individuals are multidimensional and can be considered in physical, psychological, and social terms.

Physical effects:

Trauma, exacerbation of chronic diseases, infections, and immobilization are commonly observed. Disruptions in access to medications may lead to serious complications, particularly in conditions such as diabetes and hypertension.

Psychological effects:

Depression, anxiety, and post-traumatic stress disorder are frequently reported in the post-disaster period.

Social effects:

Loss of caregivers, social isolation, and displacement can negatively affect the quality of life of older adults.

Functional Assessment and Dependency

Functional status is a key component in assessing the health of older adults in disaster settings. Activities of daily living (ADL) and instrumental activities of daily living (IADL) are commonly used to determine an individual's level of independence.

Studies indicate that a substantial proportion of older adults require assistance in areas such as:

- transportation (39%)
- household tasks (38%)
- meal preparation (30%)

These findings highlight that disaster planning should take into account not only medical conditions but also the functional capacity of older individuals.

Disaster Preparedness and Existing Gaps

The level of disaster preparedness among older adults is generally low. Studies show that only a small proportion of this population has a formal disaster plan. At the same time, the majority are dependent on medications and medical equipment.

Many older individuals:

- do not have a documented medication list
- lack accessible contact information for their physicians
- do not have an established emergency plan

These gaps highlight the growing importance of preventive approaches within primary health care.

Comprehensive Geriatric Assessment

Comprehensive geriatric assessment (CGA) is a multidimensional approach that evaluates the medical, functional, cognitive, and psychosocial status of an older individual in an integrated manner.

The main components of CGA include:

- medical assessment
- functional assessment
- cognitive assessment
- psychosocial evaluation
- nutritional status
- medication use (polypharmacy)

When conducted prior to a disaster, CGA enables the identification of high-risk individuals and supports the development of individualized care plans.

Geriatric Syndromes and Disasters

Disasters can precipitate or worsen geriatric syndromes in older adults, which may ultimately lead to functional decline and increased dependency (Figure 2).

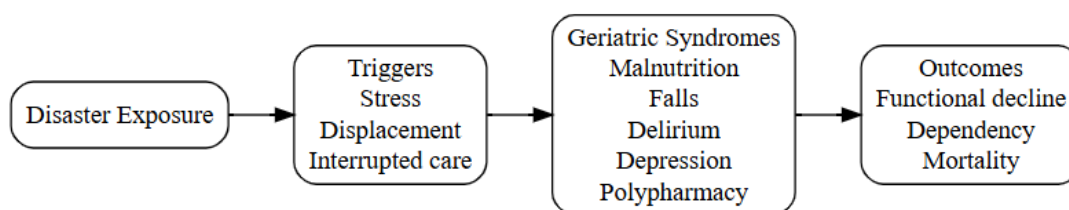


Figure 2. Impact of disasters on geriatric syndromes in older adults

These syndromes include:

- malnutrition
- sarcopenia
- falls
- delirium
- depression
- polypharmacy

Such conditions contribute to increased functional decline, leading to higher levels of dependency and increased mortality.

Role of Primary Health Care Services

Primary health care services represent one of the most critical components of disaster management. Family physicians, who provide continuous care, are in a unique position to monitor older individuals over time and identify risks at an early stage.

Within this framework, the main priorities include:

- identifying high-risk individuals
- conducting comprehensive geriatric assessments
- developing individualized disaster plans
- ensuring continuity in the management of chronic diseases
- strengthening home-based health care services

These measures are essential for improving preparedness and reducing vulnerability among older adults in disaster settings.

Multidisciplinary Approach

The management of elderly health in disaster settings requires a multidisciplinary approach. The needs of older individuals extend beyond medical care and also include psychosocial and functional dimensions.

Therefore, effective coordination among different disciplines is essential, including:

- physicians
- nurses
- social workers
- psychologists
- physiotherapists

Such collaboration is key to ensuring comprehensive and continuous care for older adults during disasters.

Conclusion

Disasters pose significant health risks for older adults. The most effective approach to reducing these risks lies in preventive health services delivered at the primary care level, along with the use of comprehensive geriatric assessment.

Current evidence clearly indicates that disaster management should move beyond age-based approaches and instead adopt function-based and multidisciplinary strategies.

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ORAL PRESENTATIONS

Positive Psychological Effects of Earthquakes: Post-Traumatic Growth

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Objective:

Large-scale traumatic events such as earthquakes typically have adverse effects on mental health; however, some individuals also experience positive psychological changes, including enhanced interpersonal relationships, increased personal strength, deeper spiritual engagement, and greater appreciation of life. These changes, termed Post-Traumatic Growth (PTG), represent an important indicator of adaptive functioning following trauma. This study aimed to systematically review the existing literature on PTG after earthquakes and summarize the key findings from published research.

Method:

A literature search was conducted in the PubMed database between 12–19 November 2025 using the terms (post-traumatic growth [Title]) AND (earthquake [Title]). Sixteen accessible full-text studies were included. Eligible studies were examined based on publication year, earthquake exposure, study location, study design, sample characteristics, measurement tools, and factors associated with PTG.

Results:

More than half of the studies (62.5%) employed a cross-sectional design, while 25% were prospective. Most research was conducted in China (50%) and Turkey (18.75%), followed by Japan (12.5%), Chile (12.5%), and South Korea (6.25%). Most studies were conducted on the 2008 Wenchuan Earthquake (40%) and the February 6, 2023, Kahramanmaraş earthquake (20%). Regarding sample characteristics, 43.75% of studies included children or adolescents, 37.5% included adults, and 18.75% focused on healthcare professionals. The Post-Traumatic Growth Inventory (PTGI) or its adapted versions were used in 87.5% of studies. Some studies investigating the relationship between PTG and post-traumatic stress symptoms have reported positive correlations, while some have identified negative associations. PTG was strengthened by protective factors such as psychological resilience, social support, self-efficacy, and parental attachment.

Conclusion:

The number of national and international studies examining PTG after earthquakes remains limited. Expanding research in this field may support the development of post-disaster interventions that not only reduce psychopathology but also enhance positive psychological adaptation in affected populations.

Keywords: Earthquake, Trauma, Post-Traumatic Growth, Mental Health

Family Physicians' Approach to Infant and Child Vision Screening

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Objectives

This study aimed to evaluate the attitudes, knowledge, and practices of family physicians regarding infant and child vision screening, and to identify barriers affecting the implementation of these screenings in primary health care settings.

Materials and Methods

This descriptive cross-sectional study was conducted between October and December 2024 among family physicians working in family health centers in Elazığ province, Türkiye. Of the 209 family physicians in the region, 75 participated in the study. Data were collected using a 19-item questionnaire developed in accordance with the Ministry of Health Infant, Child, and Adolescent Follow-up Protocols. The questionnaire assessed physicians' knowledge and frequency of performing vision screening procedures, including red reflex testing, light reflex examination, and visual acuity assessment at mandatory screening periods (0–3 months, 36–48 months, and first-grade primary school). Data were analyzed using descriptive statistics, and categorical variables were presented as numbers and percentages.

Results

Among the participants, 97.3% reported being familiar with the red reflex test. However, only 13.3% stated that they always performed the red reflex test in infants aged 0–3 months, while 34.7% reported never performing it. At 36–48 months, the rate of

physicians who always performed red reflex testing decreased to 1.3%, and 40% reported never performing it. In first-grade primary school children, 29.3% reported always performing red reflex testing. Visual acuity assessment was consistently performed by 5.3% of physicians at 36–48 months and by 18.7% in first-grade children. The Lea symbol chart was available and used by 49.3% of physicians, whereas only 8% reported always using a direct ophthalmoscope. The most frequently reported barriers to regular vision screening were lack of time and inadequate family health center conditions. A large majority of participants (84%) expressed a preference for face-to-face, hands-on training on vision screening.

Conclusion

Despite high follow-up rates during infancy and childhood, vision screening practices among family physicians remain insufficient. Enhancing in-service training programs, improving access to appropriate equipment, and optimizing workload conditions may contribute to increasing the frequency and effectiveness of vision screenings in primary care.

Keywords: Vision Screening, Primary Health Care, Family Physicians, Child

Correlation of Nocturnal Enuresis with Obstructive Sleep Apnea Syndrome in Adults: A Pilot Study

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Aim: The majority of studies on nocturnal enuresis (NE) have been conducted in pediatric populations. In adults, research on NE remains limited, with most investigations focusing predominantly on nocturia. In this study, we researched whether patients over 18 years of age attending our hospital with NE complaints had Obstructive sleep apnea syndrome (OSAS) or not and their depression and anxiety levels.

Materials and Methods: Our study was explained to patients who applied to our Hospital Urology Clinic with complaints of NE (patients had complaints of NE since childhood). Those who agreed to participate were asked to fill out the sociodemographic data form, Beck depression Inventory (BDI), Beck Anxiety Inventory (BAI), Epworth Sleepiness Scale (ESS), and Urinary Incontinence

Patient Quality of Life Questionnaire (IQOL). Polysomnography was also performed on the patients.

Results: This study was completed with a total of 24 patients, 14 women (58.3%) and 10 men (41.7%). Among patients, 6 had OSAS (25.0%), while 18 did not have OSAS (75.0%).

In this study, sociodemographic data of groups with and without Obstructive Sleep Apnea Syndrome (OSAS) were compared. According to the statistical analyses, no significant differences were found between the groups in terms of gender ($p = 0.192$), marital status ($p = 0.597$), education level ($p = 0.931$), occupation ($p = 0.123$), medications used ($p = 0.343$), and family history of NE ($p = 0.832$).

In the group who were OSAS (+), AHI rem ($p=0.002$), AHI non-rem ($p=0.003$), AHI total ($p=0.005$), supine sleep duration ($p<0.001$), desaturation index ($p=0.007$) and obstructive apnea index ($p=0.019$) were significantly higher than the OSAS (-) group (Table 1).

For patients included in the study, according to BDI category, 14 had normal findings (58.3%), while 10 had depressive findings (41.7%). For patients, the median BDI score was 15 (6-21), BAI score was 12 (4-19), median ESS score was 4 (2-7) and median IQOL score was 49 (29-62) (Table 2).

Conclusion: In conclusion, in this study, one quarter of adult patients with NE were found to have OSAS. When researching etiology in NE patients, we recommended researching OSAS. As our study was performed with a small patient group, generalization should not be performed.

Table 1: Comparison of polysomnography results for patients with and without OSAS

	OSAS (-) n=18(75.0%) Median(IQR ₂₅₋₇₅)	OSAS (+) n=6(25.0%) Median(IQR ₂₅₋₇₅)	p
Total sleep duration, min	297.6(264.1-329.0)	292.6(228.8-325.8)	0.790
Sleep efficiency, %	87.8(78.3-94.9)	89.5(79.1-94.2)	0.894
Total rem duration	8.9(0.0-15.5)	23.8(12.4-34.7)	0.088
Stage N1%	1.6(0.6-2.6)	1.3(0.3-1.9)	0.422

Stage N2%	61.6(54.6-68.8)	61.6(48.5-72.1)	0.894
Stage N3%	31.0(22.9-36.5)	27.4(20.1-43.6)	0.973
AHI rem	0.0(0.0-0.0)	3.9(1.9-23.3)	0.002
AHI non-rem	1.4(0.2-2.2)	5.9(4.1-9.7)	0.003
AHI total, events/h	1.7(0.3-2.3)	6.2(5.6-10.5)	0.005
Supine sleep duration	0.8(0.2-1.8)	7.7(5.3-33.0)	<0.001
Supine AHI	0.1(0.0-2.7)	3.1(0.0-9.0)	0.285
PLM	2.9(2.0-5.2)	3.1(2.5-90.5)	0.709
Basal oxygen SPO ₂ , %	95.0(94.0-96.0)	95.0(93.2-97.0)	0.610
Desaturation index	1.0(0.0-2.0)	3.6(2.0-7.5)	0.007
Obstructive apnea index	0.1(0.0-0.2)	0.5(0.2-0.8)	0.019
Mean SPO ₂ , %	96.0(94.0-96.0)	95.5(94.0-96.0)	0.691
Minimum SPO ₂ , %	92.0(91.0-93.0)	91(90.5-92.0)	0.589
Aurosolin index, events/h	3.6(0.7-5.1)	3.8(0.0-9.0)	0.974

Mann Whitney U Test. N1: non rapid-eye movement sleep stage 1; N2: non rapid-eye movement sleep stage 2; N3: deepest non rapid-eye movement sleep stage3; REM: rapid eye movement; AHI: apnoea-hypopnoea index; PLM: periodic leg movements; SPO₂: oxygen saturation measured by pulse oximetry

Table 2: Comparison of scale scores in the study groups

		OSAS (-) n=18(75.0%)	OSAS (+) n=6(25.0%)	All patients n=24	p
Beck Depression category ¹	Normal	11(78.6%)	3(21.4%)	14(58.3%)	0.665
	Depressive findings	7(30.0%)	3(30.0%)	10(41.7%)	
		Median(IQR ₂₅₋₇₅)	Median(IQR ₂₅₋₇₅)	Median(IQR ₂₅₋₇₅)	
BDI ²		15(6-22)	16(12-20)	15(6-21)	0.548
BAI ²		12(3-18)	11(4-20)	12(4-19)	0.920
Epworth Sleepiness Scale ²		4(1-7)	6(3-7)	4(2-7)	0.537
Incontinence Quality of Life ²		55(30-65)	39(24-50)	49(29-62)	0.217

¹ Fisher's Exact Test, ²Mann Whitney U Test. BDI: beck depression inventory; BAI: beck anxiety inventory

Keywords: Nocturnal Enuresis, Obstructive Sleep Apnea Syndrome, Adult Patient, Polysomnography

Factors Associated With Short-Term Smoking Cessation in a Smoking Cessation Outpatient Clinic

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Objective

Smoking cessation remains a major public health challenge, particularly in low- and middle-income countries where tobacco use is still highly prevalent. Identifying factors that influence cessation success in real-world clinical settings is essential for improving intervention strategies. This study aimed to evaluate demographic, smoking-related, and treatment-related factors associated with short-term smoking cessation success among individuals applying to a smoking cessation outpatient clinic.

Methods

This cross-sectional study included 160 individuals who applied to the Smoking Cessation Outpatient Clinic of Kırşehir Training and Research Hospital between December 2024 and March 2025 and agreed to participate. Demographic characteristics and smoking-related variables were recorded using a structured data form. Nicotine dependence levels were assessed using the Fagerström Test for Nicotine Dependence (FNBT). Based on FNBT scores, nicotine dependence was classified as low (0–3), moderate (4–6), or high (≥ 7).

Pharmacological treatment modalities were categorized as cytisine, bupropion, or combination therapy (cytisine plus bupropion). Smoking cessation status was assessed at the third month by telephone follow-up, representing short-term cessation outcomes.

Oral Presentation – OP104

Participants were classified as having quit smoking, continued smoking, or being unreachable. Logistic regression analysis was performed among participants who could be reached at follow-up to identify factors independently associated with smoking cessation. Statistical analyses were conducted using SPSS version 25.0, and a p value <0.05 was considered statistically significant.

Results

Of the participants, 68.0% were male (n=109), and the mean age was 37.5 ± 11.8 years. The mean age at smoking initiation was 18.4 ± 4.6 years, with a mean smoking duration of 21.8 ± 10.9 years. The average annual cigarette consumption was 21.6 ± 18.5 pack-years. The mean FNB score was 6.2 ± 2.1 , and 81.9% of participants had moderate to high nicotine dependence.

Regarding treatment modalities, 77.6% of participants received cytisine, 16.8% received bupropion, and 5.6% received combination therapy. At the third-month follow-up, 38.8% of participants had quit smoking, 33.1% continued smoking, and 28.1% were unreachable.

Table 1. Short-term smoking cessation outcomes and associated factors

Variable	Quit smoking (n=62)	Continued smoking (n=53)	p value
Age (years)	—	—	>0.05
Age at smoking initiation (years)	Higher	Lower	<0.001
Gender (male vs female)	—	—	>0.05
FNB score	—	—	>0.05
Treatment modality (cytisine vs others)	—	—	>0.05

In logistic regression analysis, earlier age at smoking initiation was the only factor independently associated with short-term smoking cessation success (OR = 0.72; 95% CI: 0.64–0.82; p < 0.001). Gender, nicotine dependence score, and treatment modality were not significantly associated with cessation outcomes.

Conclusion

This study demonstrates that early initiation of smoking is a key determinant of reduced short-term smoking cessation success in a clinical outpatient setting. These findings highlight the importance of preventing smoking initiation at younger ages and emphasize the need for early, targeted interventions. Personalized cessation strategies that consider individual smoking history may improve short-term cessation outcomes. Further studies with longer follow-up periods and biochemical verification are warranted to confirm these findings.

Keywords: Smoking Cessation, Nicotine Dependence, Cytisine, Bupropion

Sociodemographic Characteristics and Psychiatric Evaluation Results of Driver's License Applications Referred from Family Medicine to Psychiatry

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Objective

This study aimed to examine the sociodemographic characteristics and psychiatric evaluation results of individuals referred by family physicians to psychiatric outpatient clinics for the purpose of obtaining or renewing a driver's license.

Materials and Methods

This retrospective, cross-sectional study included 140 cases referred to the psychiatry outpatient clinic for driver's license evaluation during the specified period. The cases' age, gender, marital status, education level, employment status, and application type (first application/renewal) were recorded. The presence of a diagnosis was determined based on psychiatric evaluation. The distribution of continuous variables was assessed using the Shapiro-Wilk test. Variables with a normal distribution were compared using the Student t-test, while variables without a normal distribution were compared using the Mann-Whitney U test. The chi-square test or Fisher's exact test was used for categorical variables when appropriate. Variables associated with psychiatric diagnosis were evaluated using univariate logistic regression analysis. Statistical significance was set at $p < 0.05$.

Oral Presentation - OP105

Results

The mean age of the cases was 39.1 ± 12.0 years, with 67.1% being male. Psychiatric evaluation identified at least one psychiatric diagnosis in 42.1% of the cases. Patients with a diagnosis were older than those without (42.0 ± 11.2 vs. 36.9 ± 12.3 ; $p=0.016$) and had a lower rate of university graduation ($p=0.018$). The frequency of psychiatric diagnoses was significantly higher in renewal applications compared to initial applications (49.4% vs. 32.8%; $p=0.041$). In univariate logistic regression analysis, increasing age (OR=1.04; 95% CI: 1.01–1.07; $p=0.012$) and renewal application (OR=1.96; 95% CI: 1.01–3.80; $p=0.046$) were associated with the presence of a psychiatric diagnosis.

Conclusion

The rate of psychiatric diagnoses in driver's license applications referred from family medicine to psychiatry outpatient clinics is noteworthy and increases significantly, especially in renewal applications. This situation suggests that the need for psychiatric evaluation for renewal applications at the primary care level should be addressed more carefully in the driver's license report process.

Keywords: Driver's License, Family Medicine, Psychiatric Evaluation, Primary Care, Referral To Psychiatry, Sociodemographic Characteristics

Psychiatric Evaluation Results and Associated Factors in Individuals Referred for Psychiatric Consultation for a Smoothbore Hunting Rifle License

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Objective

This study aimed to examine the distribution of psychiatric evaluation results and the sociodemographic and clinical factors associated with these results in individuals who applied to family physicians for the first time to obtain or renew a smoothbore shotgun license and were referred to the psychiatry outpatient clinic by their family physicians.

Materials and Methods

The study was designed as a retrospective and cross-sectional study. It included 150 consecutive cases who consulted a psychiatry outpatient clinic for the first time to obtain a smoothbore shotgun license or renew an existing one during the specified period. Age, gender, type of referral (initial referral or renewal), and presence of psychiatric diagnoses were recorded for each case. Decisions based on psychiatric evaluation were categorized as “suitable” and “unsuitable/postponement.” The distribution of continuous variables was assessed using the Shapiro–Wilk test. An independent t-test or a Mann–Whitney U test was used for intergroup comparisons. Categorical variables were compared with the chi-square or Fisher's exact test. Factors associated with the “inappropriate/postponement” decision were examined using univariate logistic regression. Statistical significance was accepted at $p < 0.05$.

Results

The mean age of the cases was 40.2 ± 11.7 years, with 95.3% being male. Sixty percent of the applications were for renewing existing licenses. Psychiatric diagnoses were identified in 46% of the cases. As a result of the assessment, 84.0% of the cases were deemed "suitable" and 16.0% as "unsuitable/postponed" regarding license issuance. All cases diagnosed with psychotic disorder and bipolar disorder received a "unsuitable/postponed" decision. In cases with substance use disorder, the "unsuitable/postponed" rate was significantly higher at 75.0%. The mean age in the unsuitable/postponed group was higher than in the suitable group (44.7 ± 11.2 vs. 39.3 ± 11.6 ; $p=0.034$), and renewal applications were more common in this group. The presence of a psychiatric diagnosis was strongly associated with an unsuitability or postponement decision (OR=11.38; 95% CI: 3.08–42.0; $p<0.001$).

Conclusion

When individuals seek psychiatric consultation either for a first-time application or renewal of a smoothbore shotgun license, the number of unsuitability or postponement decisions is high. These decisions are especially common among individuals diagnosed with psychotic and bipolar disorders, as well as those with substance use disorders. The findings indicate that psychiatric evaluation is essential in the clinical decision-making process during primary care licensing procedures.

Keywords: Smoothbore Hunting Rifle, Firearm Licensing, Psychiatric Evaluation, Psychiatric Consultation, Primary Care, Mental Disorders

Evaluation of Polysomnographic Findings in Individuals Referred to a Sleep Laboratory Due to Driver's License Application and Their Possible Association with Previous Traffic and Occupational Accidents

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Aim: According to national regulations in Türkiye, individuals applying for a driver's license with a body mass index (BMI) ≥ 33 kg/m² are required to undergo overnight polysomnography. The aim of this study was to evaluate polysomnographic findings in individuals referred to a sleep laboratory due to driver's license application and to investigate their possible association with previous traffic and occupational accidents.

Methods: This retrospective study included patients who underwent polysomnography for driver's license application at the Konya City Hospital Sleep Laboratory between 01.06.2024 and 30.07.2025. Polysomnography results, Epworth Sleepiness Scale (ESS) and STOP-Bang questionnaire scores, as well as demographic and anthropometric data (age, sex, weight, height, waist circumference, neck circumference) were obtained from patient records. Information regarding previous occupational accidents related to sleepiness and traffic accidents while driving was also recorded.

Results: A total of 305 participants were included, of whom 89 (29.2%) were female and 216 (70.8%) were male. Sleep apnea was diagnosed in 179 participants (58.7%), while 126 participants (41.3%) had no sleep apnea. Among those diagnosed with sleep apnea,

19 (10.6%) had central sleep apnea and 160 (89.4%) had obstructive sleep apnea. Of the sleep apnea patients, 61 (34.1%) had mild, 48 (26.8%) had moderate, and 70 (39.1%) had severe sleep apnea.

All participants reported no history of occupational or traffic accidents due to sleepiness. Compared to the sleep apnea-negative group, the sleep apnea-positive group had significantly higher age, ESS score, STOP-Bang score, apnea-hypopnea index (AHI), oxygen desaturation index (ODI), N2 sleep stage percentage, neck circumference, and waist circumference ($p < 0.05$). N3 sleep stage percentage, sleep latency, mean SpO_2 , and minimum SpO_2 were significantly lower in the sleep apnea-positive group. Sleep apnea prevalence was significantly higher in males than in females ($p < 0.001$) (Table 1).

Receiver-operating characteristic (ROC) analysis demonstrated that both neck and waist circumferences had predictive value for sleep apnea. The area under the curve (AUC) for neck circumference was 0.712 (95% CI: 0.653–0.771, $p < 0.001$), and a cut-off value of ≥ 42.5 cm predicted sleep apnea with 60.3% sensitivity and 75.4% specificity. For waist circumference, the AUC was 0.569 (95% CI: 0.503–0.634, $p = 0.041$), and a cut-off value of ≥ 115.5 cm predicted sleep apnea with 66.5% sensitivity and 46.8% specificity (Table 2).

Conclusion: This study demonstrates a high prevalence of sleep apnea among individuals undergoing polysomnography for driver's license application, with the majority of cases being obstructive sleep apnea. Age, male sex, ESS and STOP-Bang scores, as well as neck and waist circumferences, were significantly higher in individuals with sleep apnea. Neck and waist circumferences showed predictive value for the diagnosis of sleep apnea. The absence of reported occupational and traffic accidents due to sleepiness may be attributed to self-reporting bias, suggesting possible underreporting of such events.

Keywords: Driver's License, Polysomnography, Epworth Sleepiness Scale, and STOP-Bang Questionnaire

Admission FIB-4 Independently Predicts Contrast-Induced Nephropathy in STEMI Patients Undergoing Primary PCI

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Background

Contrast-induced nephropathy (CIN) remains a frequent and clinically relevant complication in patients with ST-segment elevation myocardial infarction (STEMI) undergoing coronary angiography and primary percutaneous coronary intervention (PCI). CIN is associated with increased short-term morbidity, prolonged hospitalization, and adverse prognosis. Although baseline renal function is a key determinant of CIN, STEMI is characterized by acute hemodynamic instability, intense systemic inflammation, and microvascular dysfunction, which may not be fully captured by creatinine-based parameters alone. The Fibrosis-4 (FIB-4) index, a composite score derived from age, aminotransferase levels, and platelet count, has emerged as a marker of systemic vulnerability beyond liver disease. We aimed to investigate whether admission FIB-4 is associated with CIN development in STEMI patients.

Methods

We retrospectively analyzed consecutive STEMI patients undergoing coronary angiography and/or primary PCI at a tertiary center. CIN was defined according to the classical definition as an absolute increase in serum creatinine ≥ 0.5 mg/dL or a relative increase $\geq 25\%$ from baseline to post-procedural/discharge creatinine value. Admission

FIB-4 was calculated using the formula: $(\text{age} \times \text{AST}) / (\text{platelet count} \times \sqrt{\text{ALT}})$. Patients were classified according to CIN status. Continuous variables were compared using the Mann-Whitney U test and categorical variables using χ^2 or Fisher's exact test, as appropriate. Multivariable logistic regression analysis was performed to assess the independent association between FIB-4 and CIN, adjusting for clinically relevant covariates including age, sex, diabetes mellitus, hypertension, history of heart failure, systolic blood pressure on admission, baseline estimated glomerular filtration rate (eGFR), and Killip class ≥ 2 . Discriminatory performance was evaluated using receiver operating characteristic (ROC) curve analysis.

Results

A total of 851 STEMI patients were included; creatinine data were available in 846 patients. CIN occurred in 241 patients, yielding an incidence of 28.5%. Median FIB-4 values were similar between patients with and without CIN [1.53 (IQR 1.09–2.57) vs. 1.54 (IQR 1.01–2.33), $p=0.263$]. However, in multivariable logistic regression analysis, admission FIB-4 was independently associated with CIN development (adjusted odds ratio 1.09 per 1-unit increase, 95% confidence interval 1.01–1.18, $p=0.027$). Other independent predictors included advanced age, reduced baseline eGFR, Killip class ≥ 2 , diabetes mellitus, and lower systolic blood pressure. The ROC-AUC for FIB-4 alone was modest (AUC 0.527), whereas the multivariable model demonstrated improved but still moderate discrimination (AUC 0.579). An optimal FIB-4 cut-off value of 2.63 provided high specificity (82.1%) but low sensitivity (25.0%) for CIN prediction.

Conclusions

In STEMI patients undergoing primary PCI, admission FIB-4 is independently associated with the development of CIN despite limited standalone discriminatory performance. These findings suggest that FIB-4 reflects a systemic vulnerability to renal injury rather than serving as a screening biomarker. Incorporation of FIB-4 into early risk stratification models may help identify a high-risk STEMI subgroup that could benefit from intensified



renal-protective strategies. Prospective studies incorporating contrast volume and standardized post-procedural creatinine measurements are warranted.

Keywords: ST Segment Elevated Myocardial Infarction, Primary Percutaneous Coronary Intervention, Fibrosis-4

Evaluation of Pediatric Patients with Mastoiditis in A Tertiary Care Hospital

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Objective: The aim of this study is to examine the demographic and clinical characteristics, surgical-medical treatments, and complications of pediatric patients diagnosed with mastoiditis in a tertiary hospital.

Materials-Methods: This cross-sectional retrospective study included pediatric patients aged 0-18 years who were diagnosed with mastoiditis at Çukurova University Balcalı Hospital between January 1, 2021, and December 31, 2025. The sociodemographic and clinical characteristics, laboratory values, surgical-medical treatments, and complications of the patients were examined and recorded from their files.

Results: A total of 14 patients were included in our study. The gender distribution was M/F:1. The median age was 56 months (min: 3, max: 115). The most frequent complaint of the patients was postauricular erythema and tenderness. The median hospital stay was 14 days (min: 9, max: 15). In terms of complications, cholesteatoma occurred in 1 (7.1%) patient, subgaleal abscess in 1 (7.1%) patient, and hearing loss in 1 (7.1%) patient. Five (35.8%) patients underwent surgery. One (7.1%) patient underwent mastoidectomy and cochlear implant placement, two (14.3%) patients underwent myringotomy and mastoidectomy, one (7.1%) patient underwent myringotomy and mastoidectomy with abscess drainage, and one (7.1%) patient

underwent radical mastoidectomy. The average antibiotic treatment duration was 22 days (min: 14, max: 29). No antibiotic-related complications occurred in any patient.

Conclusions: Acute mastoiditis can be diagnosed early in the clinic with findings such as postauricular tenderness and erythema. Abscess drainage with adequate antibiotic treatment is safe as a conservative approach initially; simple mastoidectomy can be applied in patients who do not respond to this treatment. With early diagnosis and effective treatment, acute mastoiditis has a good prognosis and should be considered in all patients with otitis media during follow-up.

Keywords: Mastoiditis, Child, Acute Otitis Media, Treatment

Evaluation of the relationship between pain and other symptoms with cortisol, C-reactive protein (CRP), and erythrocyte sedimentation rate (ESR) in patients with advanced-stage cancer experiencing pain, and assessment of changes in these parameters during the pain follow-up period

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Purpose: The primary aim of this study was to evaluate cortisol and inflammatory parameters in patients with advanced-stage cancer experiencing pain, both before and after analgesic treatment. Pain and associated symptoms were assessed using the Edmonton Symptom Assessment Scale (ESAS). Additionally, we aimed to investigate the relationship between biomarkers and symptom burden and to evaluate changes following treatment in order to better understand the biological and clinical reflections of pain management.

Methods: This cross-sectional and prospective study was conducted between May 21 and December 1, 2025, following ethics committee approval. A total of 42 patients with advanced-stage cancer and pain who were hospitalized in the Palliative Care Unit of Tokat Gaziosmanpaşa University were included. A control group of 43 individuals presenting to the Family Medicine Outpatient Clinic and meeting inclusion criteria was also enrolled. In the patient group, C-reactive protein (CRP), erythrocyte sedimentation rate (ESR), and cortisol levels were measured at admission and after analgesic treatment. Also in the control group, CRP, ESR, cortisol were measured at admission. Symptom changes were evaluated using ESAS before and after treatment.

Oral Presentation - OP115

Findings: Pre-treatment cortisol, ESR, and CRP levels were significantly higher in the patient group compared with controls ($p<0.001$). After treatment, cortisol levels decreased significantly ($p=0.009$), whereas CRP and ESR levels did not show significant changes. ESAS pain scores showed a significant reduction following treatment ($p=0.001$). In the subgroup with follow-up data, a significant decrease in cortisol levels was observed at the second week, accompanied by improvements in pain, fatigue, nausea, sadness, anxiety, insomnia, appetite loss, well-being, and total ESAS scores. No significant changes were detected in CRP, ESR, or dyspnea scores. Patients in the mortality group had significantly higher baseline total ESAS scores compared with survivors ($p=0.014$).

Results: This study demonstrates that symptom burden in advanced-stage cancer is associated with biological stress responses. While inflammatory markers remained relatively stable in the short term, cortisol levels and symptom scores improved significantly following analgesic treatment. Importantly, baseline total ESAS score emerged as a prognostic indicator independent of biomarkers. These findings highlight the importance of comprehensive symptom assessment in advanced cancer patients and suggest that symptom burden may have both biological and prognostic implications in palliative care settings.

Keywords: Palliative Care, Cancer, Pain, CRP, ESR, Cortisol, ESAS

Reference: Doymus S. The Relationship of Pain and Other Symptoms with Cortisol, CRP, and ESR in Patients with Advanced-Stage Cancer Experiencing Pain, and the Evaluation of Changes in These Parameters During Pain Follow-up. [Medical specialty thesis]. Tokat Gaziosmanpaşa University Faculty of Medicine; 2026.

The Relationship Between Psychosocial Health and Postpartum Depression in Pregnant Women

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Aim: This study aimed to investigate the effect of psychosocial health on the risk of pregnancy depression and postpartum depression (PPD) in women with high-risk pregnancies.

Materials and Methods: The study included volunteers aged 18 years and older who were pregnant for 30 weeks or more and who attended the Pregnancy Monitoring Centre at Konya Beyhekim Training and Research Hospital between 1 February and 31 October 2025. The study was completed with a total of 225 participants. Participants were assessed during pregnancy using the Pregnancy Risk Assessment (PRA) Form; they also completed the Pregnancy Psychosocial Health Assessment Scale (PSHAS), the Beck Depression Scale (BDS), and a sociodemographic data form. Between days 14 and 28 postpartum, the postpartum assessment form and the Edinburgh Postnatal Depression Scale (EPDS) were administered, and an assessment for postpartum depression was conducted according to DSM-5 diagnostic criteria.

Results: In this study, high-risk and low-risk pregnancy groups were compared in terms of sociodemographic, obstetric, clinical, and psychosocial characteristics. There was no difference between the groups in terms of gestational age ($p=0.727$), but the mean age

($p<0.001$) and duration of marriage ($p=0.001$) were higher in the high-risk pregnancy group. The number of births ($p=0.001$), number of living children ($p=0.001$), number of miscarriages ($p=0.001$), number of abortions ($p=0.042$) and history of stillbirth ($p=0.001$) were higher in the high-risk pregnancy group. A relationship was found between educational level and pregnancy risk; university graduates were significantly more common in the low-risk pregnancy group ($p=0.032$). Chronic disease ($p<0.001$), continuous medication use ($p<0.001$) and smoking ($p=0.008$) were significantly more common in high-risk pregnancies. The caesarean section rate was significantly higher in the high-risk pregnancy group ($p<0.001$), while the gestational age ($p<0.001$) and birth weight were significantly lower ($p=0.045$). In the high-risk pregnancy group, the total GPSDÖ scores were significantly higher ($p=0.015$); however, no significant difference was found between the groups in terms of the EDSDÖ ($p=0.564$) and DSD ($p=0.677$) variables. In the psychosocial assessment, the GPSDÖ total score and subscales were significantly higher in the low-risk pregnancy group ($p<0.05$ for GPSDÖ and subscales); no significant difference was found only in the anxiety and stress subscales ($p=0.546$). Postnatal depression was detected in 8.9% ($n=20$) of the 225 pregnant women included in the study and was found to be statistically significantly associated with an extended family structure ($p=0.034$) and the presence of chronic disease ($p=0.021$). A negative correlation was found between the Beck Depression Scale and GPSDÖ ($r=-0.511$, $p<0.001$), and between EDSDÖ and GPSDÖ ($r=-0.413$, $p<0.001$), while a positive correlation was found between BDÖ and EDSDÖ ($r=0.426$, $p<0.001$). In women diagnosed with postnatal depression, BDÖ ($p=0.001$) and EDSDÖ ($p<0.001$) scores were found to be significantly higher, while GPSDÖ ($p<0.001$) total scores were found to be significantly lower.

Conclusion: This study revealed a strong and statistically significant relationship between psychosocial health levels and depressive symptoms during pregnancy in high-risk pregnant women. Pregnant women diagnosed with postnatal depression were found to have significantly lower psychosocial health levels and significantly higher depression scale scores. These findings suggest that psychosocial health during pregnancy may be an

important determinant of postnatal depression development. The results obtained indicate that mental health assessment should be systematically addressed in antenatal follow-ups. In family medicine practice, it is important that pregnancy follow-ups are not limited to obstetric parameters alone, but that psychosocial risk factors are also assessed using a holistic approach. In particular, conducting depression screenings in the early stages of pregnancy can increase the effectiveness of preventive healthcare services by enabling the early diagnosis of high-risk cases and timely intervention.

Keywords: Pregnancy, Psychosocial Health, Depression

Evaluation of the Relationship Between Serum Magnesium, Body Mass Index, and Serum Lipid Profile in Patients Aged 18 and Above Admitted to a Training Family Health Center

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Objective: Obesity and associated metabolic disorders have become a major public health concern worldwide. Magnesium (Mg) is an essential mineral involved in numerous biochemical processes such as energy metabolism, glucose regulation, and lipid homeostasis. Deficiency in magnesium has been associated with conditions such as obesity, type 2 diabetes mellitus, and dyslipidemia. However, studies investigating the relationship between magnesium levels, obesity, and lipid profile at the primary care level are limited. This study aimed to evaluate the relationship between serum magnesium levels, body mass index (BMI), and serum lipid profile in adults admitted to a primary healthcare facility.

Materials and Methods: This retrospective, cross-sectional study included 415 individuals aged 18 years and older who had available anthropometric measurements and laboratory data. The participants were admitted between 01.01.2023 and 30.11.2024 to the Konya Selçuklu 92nd Training Family Health Center, affiliated with Konya

Beyhekim Training and Research Hospital. Demographic data, body mass index (BMI) calculated from height and weight measurements [kg/m^2], serum magnesium, and lipid parameters [LDL-cholesterol (LDL-C), HDL-cholesterol (HDL-C), total cholesterol (Total-C), triglycerides (TG)] were obtained through the family medicine information system used at the Family Health Center. BMI values of 18,5–24,9 kg/m^2 were considered normal weight, 25,0–29,9 kg/m^2 overweight, and ≥ 30 kg/m^2 obese.

Results: Of the participants, 68.9% were women ($n=286$) and 31.1% were men ($n=129$). The prevalence of obesity was 23.9%, while 38.8% were overweight. Serum magnesium levels showed a statistically significant inverse correlation with BMI in the overall population ($r=-0,183$ $p<0,001$). No significant associations were found between serum magnesium levels and LDL-C, HDL-C, total cholesterol, or triglyceride levels ($p>0.05$). Magnesium levels were significantly lower in individuals with type 2 diabetes compared to those without chronic diseases ($p=0.029$). When serum magnesium and cholesterol parameters were compared according to BMI categories, a statistically significant difference was observed in magnesium levels among the study groups ($p < 0.001$). Post hoc analysis revealed a statistically significant difference between the obese and normal-weight groups ($p < 0.001$) and between the overweight and normal-weight groups ($p = 0.001$), whereas no statistically significant difference was found between the obese and overweight groups ($p = 1.000$).

Conclusion: In this study, serum magnesium levels were found to be inversely associated with body mass index, while no significant relationship was observed with lipid profile parameters. These findings support the potential role of magnesium in metabolic processes related to obesity. In primary care settings, the evaluation of serum magnesium levels in individuals at risk for obesity and diabetes may be beneficial for early risk identification and preventive strategies. Larger, prospective studies are needed to further elucidate the relationship between obesity and serum magnesium levels.

Keywords: Magnesium, Body Mass Index, Dyslipidemia, Obesity, Type 2 Diabetes Mellitus

Perceptions of Benefits and Barriers Regarding Colorectal Cancer Screening Among Individuals Registered at an Educational Family Health Center

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Aim: This study aimed to determine perceived benefits and barriers toward colorectal cancer (CRC) screening among individuals aged 50–70 years who had not undergone a fecal occult blood (FOB) test within the past two years, and to evaluate the effect of education on these perceptions and willingness to undergo testing.

Materials and Methods: This prospective study was conducted between September 15 and December 1, 2025, at the Educational Family Health Center No. 92 in the Selçuklu district of Konya province among individuals who had not undergone an FOB test within the past two years. A total of 230 participants meeting the study criteria were included. At admission, a 15-item questionnaire assessing sociodemographic characteristics and willingness to undergo CRC screening, and the 31-item “CRC Screening Behaviors Benefits and Barriers Perception Scale,” which evaluates perceptions regarding CRC screening, were administered. Following data collection, education was provided on the importance of early CRC diagnosis and on screening methods. After the education, the scale was re-administered to evaluate changes in screening perceptions and willingness to undergo the FOB test. Test kits were provided to participants willing to undergo testing, with instructions. Reasons for refusal were recorded for those unwilling.

Results: Of the 230 participants, 136 (59.1%) were female and 94 (40.9%) were male. The median age was 59.0 (51.0–69.0) years. Before education, 140 (60.9%) participants

were willing to undergo FOB testing, whereas 90 (39.1%) were unwilling. Among the 90 initially unwilling participants, 57 (63.3%) accepted testing after education, while 33 (36.7%) continued to refuse; the increase in willingness was statistically significant ($p<0.001$). Post-education comparisons showed increased FOB benefit ($p<0.001$) and colonoscopy benefit perception scores ($p=0.001$), and decreased FOB barrier ($p<0.001$) and colonoscopy barrier perception scores ($p<0.001$). Before education, participants willing to test had higher FOB benefit ($p<0.001$) and colonoscopy benefit ($p=0.048$) scores, and lower FOB barrier ($p<0.001$) and colonoscopy barrier ($p=0.001$) scores than those unwilling. After education, willing participants continued to demonstrate higher FOB benefit ($p<0.001$) and colonoscopy benefit ($p<0.001$) scores, and lower FOB barrier ($p<0.001$) and colonoscopy barrier ($p<0.001$) scores. Of the 197 (85.6%) participants who completed the FOB test, 34 (17.3%) were positive, 159 (80.7%) negative, and 4 (2.0%) unsuccessful. Among the 33 participants who refused testing after education, reasons were absence of complaints (51.5%), anxiety about a negative result (18.2%), finding the test difficult or unpleasant (18.2%), and distrust of the test (12.1%).

Conclusion: Education delivered in a primary care setting significantly improved benefit perceptions, reduced barrier perceptions, and increased willingness to undergo FOB testing. Structured, face-to-face educational interventions and sustained communication in primary care may effectively enhance CRC screening participation.

Keywords: Cancer Screening, Colorectal Cancer, Perceived Benefits, Perceived Barriers

Evaluation of Psychiatric Consultations of Patients Hospitalized in Palliative Care Services

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Objective: Palliative care-requiring diseases are chronic and life-threatening conditions, with psychiatric disorders being common among this patient group. It is well known that psychiatric and psychosocial consultations improve symptom management and contribute to psychological well-being in individuals with terminal illnesses (1). This study aims to examine psychiatric consultation requests for patients hospitalized in palliative care units and to evaluate the frequency of psychiatric symptoms and diagnoses determined after assessment.

Methods: This retrospective study reviewed the hospital automation system records of patients hospitalized in the palliative care unit between 2023 and 2025. Patients were analyzed in terms of their primary diagnoses, reasons for consultation requests, and psychiatric diagnoses made after evaluation. The data were analyzed using descriptive statistical methods with the SPSS program. Ethical approval for the study was obtained from the Tokat Gaziosmanpaşa University Ethics Committee (Ethics Committee No:25-MOBAEK-108).

Results: A total of 245 patients were referred for psychiatric consultation, with 39.6% of them having repeated consultations. By including only the most recent consultations, a total of 96 patient records were retrospectively reviewed. Among the patients, 53.1% (n = 51) were male, with a mean age of 70.02 (SD = 14.97). The most common primary diagnoses were malignant neoplasms (59.4%), cardiovascular diseases (36.5%), and

neurological diseases (32.3%). The most frequent reasons for psychiatric consultation requests were restlessness/agitation (33.3%), insomnia (14.6%), and anxiety (12.5%). The most common psychiatric diagnoses after evaluation were delirium (36.5%), other unspecified psychiatric disorders (a heterogeneous group) (20.8%), and anxiety disorders (17.7%). Among patients with oncological, cardiovascular, and neurological diseases, the most frequent reason for consultation was restlessness/agitation, with delirium being the most common diagnosis in this group.

Conclusion: This study demonstrates that psychiatric symptoms are frequently observed in palliative care patients and are often associated with multiple symptoms. Literature indicates that the prevalence of psychiatric diagnoses in palliative care patients can reach up to 70% (2), and significant improvements in psychological well-being are observed in 40% of patients following psychiatric consultations (3). Restlessness/agitation and insomnia are among the most common psychiatric symptoms encountered in palliative care patients. The findings of this study highlight the necessity of a multidisciplinary approach and emphasize the critical role of psychiatric interventions in the management of patients in palliative care.

Keywords: Palliative Care, Psychiatric, Consultations

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Effect of Diaphragmatic Breathing Exercises on Lower Urinary Tract Symptoms in Adolescent Female Athletes: A Non-Randomized Controlled Study

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Background

Lower urinary tract symptoms (LUTS), including urinary incontinence, nocturia, and polyuria, are more common among adolescent girls even in the absence of urinary tract infection (UTI). High-impact sports involving repetitive jumping movements, such as volleyball, may increase the load on the pelvic floor and exacerbate these symptoms. Therefore, there is a need for low-cost and non-invasive preventive approaches. However, studies evaluating the effectiveness of diaphragmatic breathing (DB) in adolescents remain limited compared to adults.

Objectives

To evaluate the effectiveness of a diaphragmatic breathing exercise program in reducing lower urinary tract symptoms (LUTS) among licensed adolescent female (AF) athletes.

Methods

This prospective, non-randomized controlled intervention study was conducted among licensed adolescent female volleyball players in Türkiye between September and October 2025. Sample size calculation was performed with a 95% confidence interval, 80% power, and a 5% margin of error, requiring at least 40 participants per group with a projected

Oral Presentation - OP132

20% difference between groups. A total of 97 participants completed the study (intervention group [IG], n=53; control group [CG], n=44).

The intervention group performed supervised diaphragmatic breathing exercises using the 4–6 breathing technique (4 seconds of nasal inhalation followed by 6 seconds of oral exhalation) for 10 minutes, three times weekly, over a six-week period before training sessions. The control group continued their routine training without any additional intervention.

Lower urinary tract symptoms were assessed using the Lower Urinary Tract Symptom Score (LUTSS; range 1–48: 0–8 mild, 9–19 moderate, 20–35 severe, 36–48 very severe). Participants with urinary tract infection or any acute/chronic disease were excluded. Only participants with LUTSS scores ≥ 1 and < 20 were included. Student's t-test and paired t-test were used for between-group and within-group comparisons, respectively.

Results

The mean age of participants was 15.6 ± 1.09 years. At baseline, the mean LUTSS score was significantly higher in the intervention group compared to the control group (8.11 ± 4.88 vs. 6.04 ± 4.60 ; $p=0.035$). After six weeks, LUTSS scores significantly decreased in the intervention group (from 8.11 to 7.26; $p=0.015$), whereas the control group showed a statistically significant but small increase (from 6.04 to 6.41; $p=0.005$). No adverse events related to the intervention were reported.

Conclusion

Diaphragmatic breathing exercises may represent a safe, low-cost, and feasible preventive strategy for reducing lower urinary tract symptoms among adolescent female athletes in community settings.

Keywords: Adolescent Female Athletes, Lower Urinary Tract Symptoms, Diaphragmatic Breathing, Pelvic Floor

Trends in Sex-Disaggregated Healthcare Utilization in Türkiye (2008–2022): A Repeated Cross-Sectional Study

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Aim Monitoring healthcare utilization is crucial for evaluating Universal Health Coverage and addressing gender-based disparities. This study examines sex-disaggregated healthcare utilization trends in Türkiye from 2008 to 2022 to assess the impact of health reforms and the COVID-19 pandemic on equitable access. Additionally, it aims to highlight the post-pandemic shifts in health-seeking behavior.

Material and Methods A secondary analysis of repeated cross-sectional data from the Türkiye Health Survey (2008–2022) was performed on non-institutionalized individuals aged 15 years and older. Temporal trends and sex differences in general practitioner (GP), specialist, and dentist visits were analyzed using linear regression and chi-square tests. The study compared pre-COVID (2008–2019) and post-COVID (2022) periods to evaluate pandemic-driven behavioral changes in healthcare access.

Results Over the 15-year period, GP and dentist utilization significantly increased for both sexes (GP Males: 1.14%/year; Females: 0.97%/year), alongside steadily declining "never utilized" rates. Overall utilization slopes showed no significant sex disparities, suggesting equitable access improvements driven by the nationwide family medicine system. Notably, a striking shift occurred in the post-COVID-19 period: male GP utilization surged significantly from a pre-pandemic mean of 47.2% to 55.3% in 2022 ($p=0.0236$).

Oral Presentation - OP133

Concurrently, the GP "never utilized" rate for males dropped drastically by 57.7% ($p=0.0018$). While female utilization remained stable and historically higher, this unexpected post-pandemic surge in male engagement significantly narrowed traditional gender gaps in primary care access.

Conclusion Türkiye's health reforms have successfully expanded access across both sexes over the last decade. Importantly, the COVID-19 pandemic acted as a powerful catalyst for male health-seeking behavior, shifting them away from traditional masculine norms of delaying care. This remarkable post-pandemic increase in male GP utilization presents a critical window of opportunity. Health systems should leverage this momentum through targeted, gender-sensitive health campaigns to promote routine check-ups and preventive care among men, thereby further advancing Universal Health Coverage and health equity.

Keywords: Healthcare Disparities, Gender Factors, Health Services Accessibility, Universal Health Insurance, COVID-19

The Association Between Sleep Disturbances, Quality of Life, and Diabetes Risk Among Adults Aged 18–65 in Primary Care Settings

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Objective

Sleep disturbances are increasingly recognized as modifiable determinants of metabolic disorders. Experimental and epidemiological studies indicate that insufficient or poor-quality sleep impairs glucose metabolism, reduces insulin sensitivity, and alters appetite-regulating hormones, thereby increasing the risk of type 2 diabetes mellitus (T2DM) (1–3). Quality of life (WHOQOL), encompassing physical, psychological, social, and environmental well-being, is also closely linked to metabolic risk processes (4,5). This study aimed to investigate the association between sleep disturbances, quality of life, and 10-year diabetes risk among adults attending primary care centers and to evaluate the mediating role of quality-of-life domains in this relationship.

Oral Presentation – OP134

Materials And Methods

This cross-sectional study was conducted between December 2025 and January 2026 among 276 adults aged 18–65 years attending Family Health Centers within the Health Practice Region of Çukurova University Faculty of Medicine. Individuals with a prior diagnosis of T2DM were excluded.

Diabetes risk was assessed using the Finnish Diabetes Risk Score (FINDRISC), a validated non-laboratory screening tool for estimating 10-year diabetes risk (6–8). Sleep

disturbances were evaluated using the DSM-5 Sleep Disturbance Scale (11,12). Quality of life was measured using the WHOQOL-BREF-TR (9,10).

Spearman correlation analyses examined associations between sleep scores, FINDRISC scores, and QoL subdomains. Mediation analyses were conducted to determine whether QoL domains mediated the relationship between sleep disturbances and diabetes risk. Log-linear regression analysis estimated the likelihood of elevated diabetes risk associated with sleep disturbances. Statistical significance was set at $p < 0.05$.

Results

The mean age of participants was 37.54 ± 13.4 years, and 54.7% were female. According to FINDRISC classification, 36.6% were low risk, 43.4% slightly elevated risk, 9.8% moderate risk, and 10.2% high risk for developing diabetes within 10 years.

Sleep disturbance scores were positively correlated with FINDRISC scores ($r = 0.121$, $p < 0.05$). FINDRISC scores were significantly and negatively correlated with all QoL domains, including general health ($r = -0.264$), physical health ($r = -0.264$), social relationships ($r = -0.242$), psychological health ($r = -0.224$), and environmental health ($r = -0.161$) (all $p < 0.01$).

Mediation analyses demonstrated that all QoL domains significantly mediated the relationship between sleep disturbances and diabetes risk. The highest mediation proportions were observed for general health (88.1%) and psychological health (80.2%).

In log-linear regression analysis, individuals with sleep disturbances in the high-risk FINDRISC group had nearly a threefold increased likelihood of elevated diabetes risk (OR = 2.89; 95% CI: 1.23–6.80; $p = 0.015$).

Conclusion

Poor sleep quality is significantly associated with increased diabetes risk, and this relationship is substantially mediated by quality-of-life domains, particularly general health perception and psychological well-being. Integrating sleep assessment and QoL evaluation into primary care-based diabetes risk screening may enhance early identification and preventive strategies for T2DM.

Keywords: Sleep Disturbance; Quality Of Life; Diabetes Risk; FINDRISC; Primary Care

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Fever in Childhood: Parental Perceptions, Fever Phobia and Management Practices

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Objective

This study aimed to investigate parental anxiety when their children experience fever, the methods used to measure it, the practices applied to reduce it, and parents' level of knowledge regarding fever management.

Materials and Methods

A structured questionnaire was administered to 321 parents through face-to-face interviews. Data were analyzed using mean and standard deviation for normally distributed variables, and median with minimum–maximum values for non-parametric data. Categorical variables were evaluated using frequency and percentage analyses. The Chi-square test and Student's t-test were used to examine relationships between variables, and $p < 0.05$ was considered statistically significant.

Findings

The mean age of the children was 55.3 ± 43.1 months, and the mean age of the mothers was 31.8 ± 5.7 years. Parents considered 37.8°C as fever and defined 38.3°C as the threshold for high or serious fever. Fear was reported by 90.3% of parents when their child had a fever, and 87.2% were concerned that fever could lead to febrile seizures.

The most commonly used method for measuring fever was tactile assessment (“touching by hand”) (47.7%). The use of objective thermometers significantly increased with higher maternal education levels, while tactile assessment was more common among parents with lower education levels ($p < 0.001$). Additionally, 60.8% of parents measured their child’s temperature at intervals of less than one hour. A significant positive association was found between the belief that fever is harmful and frequent temperature monitoring ($p = 0.024$).

Regarding medication administration, 85.4% of parents reported dosing antipyretic syrups using visual estimation (“eyeballing”), whereas only 14% used weight-based measurement tools. Furthermore, 83.2% believed antibiotics were necessary in cases of fever. Incorrect antibiotic use and improper dosing were significantly more common among parents who obtained information from non-professional sources (e.g., neighbors or older family members) compared to those who consulted healthcare professionals ($p = 0.008$).

Discussion

Consistent with previous literature, the prevalence of “fever phobia” among parents remains high. The high rates of tactile temperature assessment (47.7%) and visual estimation of antipyretic dosing (85.4%) suggest limited use of objective measurement tools and increased risk of medication errors. Frequent temperature monitoring (60.8%) appears closely associated with elevated anxiety and the belief that fever reflects illness severity.

The findings indicate that sociodemographic characteristics and information sources significantly influence parental attitudes and practices. The widespread belief that fever is inherently harmful contributes to inappropriate behaviors, including subjective temperature measurement, incorrect dosing, and unnecessary antibiotic use. Statistical

evidence suggests these practices can be reduced through targeted education and accurate information dissemination.

Regardless of educational background, providing parents with clear guidance from healthcare professionals on proper fever measurement techniques and accurate weight-based dosing is critically important for public health and medication safety.

Keywords: Fever; Fear; Febrile Seizure; Antipyretic; Antibiotic

Tobacco Use, Dependence Levels, and Associated Factors Among Medical Students at Dicle University Faculty of Medicine

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Introduction and Aim

Tobacco use remains a major global public health problem and continues to be highly prevalent in many countries, including Türkiye. Medical students, as future healthcare professionals, play a crucial role in tobacco control and smoking cessation counseling. However, tobacco use among medical students may undermine their ability to serve as effective role models for patients and society. This study aimed to determine the prevalence of tobacco and tobacco product use among 4th-, 5th-, and 6th-year students at Dicle University Faculty of Medicine (DUFM), to assess their nicotine dependence levels, and to identify factors associated with smoking behavior, including gender, academic year, stress, peer influence, and socio-demographic characteristics. Additionally, the study evaluated the relationship between smoking behaviors and dependence levels, as well as students' attitudes toward smoking as future physicians.

Methods

This cross-sectional study was conducted among 4th-, 5th-, and 6th-year medical students at DUFM. The study population consisted of 1,082 students, including 421 fourth-year, 288 fifth-year, and 373 sixth-year students. The required sample size was calculated using

the G*Power 3.7 program according to Cohen's criteria (effect size $f = 0.2231839$), with a 95% confidence level and 95% statistical power, resulting in a minimum sample size of 380 participants. Data were collected using a structured questionnaire that included questions on socio-demographic characteristics, smoking behaviors, environmental influences, and smoking cessation attempts. Descriptive statistics and relevant comparative analyses were performed to evaluate the associations between smoking behaviors and potential risk factors.

Results

Among the participants, 66.8% reported having at least one first-degree relative who smoked, and 52.6% indicated that the majority of their close friends smoked. While 73.2% of students reported receiving education about smoking during their medical training, 87.4% stated that physicians should not smoke. Among smoking students, 80.0% reported smoking while wearing a hospital coat or uniform in hospital settings, and 54.4% reported having knowledge about smoking cessation methods. Regarding smoking status, 64.2% reported never smoking, 21.1% reported regular smoking, 11.8% reported occasional smoking, and 2.9% reported that they had quit. The mean age of smoking initiation was approximately 18 years, with nearly half of the smokers reporting initiation before entering university. Among smokers, 63.2% had attempted to quit smoking at least once, and the most common cessation method was quitting without assistance (91.1%). The main reasons for attempting to quit included concerns about health (78.5%), discomfort from smoke or odor (60.8%), financial reasons (27.8%), family reactions (22.8%), and health problems (20.3%). The primary reasons for unsuccessful cessation attempts were difficulty coping with stress (63.3%) and cigarette cravings (50.6%).

Conclusion

Nicotine dependence increased with age, while earlier initiation of smoking was associated with higher dependence scores. The presence of smokers among family members and close friends was associated with regular smoking behavior. No significant relationship was found between smoking behavior and socio-demographic variables such

as family structure, parental education level, income, or place of residence. A considerable proportion of students had attempted to quit smoking, although most relied on unassisted cessation methods with limited long-term success. These findings indicate that tobacco use remains an important clinical and ethical concern among medical students. Strengthening tobacco control education, incorporating practical smoking cessation counseling training into medical curricula, and providing accessible cessation support services for students may help reduce tobacco use among future physicians.

Keywords: Smoking, Tobacco Use Disorder, Medical Students, Nicotine Dependence, Risk Factors

Validity and Reliability of the Turkish Version of the Luxembourg Workplace Mobbing Scale (LWMS) Among Resident Physicians

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Background: Workplace mobbing is a persistent occupational hazard in medical training, undermining clinician well-being, retention and, ultimately, patient care. Brief, psychometrically sound instruments are needed for routine monitoring in high-workload settings.

Objective: To translate and evaluate the validity and reliability of the Turkish Luxembourg Workplace Mobbing Scale (LWMS) among resident physicians.

Methods: In this cross-sectional validation study, 375 residents from internal medicine and surgical specialties at a tertiary teaching hospital in Türkiye completed the Turkish LWMS. Internal consistency (Cronbach's α , McDonald's ω), structural validity (one-factor confirmatory factor analysis) and convergent validity (associations with workload indicators) were assessed. Multiple linear regression examined independent predictors of mobbing exposure.

Results: The Turkish LWMS supported a unidimensional structure with excellent fit (CFI=0.994, TLI=0.988, RMSEA=0.052; SRMR=0.022). Reliability was strong (α =0.863; ω =0.864). Response distributions suggested task-related negative acts were more salient than overt public humiliation; assignment of absurd or meaningless duties was most frequently endorsed, whereas being ridiculed in front of others was least common. Weekly working hours showed modest bivariate associations with mobbing exposure, but

in the adjusted model specialty group was the only significant predictor: surgical residents reported higher LWMS scores than internal medicine residents ($B=0.772$, $p<0.001$).

Conclusion: The Turkish LWMS is a valid, reliable and time-efficient tool for assessing workplace mobbing in residency. Findings point to specialty-specific organisational culture, rather than workload alone, as a key driver of mobbing exposure, supporting targeted prevention efforts in high-risk departments.

Keywords: Bullying; Factor Analysis, Statistical, Internship and Residency, Psychometrics, Surveys and Questionnaires, Workplace

Methods

Study design and setting

This cross-sectional psychometric validation study was conducted between January and February 2026 at İzmir City Hospital, a tertiary teaching hospital in İzmir, Türkiye. The study is reported in accordance with the Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) recommendations.¹⁴

Study population and recruitment

Resident physicians working in internal medicine and surgical specialties were eligible. All eligible residents in participating departments were invited to take part via the hospital's internal professional communication networks using a self-administered, web-based survey. The survey remained open for 14 days. To enhance participation and reduce differential non-response across departments, targeted reminders were sent to specialty groups with lower initial response rates. The final analytic sample comprised 375 resident physicians.

Data Collection Procedure

After providing informed consent, participants completed a structured, self-administered questionnaire. They first provided demographic and occupational information, including age, gender, marital status, specialty group, year of residency training, number of monthly on-call duties, and average weekly working hours. Following this section, participants completed the workplace mobbing measure.

Workplace mobbing measure

Workplace mobbing was assessed using the Luxembourg Workplace Mobbing Scale (LWMS), a brief 5-item instrument rated on a five-point Likert scale from 1 (“Never”) to 5 (“Almost always”), with higher scores indicating more frequent exposure to mobbing behaviours. In the original development and validation studies, internal consistency was acceptable (Cronbach’s α approximately 0.72–0.76; McDonald’s ω approximately 0.73).^{9–11} In the present study, the primary score used for group comparisons and association analyses was the mean item score (range 1–5). For descriptive reporting, a summed total score (range 5–25) was also calculated.

Translation and cultural adaptation

Permission to use and adapt the scale was obtained from the developers prior to the study. Translation and cultural adaptation were performed in line with International Society for Pharmacoeconomics and Outcomes Research (ISPOR) Task Force guidance.¹⁵ Briefly, the scale was translated into Turkish and then back-translated into English by independent bilingual translators. An expert panel reviewed the translated version for semantic and conceptual equivalence, and the pre-final version was piloted in a small group of resident physicians to assess clarity, relevance, and comprehensibility. Minor wording adjustments were made where needed to improve readability.

Sample size considerations

Sample size adequacy was evaluated using commonly applied rules of thumb for psychometric studies (for example, a minimum of 10 participants per item).^{16,17} With five items, the target minimum was at least 50 participants; the achieved sample size (N = 375) exceeded this threshold.

Data analysis

Analyses were conducted using IBM SPSS Statistics (version 27.0) and IBM SPSS Amos (version 24.0). Descriptive statistics are presented as mean $\pm$ standard deviation (SD) or median (interquartile range, IQR) for continuous variables and n (%) for categorical variables. Distributional characteristics were assessed using histograms, normal probability plots, and item-level skewness and kurtosis.

Reliability. Internal consistency was evaluated using Cronbach's alpha and McDonald's omega. Corrected item-total correlations and alpha/omega if item deleted were examined to assess item contribution and the stability of the scale. In addition, temporal stability (test-retest reliability) was evaluated in a subsample of 30 resident physicians over two-week interval using the intraclass correlation coefficient (ICC), based on a two-way mixed-effects model with absolute agreement.

Confirmatory factor analysis. Structural validity was tested using a one-factor CFA with maximum likelihood estimation in Amos. Model fit was evaluated using the chi-square test, χ^2/df , comparative fit index (CFI), Tucker-Lewis index (TLI), root mean square error of approximation (RMSEA) with 90% confidence interval, and standardized root mean square residual (SRMR). To evaluate model fit under potential departures from multivariate normality, Bollen-Stine bootstrapping with 2,000 resamples was applied. Standardized factor loadings and squared multiple correlations (R^2) were reported for each item. For figure preparation, the standardized CFA estimates were used to generate a high-resolution path diagram in R (lavaan/semPlot).

Known-groups validity and work-related associations. Known-groups validity was examined by comparing mean LWMS scores across gender, marital status, and specialty group using independent-samples t-tests, with Cohen's d reported as effect size. Associations between mean LWMS score and continuous occupational variables (age, residency year, monthly duties, and weekly working hours) were assessed using Spearman correlation coefficients.

Multivariable analysis. Multiple linear regression was used to identify independent predictors of mean LWMS score. Predictors included age, specialty group, residency year, monthly duties, marital status, and weekly working hours. Results are presented as unstandardized coefficients (B) with standard errors (SE), standardized coefficients (β), 95% confidence intervals (CI), and explained variance (R^2 and adjusted R^2). Regression assumptions were evaluated using residual diagnostics and collinearity statistics. A two-sided p value < .05 was considered statistically significant.

Ethical considerations

Ethics approval was obtained from the Non-Interventional Clinical Research Ethics Committee of İzmir City Hospital in Türkiye (Date: 2025 December 03; File number: 2025/583). Written informed consent was obtained from the participants. Permission to use the LWMS was obtained from the developers of the scale.

Results

Table 1. Baseline characteristics of participants (n=375)		
Variable	Mean $\pm$ SD / Median (IQR)	Min-Max
Age, years	28.63 $\pm$ 4.01	24–57
Monthly on-call duties, n	5 (2–6)	0–9
Weekly working hours, hours	50 (40–60)	40–120
Variable	Category	n (%)
Gender	Female	231 (61.6)
	Male	144 (38.4)
Marital status	Single	259 (69.1)
	Married	116 (30.9)

Specialty group	Internal medicine	256 (68.3)
	Surgical	119 (31.7)
Year of residency training	Year 1	114 (30.4)
	Year 2	142 (37.9)
	Year 3	78 (20.8)
	Year 4	35 (9.3)
	Year 5	6 (1.6)
Continuous variables are presented as mean $\pm$ standard deviation or median (interquartile range); categorical variables as n (%).		

Participant characteristics

We included a total of 375 resident physicians in the study. The mean (SD) age of the participants was 28.63 (4.01) years. The majority of participants were female (231, 61.6%) and single (259, 69.1%). Participants comprised 375 resident physicians and represented 22 medical specialties. Family Medicine was the largest group (n = 103, 27.5%), followed by Infectious Diseases (n = 30, 8.0%), Dermatology and Emergency Medicine (each n = 27, 7.2%), Otorhinolaryngology (ENT) (n = 25, 6.7%), and Obstetrics and Gynaecology (n = 21, 5.6%). All remaining specialties each accounted for 0.8% to 4.8% of the sample. Most residents were training in internal medicine specialties (256, 68.3%), and the largest proportion were in their first (114, 30.4%) or second (142, 37.9%) year of residency. Workload indicators suggested demanding schedules, with a median of 5 monthly on-call duties (IQR 2–6) and a median weekly working time of 50 hours (IQR 40–60), reaching up to 120 hours per week in some cases. Table 1 summarizes the baseline demographic and occupational characteristics of the participants.

Across the LWMS items, residents more often reported task-related negative acts than public interpersonal humiliation. The clearest example was Item 3 (being assigned absurd or meaningless duties): 55.8% of participants indicated experiencing this “often” or “almost always” (85 [22.7%] and 124 [33.1%], respectively). By contrast, Item 4 (being ridiculed in front of others) was the least frequently endorsed behaviour; 48.0% reported “never” experiencing it, and 69.9% selected “never” or “rarely.” For the remaining items

(Items 1, 2 and 5), reported exposure was generally low, with responses clustering in the lower categories (“never/rarely”: 56.5%, 67.7% and 65.6%, respectively).

Table 2. Reliability, item characteristics, and confirmatory factor analysis results for the Turkish version of the Luxembourg Workplace Mobbing Scale (LWMS) in resident physicians (N = 375)

Panel A. Internal consistency and item-total statistics								
Scale / item		Mean (SD)	Corrected item-total correlation	Cronbach's α if item deleted	McDonald's ω if item deleted			
Total scale score (5 items)		12.46 (4.98)	—	$\alpha = 0.863$	$\omega = 0.864$			
Item 1		2.41 (1.21)	0.604	0.853	0.855			
Item 2		2.20 (1.26)	0.720	0.824	0.825			
Item 3		3.55 (1.34)	0.578	0.862	0.866			
Item 4		2.02 (1.22)	0.760	0.814	0.815			
Item 5		2.29 (1.16)	0.765	0.814	0.816			
Panel B. Descriptive statistics and standardized factor loadings (one-factor model)								
Item	M	SD	Skewness	Kurtosis	Standardized loading (λ)	R^2		
Item 1	2.41	1.21	0.58	−0.51	0.634	0.402		
Item 2	2.20	1.26	0.79	−0.53	0.783	0.613		
Item 3	3.55	1.34	−0.50	−0.95	0.602	0.362		
Item 4	2.02	1.22	1.03	0.02	0.862	0.744		
Item 5	2.29	1.16	0.82	−0.05	0.861	0.741		
One-factor CFA model fit: $\chi^2(5) = 10.15$, $p = .071$; $\chi^2/df = 2.03$; RMSEA = .052 (90% CI: .000–.099); CFI = .994; TLI = .988; SRMR = .022.								
Panel C. Measurement invariance of the LWMS across specialty groups (Internal medicine vs Surgery)								
Model		χ^2 (df)	CFI	SRMR	Model comparison	$\Delta\chi^2$ (Δdf)	p-value	ΔCFI
Configural (no equality constraints)		37.88 (10)	0.965	0.031	—	—	—	—

Metric (factor loadings constrained equal)	46.41 (14)	0.959	0.052	Metric vs. Configural	8.53 (4)	0.074	0.006
Items were rated on a five-point Likert scale (1 = Never, 5 = Almost always); higher scores indicate more frequent exposure to workplace mobbing. Measurement invariance was evaluated to assess whether the LWMS functions equivalently across specialty groups. Invariance at a given level was considered supported when the likelihood-ratio test was non-significant ($\Delta\chi^2$, $p > .05$) and the change in comparative fit index met the recommended criterion ($\Delta CFI \leq .010$).							

Table 2 summarises the psychometric findings for the Turkish LWMS. Internal consistency was high (Cronbach's $\alpha = 0.863$; McDonald's $\omega = 0.864$), and corrected item-total correlations were moderate to strong (0.578–0.765), supporting coherent item performance. Item means ranged from 2.02 to 3.55, with the highest endorsement for Item 3 and the lowest for Item 4; distributional indices showed only modest non-normality (skewness –0.50 to 1.03; kurtosis –0.95 to 0.02).

Furthermore, test-retest reliability analysis conducted on a subsample of 30 residents demonstrated excellent temporal stability for the scale. The single-measures intraclass correlation coefficient (ICC) was 0.996 (95% CI: 0.991 to 0.998, $p < .001$), indicating near-perfect absolute agreement between the two assessments.

Structural validity was supported by a one-factor CFA with excellent fit ($\chi^2(5) = 10.15$, $p = .071$; $\chi^2/df = 2.03$; RMSEA = 0.052 [90% CI 0.000–0.099]; CFI = 0.994; TLI = 0.988; SRMR = 0.022). Standardised factor loadings were moderate to high ($\lambda = 0.602$ –0.862), with item-level explained variance ranging from 0.362 to 0.744, indicating that the latent mobbing construct accounted for a substantial proportion of observed item variance (Figure 1).

Measurement invariance across specialty groups was supported at the metric level. The configural model showed acceptable fit ($\chi^2(10) = 37.88$; CFI = 0.965; SRMR = 0.031), and constraining factor loadings to equality resulted in a small decrement in fit ($\chi^2(14) =$

46.41; CFI = 0.959; SRMR = 0.052). The likelihood-ratio test for the metric versus configural comparison was not significant ($\Delta\chi^2(4) = 8.53, p = .074$), and Δ CFI remained within the recommended threshold (0.006), consistent with comparable factor loadings between internal medicine and surgical residents.

Figure 1. Standardized one-factor confirmatory factor analysis model of the Turkish Luxembourg Workplace Mobbing Scale (LWMS).

Table 3. Known-groups comparisons and work-related correlations for the Luxembourg Workplace Mobbing Scale among resident physicians (N = 375)

Panel A. Comparison of total scale scores across demographic and professional groups (independent samples t-tests)

Variable	Group	n	Mean $\pm$ SD	t	p	Cohen's d
Gender	Female	231	2.59 $\pm$ 0.96	2.34	.020	0.25
	Male	144	2.34 $\pm$ 1.04			
Specialty group	Internal medicine	256	2.22 $\pm$ 0.82	-7.50	< .001	0.93
	Surgical	119	3.07 $\pm$ 1.10			
Marital status	Single	259	2.47 $\pm$ 1.03	-0.77	.444	0.09
	Married	116	2.55 $\pm$ 0.92			

Panel B. Spearman correlations between scale scores and work-related variables

Scale / item	Age	Residency year	Monthly duties	Weekly hours
Mean LWMS score	-0.043	-0.065	0.103‡	0.262†
Item 1	-0.079	-0.017	0.199†	0.273†
Item 2	-0.086	-0.138†	-0.072	0.072
Item 3	-0.006	-0.051	0.103‡	0.274†
Item 4	-0.059	-0.025	0.065	0.190†
Item 5	-0.015	-0.025	0.085	0.200†

Note. Panel A reports independent samples t-tests; Cohen's *d* values are based on pooled standard deviations. Panel B reports Spearman correlation coefficients. LWMS : Luxembourg Workplace Mobbing Scale. † $p < .01$; ‡ $p < .05$.

Comparison of mobbing exposure across subgroups

Total Luxembourg Workplace Mobbing Scale (LWMS) scores were compared across demographic and occupational characteristics to examine known-groups validity (Table 3, Panel A). Female residents reported higher mean LWMS scores than male residents (2.59 ± 0.96 vs. 2.34 ± 1.04), and this difference was statistically significant ($t = 2.34$, $p = .020$) with a small effect size ($d = 0.25$). LWMS scores did not differ significantly by marital status (single: 2.47 ± 1.03 vs. married: 2.55 ± 0.92 ; $t = -0.77$, $p = .444$), reflecting a negligible effect ($d = 0.09$). In contrast, specialty group was strongly associated with mobbing exposure: residents in surgical specialties reported substantially higher LWMS scores than those in internal medicine (3.07 ± 1.10 vs. 2.22 ± 0.82), a highly significant difference ($t = -7.50$, $p < .001$) with a large effect size ($d = 0.93$), indicating pronounced disparities in perceived mobbing across specialty groups (Table 3, Panel A).

Correlations with occupational factors

Bivariate associations between LWMS scores and continuous work-related variables are presented in Table 3, Panel B. Age and residency year were not significantly correlated with the total LWMS score ($r_s = -0.043$ and -0.065 , respectively; both $p > .05$). At the item level, residency year showed a small negative correlation with Item 2 ($r_s = -0.138$, $p < .01$), suggesting that more senior residents reported slightly lower frequency of this specific mobbing behavior. Workload indicators displayed clearer relationships. Monthly duties were weakly but significantly associated with the total LWMS score ($r_s = 0.103$, $p < .05$) and with Item 1 ($r_s = 0.199$, $p < .01$) and Item 3 ($r_s = 0.103$, $p < .05$). Weekly working hours demonstrated the most consistent pattern, showing a modest positive correlation with the total LWMS score ($r_s = 0.262$, $p < .01$) and significant correlations with Item 1, Item 3, Item 4, and Item 5 ($r_s = 0.190$ – 0.274 , all $p < .01$), while the association with Item 2 was not significant ($r_s = 0.072$, $p > .05$). Collectively, these findings suggest that workload intensity—particularly extended weekly working hours—is systematically associated with higher exposure to workplace mobbing among resident physicians.

Table 4. Multiple Linear Regression Analysis Predicting LWMS Scores (N = 375)					
Predictor	B	SE	β	p	95% CI for B
Age (years)	-0.006	0.013	-0.023	.644	-0.030, 0.019
Specialty group	0.772	0.128	0.361	< .001	0.521, 1.023
Year of residency training	-0.094	0.050	-0.095	.059	-0.192, 0.004
Number of monthly on-call duties	-0.009	0.022	-0.026	.671	-0.053, 0.034
Marital status	0.105	0.105	0.049	.317	-0.101, 0.312
Average weekly working hours (hours)	0.004	0.004	0.070	.330	-0.004, 0.012
Model fit: $R^2 = .172$, Adjusted $R^2 = .158$, $F(6, 368) = 12.71$, $p < .001$. (Std. error of the estimate = 0.913)					

Multivariable predictors of workplace mobbing

In the multiple linear regression model predicting total LWMS scores (N = 375), overall model fit was statistically significant ($F(6, 368) = 12.71$, $p < .001$), explaining 17.2% of the variance in LWMS scores ($R^2 = .172$; adjusted $R^2 = .158$) (Table 5). After adjustment for covariates, specialty group remained the only independent predictor of workplace mobbing: residents in surgical disciplines reported significantly higher LWMS scores than those in internal medicine ($B = 0.772$, $SE = 0.128$, $\beta = 0.361$, $p < .001$; 95% CI: 0.521 to 1.023). Age, monthly on-call duties, marital status, and average weekly working hours were not associated with LWMS scores in the adjusted model (all $p > .05$). Year of residency training showed a borderline association that did not reach conventional statistical significance ($B = -0.094$, $p = .059$). The standard error of the estimate was 0.913 (Table 4).

Discussion

In this cross-sectional study of resident physicians at a tertiary teaching hospital in Türkiye, the Turkish Luxembourg Workplace Mobbing Scale (LWMS) showed strong reliability, excellent temporal stability, and clear structural validity. Internal consistency was high (Cronbach's $\alpha = 0.863$; McDonald's $\omega = 0.864$), and a subsample analysis indicated excellent test-retest reliability over a two-week interval (ICC = 0.996). Confirmatory factor analysis supported the hypothesised one-factor model with excellent fit. Metric measurement invariance across specialty groups further suggested that the

construct is captured similarly in internal medicine and surgical residents, supporting cross-disciplinary comparisons.

The response profile also offers insight into how mobbing is experienced during medical training. Task-related negative acts were reported more frequently than overt interpersonal humiliation: assignment of absurd or meaningless duties was the most commonly endorsed item, whereas being ridiculed in front of others was least frequently reported. This pattern is consistent with the view that mistreatment in residency often operates through everyday work allocation and institutional practices—behaviours that may be normalised within steep clinical hierarchies—rather than through conspicuous public degradation.^{6,8}

Specialty differences were pronounced. Residents in surgical disciplines reported substantially higher scores (mean LWMS score 3.07) than those in internal medicine (2.22). Gender differences were statistically significant but small in magnitude, whereas marital status was not associated with LWMS scores. This specialty gradient is consistent with reports of higher levels of hostile behaviours in surgical training environments and other high-intensity hierarchical settings.^{18,19} Weekly working hours showed a modest positive association with mobbing scores in bivariate analyses, but the association did not persist after adjustment; specialty group remained the only independent predictor. Together, these findings suggest that specialty-linked organisational context and supervisory practices may contribute to mobbing exposure beyond what is explained by workload indicators alone.⁵⁻⁷

The LWMS was originally developed as a brief measure to capture exposure to workplace mobbing through a single underlying construct.⁹⁻¹¹ In Türkiye, the scale has previously been applied to study organisational behaviour across various sectors. For instance, a study among general staff in private hospitals in Balıkesir and Giresun reported relatively low mobbing levels (mean $\approx$ 1.83) with acceptable internal consistency ($\alpha \approx$ 0.77),¹³ while a manufacturing-sector study in Adana expanded the assessment with additional

inventory items, which limits the direct comparability of absolute levels.¹² Against this national background, our findings demonstrate that resident physicians experience substantially higher mobbing exposure than mixed hospital workforces.

Establishing a validated, low-burden tool for this specific population addresses a critical methodological gap and is particularly relevant for the broader health system. Internal medicine residents, much like primary care physicians, frequently manage complex, undifferentiated patient presentations and serve as a vital interface for care coordination and triage within large tertiary centres. High levels of mistreatment in these demanding environments compromise physician well-being, leading to fatigue and disengagement, which ultimately threatens the continuity and quality of patient care.

Implications for practice and research

From a practice perspective, the brevity of the scale makes it highly suitable for periodic screening and programme-level quality improvement in residency settings, where respondent burden is a recurrent concern. Given the large specialty-group differences observed, interventions must prioritise department-level culture and supervisory practices in addition to addressing workload. Initiatives such as clear anti-bullying policies, confidential reporting pathways, leadership development for senior physicians, and structured feedback systems are particularly relevant for high-risk surgical departments.

For research, multicentre studies across different regions and training hospitals in Türkiye will help clarify generalisability and enable national benchmarking. Longitudinal designs are also necessary to disentangle whether mobbing exposure is primarily a consequence of adverse work climates or whether it directly contributes to downstream outcomes like fatigue and intentions to leave the training programme.⁵⁻⁷

Limitations

Several limitations should be considered. First, the study was conducted at a single centre and relied on self-report data, which can be influenced by response styles and a differential willingness to disclose negative workplace experiences. Second, the cross-sectional design precludes causal inferences regarding the directionality between occupational indicators and mobbing exposure. Finally, while metric invariance was established, future research could evaluate scalar invariance to help define strict cut-points or interpretability thresholds for applied clinical settings. Despite these constraints, the sample size was highly adequate for stable estimation, and the combination of strong internal consistency, excellent test-retest reliability, and robust CFA fit indices provides a solid foundation for utilizing the Turkish LWMS.

Conclusion

The Turkish version of the Luxembourg Workplace Mobbing Scale demonstrated strong reliability, excellent temporal stability, and a clear one-factor structure among resident physicians in Türkiye. The scale is a valid, time-efficient tool suitable for research and the routine monitoring of workplace mobbing in residency settings. The observed specialty-related disparities—and their persistence even after adjusting for workload—underscore the critical need for organizational strategies that address entrenched departmental cultures alongside working conditions, with particular attention required in surgical training environments.

Keywords: Behavioral Medicine, Mental Health, Occupational Stress, Primary Care, Screening, Trauma

How Ready Are We for Artificial Intelligence?*

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Introduction and Aim:

Technological developments and transformations, driven by digitalization, have rapidly begun to influence every aspect of our daily lives. One of the most significant outcomes of digitalization is **Artificial Intelligence (AI)**. AI has increasingly become integrated into everyday life and has also begun to play a significant role in the field of healthcare. Since the 1950s, AI has gradually found its place in various aspects of life. In recent years, it has gained widespread public attention through conversational agents such as ChatGPT. Its presence in healthcare has been particularly noticeable in radiology, especially in the interpretation of medical images. Subsequently, AI has also been incorporated into portable devices, thereby significantly influencing the field of personal health management. With the increasing integration of AI into healthcare, it is expected that physicians should be familiar with AI applications. They must be prepared to respond to patients' questions regarding these technologies, and due to various factors such as accessibility and transportation limitations, following patients through digital applications has become increasingly inevitable. Previous studies have shown that although physicians generally view AI applications positively because of their potential to assist clinical practice, they also express concerns about these developments. Our study is particularly important in our country, where **Family Medicine** represents the first point of contact for healthcare services. Considering that a significant proportion of medical students will work in

Oral Presentation - OP148

*This study includes preliminary data from the thesis of Vakıf Özgür Toz

primary care after graduation, it is essential for them to gain experience and familiarity with AI applications. The aim of this study is to determine medical students' awareness of AI in the medical field and to assess their readiness for AI applications, thereby increasing awareness of their knowledge levels.

Materials and Methods:

This study was designed as a descriptive cross-sectional study and utilized the **Medical Artificial Intelligence Readiness Scale (MAIRS)**. The scale consists of a total of 22 items. The total score ranges from a minimum of 22 to a maximum of 110 points, with higher scores indicating a higher level of readiness. Statistical analyses were performed using **SPSS version 25.0**. A p-value of $p < 0.05$ was considered statistically significant.

Results:

Our survey was completed by almost all of the students. The mean total score of the MAIRS among students was calculated to be above 70. The proportion of students who reported that they had no knowledge about AI was higher among final-year students. Approximately nine out of ten students stated that primary care physicians should have knowledge about AI. Interestingly, first-year medical students demonstrated higher levels of knowledge regarding medical AI applications.

Conclusion:

The most important finding of our study is that the level of medical AI readiness among students living in the digital age appears to be relatively low due to insufficient knowledge about AI. Another important finding is that only a small proportion of students, based on their current clinical knowledge, feel capable of providing adequate information to patients regarding AI applications. It was also observed that as participants' level of knowledge about AI increased, their readiness for AI applications improved.

Keywords: Artificial Intelligence, Awareness, Medical Students

Determinants of Health-Promoting Lifestyle Behaviors in Older Adults: The Role of Sociodemographic and Health-Related Factors*

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Objective

A healthy lifestyle refers to an individual's ability to control behaviors that influence health and to select behaviors appropriate to their health status when organizing daily activities. This study aimed to examine the relationship between health-promoting lifestyle behaviors and frailty, as well as sociodemographic and health-related factors, in individuals aged 65 years and older.

Materials and Methods

Ethical approval and institutional permissions were obtained for this descriptive study. The research was conducted between September 2021 and April 2022 among individuals aged 65 years and older who applied to family health centers in Afyonkarahisar. Data were collected using a case report form, the Fried Frailty Index, and the Health-Promoting Lifestyle Profile II (HPLP-II). Data analysis included the t-test, Mann-Whitney U test, ANOVA, and Pearson correlation analysis, and a p-value of <0.05 was considered statistically significant.

Oral Presentation - OP150

* This study was prepared based on the doctoral thesis titled "The Relationship Between Health-Promoting Lifestyle Behaviors and Frailty in Individuals Aged 65 and Over," completed on January 25, 2024. Aydın Adnan Menderes University, Institute of Health Sciences, Department of Elderly Health, Doctoral Program, Aydın, Türkiye, 2024.

Results

A total of 375 patients participated in the study (50.9% female, 49.1% male). The mean age was 71.1 ± 5.3 years for women and 71.0 ± 5.4 years for men. The overall frailty prevalence was 28.0%; it was significantly higher among women (44.5%) than men (10.9%) ($p < 0.0001$). The overall Cronbach's alpha reliability coefficient of the HPLP-II was 0.90, and the mean total score was 134.7 ± 17.9 . HPLP-II scores were significantly lower in the frail group ($p < 0.001$). Men had significantly higher HPLP-II scores than women ($p < 0.001$). In subscale comparisons, men scored significantly higher than women in all subdimensions—physical activity, nutrition, spiritual growth, interpersonal relations, and stress management—except for the health responsibility subdimension ($p < 0.05$).

Among individuals aged 65–74 years, statistically significant differences were observed between age groups in the HPLP-II total score and all subscale scores except the physical activity subscale ($p < 0.05$). Higher scores were found among single individuals, those with higher income levels, and those living in towns or villages ($p < 0.001$), as well as among individuals with higher educational levels, those living in their own homes, and those not living alone ($p < 0.05$). Participants without visual impairment, hearing loss, or urinary incontinence had significantly higher scores ($p < 0.01$). Additionally, HPLP-II scores decreased as the number of emergency department visits and hospitalizations within the past year increased.

Conclusion

In conclusion, frail individuals aged 65 years and older had lower HPLP-II scores, while sociodemographic factors (such as gender, education, income, and living conditions) were identified as important determinants influencing health-promoting lifestyle behaviors.

Keywords: Elderly, Healthy Lifestyle, Healthy Aging, Frail Elderly

Association Between Restless Legs Syndrome and Calcaneal Spurs: A Cross-Sectional Radiological and Clinical Study

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Abstract

Objective: Restless Legs Syndrome (RLS) is a prevalent sensorimotor disorder predominantly affecting the lower extremities. While musculoskeletal factors may influence symptom severity, the relationship between RLS and calcaneal spur formation remains unexplored. This study aimed to investigate the prevalence of calcaneal spurs in patients with RLS and to evaluate associations between radiological foot parameters, spur characteristics, and RLS duration and severity.

Materials and Methods: A cross-sectional study was conducted including 292 patients with primary RLS, followed for at least one year, and 285 age- and sex-matched healthy controls. Participants were recruited from neurology outpatient clinics between January 2024 and January 2025. Individuals aged 18–80 years with BMI <30 and no history of foot deformity, metabolic or rheumatologic disease, or pregnancy were included. After obtaining informed consent, all participants underwent neurological examination and bilateral lateral foot radiography. Radiographs were evaluated for the presence and length of calcaneal spurs, pes planus, Böhler angle (BA), and Gissane angle (GA). RLS severity was assessed using a standardized clinical scale. Statistical analyses included Student's t-test, Mann-Whitney U test, and Spearman correlation, with significance set at $p < 0.05$.

Results: Calcaneal spurs were identified in 98 of 292 RLS patients and 52 of 285 controls. The prevalence of heel spurs was significantly higher in RLS patients ($p < 0.01$). Pes planus was more frequent among RLS patients (19.5%) compared to controls (11.2%), particularly in individuals with heel spurs. Within the RLS group, patients with heel spurs had higher RLS severity scores and longer disease duration than those without spurs ($p = 0.028$ and $p = 0.03$, respectively). Spearman correlation analysis revealed positive associations between heel spur length and both RLS duration and severity. Additionally, heel spur length was negatively correlated with BA and GA values. Notably, the side of RLS symptom onset corresponded to the side of spur localization, suggesting a potential link between symptom laterality and spur formation.

Conclusion: This study demonstrates a significant association between RLS and calcaneal spur formation. Longer disease duration and higher severity were related to increased spur length, which in turn correlated with altered foot radiological angles. The alignment of symptom onset side with spur location further supports a non-random coexistence of these conditions. Peripheral musculoskeletal factors may exacerbate RLS symptoms and affect quality of life, highlighting the clinical relevance of evaluating foot structure in selected patients. Due to the cross-sectional design, causal relationships cannot be established; prospective studies are needed to clarify underlying mechanisms and potential shared pathophysiology.

Keywords: Restless Legs Syndrome, Calcaneal Spur, Pes Planus, Foot Radiology, Cross-Sectional Study

Introduction

Restless Leg Syndrome (RLS) is a sensorimotor disorder involving mostly the lower extremities. The prevalence in the general population is approximately 15%, with a higher prevalence in the female gender (1). Plantar fasciitis is a painful inflammation of the connective tissue along the bottom of the foot that connects the heel bone to the ball of

the foot. A heel spur is a bony protrusion formed by the deposition of calcium in the lower part of the heel bone. It can be up to 2 cm in length and is easily diagnosed on X-rays (2). The etiology of heel spurs is multifactorial. Heel spur formation can be seen in a wide range of conditions ranging from metabolic diseases to structural diseases of the foot or daily life activity habits of individuals. However, in the literature the most commonly accepted etiopathologic mechanism is plantar fasciitis (3). In this study, which has not been evaluated in the literature before, our aim is to draw attention to heel spur accompanying RLS and to shed light on new studies on this subject.

Material Method

Informed consent was obtained from all participants in this study before the study was conducted. Patients who were followed up in neurology outpatient clinics with a diagnosis of RLS for at least one year between January 2024 and January 2025 were selected by random sampling method considering the study eligibility criteria. The control group was selected from the companions of the patients who applied to neurology outpatient clinics for different reasons and were similar in age and gender to the patient group. Individuals participating in the study were questioned for RLS and lateral radiography of both feet was performed. Neurologic examination of the patients and the control group was performed by the same neurologist. Individuals between the ages of 18-80 years who had been followed by a specialist neurologist for at least one year with a diagnosis of RLS in accordance with international diagnostic criteria and whose Body Mass Index (BMI) was below 30 were included in the study. Individuals with foot deformity (previous trauma or congenital), metabolic or rheumatologic disease, pregnant women and individuals with a BMI over 30 were excluded. After the examination procedures were completed, participants were questioned about heel spur symptoms and the presence of heel spurs by taking lateral radiographs of both feet and identified radiographically. In the other stage of the study, the RLS severity scale was applied to patients diagnosed with RLS.

Statistical Analysis

Quantitative variables were defined as mean and standard deviation. In the statistical analysis, the Shapiro-Wilk test was used in the distribution of normality, and Student's t-test and the Mann-Whitney U test were used in parametric and non-parametric analyses for comparisons between groups, respectively, and $P < 0.05$ was considered statistically significant.

Results

A total of 292 RLS patients with a diagnosis of primary RLS and 285 healthy individuals with similar demographic characteristics were included in the control group.

The mean ages were 46.07 ± 15.31 and 48.13 ± 13.53 in the patient and control groups, respectively. Of the 292 patients, 185 were female and 107 were male, while in the control group these ratios were 179 to 106, respectively. The mean body mass index was calculated as 25 ± 3.1 and 25 ± 2.7 in the patient and control groups. 98 of 292 patients and 52 participants in the control group had heel spurs. In the patient group, 65 of 185 female and 33 of 107 male patients had heel spurs, while in the control group, 30 female and 22 male participants had heel spurs. Statistically, the heel spur rate was found to be higher in patients with RLS. Pes planus was detected in 57 (19.5%) individuals in the patient group, while pes planus was detected in 32 (11.2%) participants in the control group. In the RLS group, pes planus was detected in 47 (48%) patients with heel spurs. In the control group, pes planus was detected in 20 (38.4%) of the participants with heel spurs. Compared to the control group, pes planus was detected more in RLS patients. In the presence of heel spurs, pes planus was detected at high rates in both groups. However, pes planus was also found more in individuals with heel spurs in the patient group. The values of the anatomical foot length angle and measurements of both groups are summarized in Table1.

When a comparison was made in the patient group according to the presence of heel spurs, it was found that the severity scale was higher in the group with heel spurs and the group with heel spurs had a diagnosis of RLS for a longer period of time. The RLS severity scale was also applied to the patient group considering the presence of heel spur. The findings are briefly summarized in Table 2.

According to Spearman correlation analysis, there was a positive correlation between the duration and severity of RLS and heel spur length. It was observed that heel spur length increased in patients with increasing duration and severity of RLS. There was a statistically positive correlation between Böhler Angle (BA) and Gissane Angle (GA) and a negative correlation was found between Gissane and Böhler angle and heel spur length. GA and BA decreased as the heel spur length increased in patients (Table 3).

Discussion

The foot has a complex anatomical structure that performs many biomechanical functions in the musculoskeletal system; it consists of muscles, tendons, ligaments, blood vessels, nerves, skin, and soft tissue. Disorders and imbalances in this anatomical structure will lead to foot instability and deformities (4). The foot affects daily life such as walking and standing. All pathologies that occur in the anatomy of the foot affect the quality of life. In this context, heel spurs should not be ignored due to their frequency and treatability (5). When the literature is examined, it is seen that heel spur patients are mostly women. In our study, the majority of heel spur patients were female, in accordance with the literature (6). Calcaneal spurs are associated with many medical conditions, such as obesity, plantar fasciitis, rheumatologic diseases, and osteoarthritis. Calcaneal spurs, while most are painless, can cause heel pain (2,7). Based on previous literature, pain may be related to size; a plantar calcaneal spur inclination of less than 30 degrees and a size of less than 10 mm may not require medical intervention (8). The calcaneal spur may be painful due to factors such as calcaneal nerve compression, inflammation, surrounding environment, and fat pad atrophy. According to studies, about 90% of patients with calcaneal spurs and

plantar fasciitis complain of pain in the early morning. In these patients, the pain usually increases at night or at rest after work (9, 10).

When the etiology of the heel spur is examined, a complete and precise explanation cannot be found. It is thought to be mostly caused by repetitive microtraumas. This reduces the elasticity of the plantar fascia. Thus, the tension on the plantar fascia increases, and degeneration and changes in the calcaneus are observed. A limited number of studies evaluating the relationship between heel spurs and anatomical measurements of the foot were found in the literature. The relationship of pes planus with heel pain and heel spur formation is known from previous studies (4,11,12,13). Calcaneus angles play an important role in the pathophysiology of heel spurs. A previous study showed that BA and GA decreased in heel spur patients. It was thought that this may be due to gait disturbance in patients with heel spurs and heel pain as a result of avoiding heel load over time, and that gait disturbance causes changes in the normal anatomical angles of the foot over time (14). In the Turkish population, the mean GA was $115.0 \pm 6.5^\circ$, while the mean BA was $33.8 \pm 4.8^\circ$. In our study, similar to the literature, mean GA and BA were found to be significantly lower than the general average in RLS patients with heel spurs (15).

In our study, GA and BA decreased in patients with increasing heel spur length. It is known that GA decreases in patients with increasing heel spur length, especially in the pes planus patient group, and this situation negatively affects the foot comfort of the patients. In our study, we believe that the increase in the RLS severity scale in RLS patients with heel spurs is due to the pain caused by the heel spur and the deterioration in the quality of life.

Although there are many pathophysiological processes underlying RLS, the poorly understood aspects of RLS deserve treatment strategies that go beyond symptomatic management. Currently, dopaminergic dysfunction, iron deficiency anemia, and RLS are the most commonly associated diseases (16). RLS can be thought of as a puzzle with multiple pieces that are not fully understood clinically and pathophysiologically.

To discuss the results of the study: In the statistical evaluation, a positive correlation was found between disease duration and heel spur length. In this study, we found a positive correlation between the limb in which RLS started and the limb in which a heel spur was present. Similar to the negative correlation between GA and BA and heel spur length, the negative correlation of the same angles with RLS severity scale and duration of RLS suggested a common etiopathogenesis. This suggests the existence of a reciprocal relationship between RLS and heel spurs. Other etiopathogenetic mechanisms should be investigated since obesity and age were ruled out as risk factors according to the inclusion criteria. We believe that genetic factors should not be ignored in the common etiopathogenesis of these two diseases. Although this study proves that the relationship between heel spurs and RLS is more than a coincidental association, comprehensive studies are needed for etiopathogenetic mechanisms that we can find in common. However, the positive correlation between RLS symptom duration and heel spur length, and between the side of RLS symptom onset and the presence of heel spurs, which we found in our study, support a common etiopathogenesis in these two diseases.

Conclusion

This study demonstrates a significant association between restless legs syndrome and calcaneal spurs, including correlations between spur length, radiological foot parameters, and RLS duration and severity. The observed relationship between the side of RLS symptom onset and calcaneal spur presence further supports a non-random coexistence of these conditions. However, due to the cross-sectional design, causal inferences cannot be drawn. Peripheral pain-related or biomechanical factors may contribute to increased symptom severity in RLS patients with calcaneal spurs. Prospective longitudinal studies and investigations focusing on underlying mechanisms are warranted to better understand the clinical relevance of this association.

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Table 1: Anatomical foot length angle and measurement values of both group

	HS (n/R/L/R+L)	HSL	PP	BA	GA	both FBL
Pa (n/R/L/R+L)	(98/50/44/4)	6.09±2.86mm	(98/47)	23.33±7.63	109.12±7.18	24.15±2.05
C (n/R/L/R+L)	(52/19/20/13)	4.21±2.32mm	(52/20)	29.88±5.68	126.52±6.16	23.71±2.09
P value		0.003	0.002	0.04	0.03	0.05

Patient: Pa Control: C R: Right L: Left Heel spur: HS Heel spur length: HSL Pes Planus:PP BA:Böhler Angle GA: Gisanne Angle Foot bone length:FBL

Table 2: Comparison between duration, severity and symptom onset of restless leg syndrome according to the presence of heel spurs in the patient group

	Side of onset of RLSYMP	Duration of RLS (M)	Severity of RLS scale averages	HSL	HS (n/R/L/R+L)
Patient (n/R/L/R+L)	(98/48/38/12)	39,4±9,8	29,7±10,2	7.27±2.21mm	(98/50/44/4)
Patient without heel spur (n/R/L/R+L)	(78/33/36/9)	33.21±7.3	22,4±7,1	0	0
P value	0.08	0.028	0.03		

Month: M: Heel spur: HS Heel spur length: HSL Restless leg symptoms: RLSYMP Restless leg syndrome: RLS

Table 3: Spearman correlation analysis results

		BMI	Duration of RLS	Severity of RLS scale averages	GA	BA	HSL	Side of onset of RLSYMP	HS (n/R/L/R+L)
BMI	r		0.152	0.062	0.020	0.894	0.358	-0.025	0.031
	p		0.154	0.563	0.855	0.205	0.006	0.813	0.775
Duration of RLS	r	0.152		0.377	-0.247	-0.538	0.358	0.120	0.142
	p	0.154		0.000	0.019	0.000	0.001	0.259	0.183
Severity of RLS scale averages	r	0.175	0.377		-0.139	-0.146	0.018	0.087	0.173
	p	0.099	0.000		0.039	0.033	0.028	0.183	0.103

GA	r	0.020	-0.247	-0.139		0.377	-0.263	0.142	0.112
	p	0.855	0.019	0.039		0.000	0.000	0.103	0.266
BA	r	0.894	-0.538	-0.146	0.377		-0.403	0.161	0.010
	p	0.205	0.000	0.033	0.000		0.000	0.130	0.923
HSL	r	0.358	0.358	0.018	-0.263	-0.403		0.097	0.758
	p	0.006	0.001	0.028	0.000	0.000		0.365	0.142
Side of onset of RLSYMP	r	0.025	0.120	0.087	0.142	0.161	0.097		0.396
	p	0.813	0.259	0.183	0.103	0.130	0.365		0.000
HS (n/R/L/R+L)	r	0.031	0.142	0.173	0.112	0.010	0.758	0.396	
	p	0.775	0.183	0.103	0.266	0.923	0.142	0.000	

Body mass index: BMI Heel spur length: HSL Restless leg syndrome: RLS BA:Böhler Angle GA: Gisanne Angle

Keywords: Restless Legs Syndrome, Calcaneal Spur, Pes Planus, Foot Radiology, Cross-Sectional Study

Vaccine Literacy and Attitudes Toward Immunization Among Adults in Primary Care*

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Objective

Vaccine hesitancy remains a major global public health concern, and adult immunization is influenced by multiple behavioral and contextual factors. Although vaccine literacy is recognized as an important determinant of vaccination behavior, its relationship with immunization attitudes has not been clearly established, particularly in adult primary care populations. This study aimed to evaluate vaccine literacy and attitudes toward immunization among adults attending Family Health Centers in Central Anatolia, Türkiye, and to examine their association.

Methods

This cross-sectional descriptive study was conducted between February and May 2025 in Family Health Centers located in the city center of Kırşehir, Türkiye. A total of 928 adults aged 18 years and older who agreed to participate were included in the study. Data were collected through face-to-face interviews using a structured sociodemographic questionnaire, the Health Literacy about Vaccination in Adults Scale (HLVa-IT), and the Attitudes Toward Immunization Scale (AITO). HLVa-IT evaluates three dimensions of vaccine literacy: functional, communicative, and critical literacy. AITO assesses attitudes toward immunization through attitude and belief/opinion subscales,

Oral Presentation - OP156

* This study has been submitted to the RAMB Journal and is currently under review

with higher scores indicating more favorable attitudes. Statistical analyses were performed using IBM SPSS Statistics 25.0. Since the variables were not normally distributed, nonparametric methods were used. Associations between scale scores were examined with Spearman correlation analysis, and multiple linear regression analysis was performed to determine whether HLVa-IT subscales predicted AITO total scores. Statistical significance was accepted as $p < 0.05$.

Results

The mean age of the participants was 49.38 ± 15.48 years, and 50.6% were male. Median scores showed moderate levels across all vaccine literacy dimensions and moderately positive immunization attitudes. Median (Q1–Q3) scores were 2.60 (2.00–3.00) for functional vaccine literacy, 2.60 (2.00–3.00) for communicative vaccine literacy, 2.50 (2.00–3.00) for critical vaccine literacy, and 40.00 (37.00–44.00) for the AITO total score. No significant sex-based differences were observed in vaccine literacy or immunization attitude scores.

Correlation analyses demonstrated generally weak relationships between vaccine literacy and immunization attitudes. Functional vaccine literacy showed a weak positive correlation with the AITO belief/opinion subscale ($r = 0.083$, $p = 0.011$). In contrast, communicative vaccine literacy showed weak negative correlations with the belief/opinion subscale ($r = -0.121$, $p < 0.001$) and the AITO total score ($r = -0.077$, $p = 0.018$). Critical vaccine literacy was not significantly correlated with AITO scores. In multiple linear regression analysis, none of the HLVa-IT subscales significantly predicted AITO total scores. The overall model was not statistically significant ($F = 2.174$, $p = 0.090$) and explained only a very small proportion of the variance ($R^2 = 0.007$; adjusted $R^2 = 0.004$).

Conclusion

Vaccine literacy alone showed limited explanatory power for immunization attitudes in an adult primary care population. Although some statistically significant associations were observed, these relationships were weak and were not maintained in multivariable

analysis. These findings suggest that immunization attitudes are influenced not only by vaccine literacy but also by broader psychosocial factors such as trust, perceived risk, and social influences. Therefore, strategies to improve adult immunization attitudes should incorporate effective communication and trust-building approaches in addition to information-based interventions.

Table 1. Key findings on vaccine literacy and attitudes toward immunization

Variable	Result
Sample size	928 adults
Mean age	49.38 ± 15.48 years
Male sex	50.6%
Functional VL, median (Q1-Q3)	2.60 (2.00-3.00)
Communicative VL, median (Q1-Q3)	2.60 (2.00-3.00)
Critical VL, median (Q1-Q3)	2.50 (2.00-3.00)
AITO total, median (Q1-Q3)	40.00 (37.00-44.00)
Functional VL vs Belief/Opinion	r=0.083, p=0.011
Communicative VL vs Belief/Opinion	r=-0.121, p<0.001
Communicative VL vs AITO total	r=-0.077, p=0.018
Regression model	Adj. R ² =0.004, p=0.090

Keywords: Vaccine Literacy, Immunization Attitudes, Primary Care

Breast Cancer Screening Behaviors and Associated Factors Among Female Healthcare Workers

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Objective: Breast cancer ranks among the most prevalent malignancies in women worldwide, and early detection is widely recognized as one of the most important strategies for improving survival outcomes. This study aimed to evaluate the participation of female healthcare workers in breast cancer screening practices, assess their preventive health behaviors, and identify the sociodemographic and occupational factors associated with these behaviors.

Methods

This cross-sectional descriptive study was conducted between May 1 and July 1, 2024, through face-to-face surveys with female healthcare workers employed at Gaziantep University Şahinbey Research and Application Hospital.

The questionnaire included items on sociodemographic characteristics, health-related information, Breast Self-Examination (BSE), Clinical Breast Examination (CBE), mammography status, and the Breast Cancer Prevention Behaviour Influencing Factors Scale (BCPIFS). Data were analyzed using IBM SPSS Statistics version 22.0. The study was approved by the Gaziantep University Clinical Research Ethics Committee (Decision No: 2024/81, dated March 13, 2024).

Oral Presentation - OP161

Results

A total of 294 female healthcare workers participated in the study, with a mean age of 34.35 ± 7.99 years. Of the participants, 39.5% were physicians, 39.8% were nurses, and 20.7% were other healthcare professionals. A family history of breast cancer was reported in 9.5% of participants among second-degree relatives (aunts or grandmothers) and in 2.7% among first-degree relatives (mother or sister). Among the participants, 54.1% reported performing BSE within the last month, while 18.4% had undergone CBE within the last year. Among participants aged 40 years and older, 36.7% had undergone mammography within the last two years. The mean total BCPIFS score was 118.51 ± 18.62 . The mean scores of the subscales were as follows: attitude 31.55 ± 4.34 , motivation 15.37 ± 3.45 , self-efficacy 14.83 ± 2.65 , support 14.10 ± 3.91 , information seeking 14.27 ± 3.43 , self-care 18.37 ± 5.05 , and stress management 10.00 ± 2.52 . The mean BCPIFS score was 121.00 ± 22.29 among participants with a first-degree family history of breast cancer, 115.04 ± 21.94 among those with a second-degree family history, and 118.81 ± 18.15 among those without a family history ($p=0.555$). Participants in menopause had significantly higher BCPIFS scores (125.67 ± 20.67) compared with those who were not in menopause (117.87 ± 18.32) ($p=0.049$).

Conclusion

The findings indicate that female healthcare workers demonstrate moderate to good levels of attitudes and motivation toward breast cancer prevention behaviors; however, the rates of clinical breast examination and mammography remain suboptimal. The significantly higher preventive behavior scores observed among participants in menopause suggest a greater inclination toward health-promoting behaviors in this group. Breast cancer awareness programs targeting younger healthcare workers and those in the premenopausal period may help increase participation in screening practices.

Keywords: Breast Cancer, Healthcare Workers, Breast Cancer Screening, Mammography

Microbiological Spectrum and Clinical Outcomes of Diabetic Foot Infections in Hospitalized Patients

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Objective:

Foot ulcers and infections developing in patients with diabetes mellitus are among the major health problems worldwide. This study aimed to evaluate patients hospitalized with diabetic foot infection in the Infectious Diseases Service.

Materials and Methods:

The data of 121 patients hospitalized with diabetic foot infection in the Infectious Diseases Service of our hospital between January 2024 and December 2025 were retrospectively reviewed from patient records. The data were presented as numbers and percentages.

Results:

Of the 121 patients included in the study, 43 (35.5%) were female and 78 (64.5%) were male, with a mean age of 61 years. The average length of hospital stay was 16 days. Among the 66 isolates, 49.09% were Gram-negative bacteria, 47.27% were Gram-positive bacteria, and 9.09% were polymicrobial. The most frequently isolated pathogens were *Staphylococcus aureus* 17 (30.9%), *Escherichia coli* 9 (16.36%), and *Pseudomonas aeruginosa* 6 (10.9%). Methicillin resistance was detected in 76.47% of *S. aureus* strains. Major amputation was performed in 31 patients (25.6%). Osteomyelitis was present in 88 patients (72.7%), and peripheral arterial disease in 73 patients (60.3%). Debridement

Oral Presentation – OP162

was performed in 33 patients (27.2%). Hyperbaric oxygen therapy was administered to 10 patients (8.2%). Mortality occurred in 6 patients (4.9%).

Conclusion:

In cases of diabetic foot infection, the implementation of a rapid and effective interdisciplinary treatment approach is crucial for reducing amputation rates. In the presence of risk factors for resistant microorganisms, initiating empirical therapy targeting these pathogens is important. Regardless of how effectively diabetic foot infections are treated, new diabetic foot ulcers and infections are likely to develop if appropriate preventive measures addressing the underlying risk factors are not implemented and patient adherence to these measures is not ensured.

Keywords: Diabetic Foot, Amputation, Infection

There Is Fever, There Is Concern: A Qualitative Study of Physicians' Clinical Decision-Making and Parental Anxiety in Managing Children with Fever

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Aim: Fever is one of the most common reasons for outpatient visits in children. This study aimed to qualitatively evaluate the experiences and approaches of pediatric and family medicine specialists regarding diagnosis, treatment, and clinical decision-making processes in the management of febrile children under three years of age.

Method: Our study was conducted between August 2025 and October 2025. Semi-structured questions were posed to 10 pediatricians and 10 family medicine specialists. The interviews were recorded, and the recordings were analyzed using open coding. The codes obtained were grouped under minor and major categories and analyzed using the MaxQDA 2021 programme.

Findings: A total of 821 codes and 15 categories were created. Following this grouping, five main themes were identified (initial assessment of fever, parents' expectations and concerns, management approaches and clinical decision-making processes, communication and education with parents, and physicians' own experiences).

Both physician groups indicated that the possibility of febrile convulsions was the parents' most frequent concern. Family medicine specialists demonstrated an approach based on clinical examination and symptoms, while pediatricians adopted an approach supported by laboratory and imaging tests. Furthermore, both groups of physicians agreed on referral when "red flag" findings were present in children with fever. Parents' expectations for antibiotics were identified as a communication challenge, particularly among pediatricians.

Conclusion: The findings of the study show that there are common clinical sensitivities for both family physicians and pediatricians in the management of children with fever, but that there are different experiences in communication with families and treatment expectations. The findings emphasize the importance of collaboration and the development of parent education programs in the management of children with fever.

Keywords: Fever, Child, Decision Making, Qualitative Research

Does Smoking Cessation Reduce Anxiety? A Prospective Study*

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Background and Aim

Smoking is one of the most commonly used addictive substances worldwide and remains a major public health problem that requires urgent intervention. According to the *Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition (DSM-5)* of the American Psychiatric Association, tobacco dependence is classified as a substance use disorder and represents an important cause of disease and mortality.

The number of studies examining the relationship between smoking and anxiety severity has been increasing. Some researchers suggest that individuals with psychological problems may use cigarettes for short-term relief, whereas other studies indicate that long-term smoking may contribute to the development of psychological disorders, particularly anxiety. In individuals with high levels of anxiety, nicotine withdrawal symptoms and the urge to smoke may be more intense, which may negatively affect the success of smoking cessation attempts. Therefore, assessing anxiety levels is critically important in planning smoking cessation treatment. Moreover, several meta-analyses have reported that

Oral Presentation - OP164

* This study includes a portion of the preliminary data from the thesis of Dr. İsmail Güneş

quitting smoking is associated with a reduction in anxiety symptoms and an improvement in quality of life.

This study aimed to evaluate the effects of smoking cessation on psychological well-being and anxiety levels. Based on the findings, it also aimed to raise awareness regarding mental well-being during the smoking cessation process and to provide recommendations for psychological support for individuals who may need it.

Materials and Methods

This prospective analytical study was conducted between **September 1, 2025, and December 31, 2025**. Individuals aged **18 years and older** who consecutively attended a smoking cessation outpatient clinic were included in the study on a voluntary basis. Therefore, no sampling method was applied.

At the initial visit, **Questionnaire-1** and the **Beck Anxiety Inventory (BAI)** were administered to the participants. One month after the smoking cessation date, participants were contacted by telephone. Their smoking cessation status was evaluated, and **Questionnaire-2**, which included questions regarding support or pharmacological treatment use, patients' complaints, and lifestyle changes, was administered along with the BAI again.

BAI scores were interpreted as follows: **0–7 minimal, 8–15 mild, 16–25 moderate, and 26–63 severe anxiety symptoms**, with higher scores indicating greater anxiety severity. Scores obtained from the **subjective anxiety** and **somatic symptoms** subscales were evaluated separately and compared before and after smoking cessation.

Individuals who were actively using psychiatric medications prior to the study were excluded because such medications could influence anxiety levels. Additionally, participants who failed to quit smoking or relapsed were not included in the final analysis. Statistical analyses were performed using **SPSS software**.

Results

Among the **68 participants** initially followed, **18 individuals** were excluded from the analysis for various reasons.

Before smoking cessation, **22%** of participants had minimal anxiety, **48%** mild anxiety, **28%** moderate anxiety, and **2%** severe anxiety. After smoking cessation, **46%** had minimal anxiety, **42%** mild anxiety, and **10%** moderate anxiety.

After smoking cessation, **Total BAI scores**, **Subjective Anxiety scores**, and **Somatic Symptom scores** decreased numerically. The reductions in **Total BAI scores** and **Somatic Symptom scores** were statistically significant ($Z = -3.507$, $p < 0.001$ and $Z = -4.329$, $p < 0.001$, respectively). Although a decrease was observed in **Subjective Anxiety scores**, it was not statistically significant ($Z = -1.053$, $p = 0.292$).

Conclusion

Our findings demonstrate that smoking cessation has a statistically significant effect on anxiety. In particular, reductions in total BAI scores and somatic symptom subscale scores indicate a decrease in pathological anxiety and overall anxiety severity following smoking cessation.

Keywords: Smoking, Smoking Cessation, Anxiety

Impact of Regulatory Changes on Burnout Among Family Medicine Residents: A Cross-Sectional Study*

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Introduction:

Burnout is a condition characterized by physical, emotional, and mental exhaustion resulting from prolonged exposure to occupational stress, leading to a loss of motivation and the development of negative attitudes toward one's profession. In recent years, regulatory changes in family medicine practice have led to significant alterations in physicians' working conditions. These changes include modifications related to on-call duties, performance criteria, contract renewal requirements, and various regulations that directly affect workload. Such adjustments may influence family physicians' professional motivation, job satisfaction, perceptions of job security, and overall quality of life. Therefore, evaluating the field-level impact of regulatory changes in family medicine is crucial for protecting the psychological well-being of healthcare professionals and ensuring the sustainability of healthcare services. The aim of this study is to evaluate the effects of frequently changing regulations and policies in primary care on family medicine residents and to contribute to the development of health policies by providing data that may help increase professional satisfaction and reduce burnout levels among family physicians.

Oral Presentation - OP169

Materials and Methods:

This cross-sectional study included physicians who were actively undergoing family medicine residency training in Türkiye. The study was conducted on a voluntary basis

* This study includes part of the preliminary data from the residency thesis of Ahmet Günaydın.

through an online questionnaire and scale application, which was announced via social media. All physicians who completed the questionnaire within a six-month period were included in the study. The questionnaire consisted of two sections. The first section collected data on participants' sociodemographic and professional characteristics. In the second section, the Maslach Burnout Inventory (MBI) was administered to assess burnout levels. Statistical analyses were performed using the IBM SPSS Statistics Version 22 software package. A p-value of <0.05 was considered statistically significant.

Results:

A total of 350 participants were included in the study, with a mean age of 34.2 years. Of the participants, 52.3% (n=183) were female and 47.7% (n=167) were male. Among them, 216 were family medicine residents (FMRs) and 134 were Contracted Family Medicine Residents (CFMRs). Overall, 46.6% (n=162) of the residents believed that current problems would continue to increase, while 35.9% (n=125) reported experiencing uncertainty regarding the future of family medicine practice. Nearly all participants (89%) stated that recent regulatory changes had increased their level of burnout. This proportion differed significantly between FMRs and CFMRs, with higher burnout levels observed among CFMRs ($t(345) = -3.845$; $p < 0.001$).

Conclusion:

The findings indicate that a considerable proportion of residents believe that current problems will continue to escalate and experience uncertainty regarding the future of family medicine practice, resulting in reduced levels of hope about the future. To address these issues, participants suggested clarifying legislation and job descriptions, improving financial and professional rights, and reducing workload.

Keywords: Regulation, Family Medicine, Burnout

Predictive Value of Preoperative Clinical Findings and Inflammatory Markers for Malignancy in Renal Masses

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Objectives: Kidney cancer accounts for more than 3% of newly diagnosed cancers worldwide and remains an important public health problem, with approximately 430,000 new cases annually. Renal tumors have traditionally been described by a triad of flank pain, hematuria, and a palpable abdominal mass. However, with the widespread use of imaging techniques, many renal tumors are now detected incidentally. Nevertheless, some patients still present with symptoms, and the relationship between these symptoms and malignancy remains clinically relevant. Hematological markers reflecting systemic inflammation have recently been investigated for their diagnostic and prognostic roles in several malignancies. This study aimed to evaluate whether preoperative clinical findings, inflammatory markers, and tumor size could predict malignancy in renal tumors among patients undergoing radical nephrectomy.

Oral Presentation - OP179

Methods: This retrospective study included patients who underwent radical nephrectomy at the urology department of our tertiary care hospital between January 2022 and March 2025 with histopathologically confirmed renal tumors. Patients with incomplete clinical data, active infection, chronic inflammatory disease, immunosuppressive therapy, or preoperative chemotherapy or radiotherapy were excluded. After applying these criteria, 141 patients were included. Demographic and clinical variables including age, sex, body mass index (BMI), presenting symptoms, tumor localization, and tumor size were recorded. Neutrophil-to-lymphocyte ratio (NLR) and

platelet-to-lymphocyte ratio (PLR) were calculated from preoperative complete blood count results. Continuous variables were assessed using the Shapiro–Wilk test and compared using the Mann–Whitney U test, while categorical variables were analyzed with the chi-square test. Receiver Operating Characteristic (ROC) analysis was performed to evaluate the predictive performance of inflammatory markers and tumor size for malignancy, and the area under the curve (AUC) was calculated. A p-value <0.05 was considered statistically significant.

Results: A total of 141 patients were included. The median age was 64.5 years (20–92) and the median BMI was 27.9 kg/m² (18.37–43.05). The median tumor size was 60 mm (10–200). Median NLR and PLR values were 2.95 (0.64–31.29) and 140.5 (47.83–802.63), respectively. Pathological examination revealed malignant tumors in 128 patients (90.8%) and benign tumors in 13 patients (9.2%). The most common presentation was an incidentally detected renal mass (45.4%), followed by flank pain (31.9%), hematuria (19.9%), and palpable abdominal mass (2.8%) (Table 1). No significant association was found between preoperative symptoms and tumor pathology ($\chi^2=1.89$, $p=0.595$). Similarly, tumor size ($p=0.185$), NLR ($p=0.773$), and PLR ($p=0.169$) did not differ significantly between benign and malignant tumors. ROC analysis showed AUC values of 0.476 for NLR, 0.384 for PLR, and 0.388 for tumor size.

Conclusion: Preoperative inflammatory markers (NLR and PLR) and tumor size did not demonstrate significant diagnostic value in distinguishing benign from malignant renal tumors. Likewise, presenting symptoms were not significantly associated with tumor malignancy. However, many renal tumors were detected incidentally, while flank pain and hematuria were the most common findings among symptomatic patients. These results suggest that clinical symptoms and inflammatory markers alone are not reliable biomarkers in the preoperative evaluation of renal masses.

Table 1. Demographic, clinical, and tumor characteristics of the study population (n = 141)

Variable	Value
Age (years), Median (Min–Max)	64.5 (20–92)
Sex, n (%)	
Male	81 (57.4%)
Female	60 (42.6%)
Body mass index (BMI) (kg/m ²), Median (Min–Max)	27.9 (18.37–43.05)
Tumor size (mm), Median (Min–Max)	60 (10–200)
Neutrophil-to-lymphocyte ratio (NLR), Median (Min–Max)	2.95 (0.64–31.29)
Platelet-to-lymphocyte ratio (PLR), Median (Min–Max)	140.5 (47.83–802.63)
Pathology, n (%)	
Malignant	128 (90.8%)
Benign	13 (9.2%)
Presenting symptoms, n (%)	
Incidentally detected renal mass	64 (45.4%)
Flank pain	45 (31.9%)
Hematuria	28 (19.9%)
Palpable abdominal mass	4 (2.8%)

Keywords: Inflammatory Markers, Presenting Symptoms, Renal Mass

The Relationship Between Perceived Professional Value and Exposure to Violence Among Residents

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Objectives:

This study aims to assess physicians' exposure to violence, their perceptions of professional values, and the impact of violence on their perceptions of professional values.

Methods

This descriptive study involved 411 resident at a university hospital. Data were collected using a questionnaire that included a socio-demographic information form and the medical profession value perception scale (MPVPS).

Results

The mean age of the physicians in the study was 28.3 ± 3.18 years. 52.1 % (n=214) identified as female and 74.0 % (n=304) worked in internal medicine.

Overall, 86.6 % (n=356) of participants reported experiencing some form of violence during their professional career. Of these, 84.9 % (n=349) experienced verbal violence, while 16.3 % (n=67) experienced physical violence. Participants identified 'intolerance of waiting' as the main cause of violence while "A decrease in motivation to work" was the most common response to feelings and thoughts associated with violence. The MPVPS

score of physicians exposed to violence (71.79 ± 7.33) was significantly lower than that of physicians not exposed to violence (75.92 ± 7.34) ($p < 0.001$).

Conclusions

This study shows a decrease in the perceived professional value of physicians who are subjected to violence. Identifying the causes and consequences of factors influencing violence in health care within an institutional framework can inform broader solutions.

Keywords: Physicians, Violence, Healthcare, Medical Professionalism

Evaluation of the Relationship Between Birth Mode Preferences and Pregnancy Distress Among Pregnant Women: A Primary Care-Focused Cross-Sectional Study

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Introduction:

Preference for the mode of delivery is a complex decision-making process influenced by medical indications and multifactorial variables, including maternal knowledge level, personal beliefs, and psychosocial status. In Türkiye, cesarean section rates exceeding both the global average and the targets set by the World Health Organization highlight the importance of examining psychosocial determinants in pregnant women's decision-making processes. This study aims to determine the relationship between birth mode preferences and the levels of distress experienced during pregnancy among women followed in primary care.

Materials and Methods:

The population of this cross-sectional study consists of pregnant women at or beyond the 12th week of gestation who are registered at Family Health Centers in the Kocasinan district of Kayseri. Data collection instruments include a sociodemographic data form, the Pregnant Women's Preferences for Mode of Delivery Questionnaire, and the Tilburg Pregnancy Distress Scale. Pregnant Women's Preferences for Mode of Delivery Questionnaire consists of 18 items on a five -point Likert scale, and the Tilburg Pregnancy Distress Scale consists of 16 items structured on a four-point Likert scale. In the data analysis, the t-test and one-way analysis of variance (ANOVA) were used to compare

independent groups, and the Tukey post hoc test was used to identify the source of the difference; meanwhile, the relationships between variables were examined using Pearson's correlation analysis.

Results:

Based on analyses of data from 286 pregnant women who met the study criteria, the average age was 28.01. Regarding their educational background, 34.2% had completed elementary school, 35.0% had completed high school, and 30.8% were college graduates. Additionally, 13.6% of participants were actively employed, 53.8% reported that their income matched their expenses, and 78.7% lived in a nuclear family structure. The mean score on the Pregnant Women's Preferences for Mode of Delivery Questionnaire was 59.63 ± 7.28 , and the Tilburg Pregnancy Distress Scale was 16.09 ± 7.47 . It was observed that pregnant women and their partners with a university education or higher statistically significantly preferred vaginal delivery more than those with only a primary school education ($p=0.002$ and $p=0.017$). In the correlation analysis, a positive and significant relationship was found between the Tilburg Pregnancy Distress Scale score and the number of pregnancies ($\rho=0.186$), the number of living children ($\rho=0.151$), and a history of miscarriage ($\rho=0.121$).

Conclusion:

This study demonstrates that there is a preference for vaginal delivery among pregnant women seeking primary care, and that this preference is strongly associated with the educational level of both the pregnant woman and her partner. The study findings indicate that the level of distress experienced by pregnant women is influenced by obstetric factors such as parity, number of children, and history of miscarriage.

Keywords: Cesarean Section, Obstetric Delivery, Pregnancy, Patient Preference, Primary Health Care

The Effect of a Structured Educational Intervention on Influenza Vaccination Behavior and Health Beliefs Among Healthcare Workers: A Quasi-Experimental Study

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Introduction

Seasonal influenza poses a significant public health concern for healthcare workers, not only because of occupational exposure risk but also because of its potential to compromise patient safety through nosocomial transmission. The literature emphasizes that vaccine hesitancy is largely driven by insufficient knowledge, misperceptions, and various perceived barriers, while educational interventions play a strategic role in overcoming these obstacles. This study aims to prospectively evaluate the impact of a structured educational intervention combined with a simultaneous on-site vaccination recommendation strategy on vaccination rates.

Materials and Methods:

This research is a quasi-experimental study with a pretest–posttest design and intervention and control groups. The study is conducted among healthcare personnel working in districts in Kayseri, including District Health Directorates and affiliated Healthy Life Centers. Participants who attended the in-service

training constituted the intervention group, while volunteers who did not attend the training formed the control group. Data were collected using a demographic questionnaire and the Health Belief Model Applied to Influenza. It consists of 29 items and is a 5-point Likert-type measurement tool. The intervention group received a 25–30-minute interactive educational session about influenza disease and vaccine delivered by a specialist, immediately followed by an on-site recommendation for influenza vaccination. The control group was monitored without intervention and completed only the questionnaires. A posttest was administered 4–6 weeks after the pretest to assess vaccination status and changes in scale scores. Data are being analyzed using IBM SPSS Statistics version 26.0. The analyses utilized t-tests, the Mann-Whitney U test, the McNemar test, and chi-square tests. The significance level was set at $p < 0.05$.

Results

A total of 140 participants (81 in the intervention group, 59 in the control group) were included in the study. In analyses conducted to test the homogeneity of the groups at baseline, no statistically significant difference was found between the mean total attitude scores prior to the intervention (pretest) ($p > 0.05$). In posttest measurements, the intervention group's mean scores were significantly higher than those of the control group ($p=0.002$). When examining changes within the intervention group, it was determined that the total attitude scores obtained after the training increased significantly compared to the pretest scores ($p=0.002$). The increase in vaccine acceptance observed in the intervention group after the training was highly statistically significant ($p<0.001$). In the control group, no changes were observed in either total attitude scores or vaccination status throughout the study period ($p>0.05$).

Conclusion

This study has demonstrated that a structured educational intervention targeting healthcare workers positively improved general attitudes toward influenza vaccination and directly increased vaccination behavior. Consequently, interactive educational



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programs and on-site vaccination are recommended as cost-effective and reliable strategies to increase vaccination compliance among staff in primary care settings.

Keywords Health Belief Model, Health Education, Healthcare Workers, Influenza Vaccines, Vaccine Hesitancy

Epidermolysis Bullosa in the Context of Home Healthcare: A Single-Center Study

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Objectives: *Epidermolysis bullosa* comprises a group of genodermatoses characterized by increased fragility of the skin and mucous membranes and requires lifelong multidisciplinary care. This study aimed to evaluate patients with epidermolysis bullosa receiving care from the home healthcare unit of a training and research hospital from a preventive medicine perspective and to contribute to the understanding of the epidemiology and management of the disease.

Methods: This descriptive cross-sectional study included all living patients with epidermolysis bullosa (n=13) who were registered in the home healthcare services unit of the Antalya Training and Research Hospital between November 2021 and April 2022. A 36-item data collection form, developed by the researchers based on a literature review and consisting of questions regarding sociodemographic characteristics, was administered to participants through face-to-face interviews. Participants under the age of 18 were included in the study in the presence of their parents.

Results: A total of 13 patients from 12 families were evaluated. Of the patients, 53.8% (n=7) were female and 46.2% (n=6) were male, and 46.2% (n=6) were under the age of 18. The mean age was 20.15 ± 15.22 years. The diagnosis was genetically confirmed in only one patient. The rate of first-degree consanguineous marriage among parents was

66.6% (n=8/12). After the diagnosis of epidermolysis bullosa, 58.3% of families (n=7/12) received genetic counseling. Families with more than one child diagnosed with epidermolysis bullosa had significantly lower parental education levels compared with other families.

Conclusion: The lower parental education level in families with more than one child diagnosed with epidermolysis bullosa and the fact that the diagnosis was genetically confirmed in only one patient suggest insufficient awareness of genetic diseases. Developing preventive healthcare strategies aimed at strengthening genetic counseling services may help break the cycle of genetic disorders. In particular, educational programs designed to increase awareness among healthcare professionals in primary care—who frequently encounter this patient group—along with further studies conducted with larger sample sizes, may contribute to promising advances for patients with epidermolysis bullosa.

Keywords: Epidermolysis Bullosa, Home Healthcare Services, Genetic Counseling, Family Medicine

Child Marriage in Turkey: An Examination of Changes Over the Last Decade

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Objective: This study aimed to examine the temporal changes in child marriage rates in Turkey between 2015 and 2025, to reveal gender-based differences and regional inequalities, and to draw attention to the issue.

Materials and Methods: Marriage data disaggregated by province, sex, and age group for the years 2015–2025 were obtained from the Marriage and Divorce Statistics database of the Turkish Statistical Institute (TÜİK). Child marriages reported on the TÜİK website refer to marriages involving individuals aged 16–17 years.

Results: In Turkey, a total of 602,982 marriages took place in 2015, of which 5.44% (n=32,820) were identified as child marriages. In 2025, the total number of marriages was 552,237, and the child marriage rate was found to have declined to 1.57% (n=8,642). A reduction of 71.2% in child marriages was calculated over the ten-year period. During the Coronavirus Disease 2019 (COVID-19) pandemic (2020–2021), this decline temporarily stalled; the number of child marriages rose from 13,763 in 2020 to 13,941 in 2021. The decline resumed from 2022 onwards. When the data were examined by sex, the issue was found to predominantly affect girls. While the number of marriages among girls decreased from 31,337 in 2015 to 8,068 in 2025, the number of marriages among boys declined from 1,483 in 2015 to 574 in 2025. In 2025, for every 14 girls who married, only 1 boy married; this ratio was 21:1 in 2015. Regarding

regional distribution, the provinces with the highest child marriage rates in 2015 were Kilis, Kars, Ağrı, Muş, and Niğde; by 2025, this ranking had changed to Kilis, Muş, Gaziantep, Ağrı, and Bitlis.

Conclusion: This study demonstrates that the problem of child marriage in Turkey has decreased substantially over the past decade. Nevertheless, the continued early marriage of girls and the persistence of a girl-to-boy ratio of 14:1 remain notable findings. Nationwide, higher rates of child marriage are observed particularly in the Eastern and Southeastern Anatolia regions. Achieving sustainable improvement in high-risk areas requires the development of region-specific policies that support girls' education and their social empowerment.

Keywords: Child Marriage, Adolescent Marriage, Turkey

Evaluation of the Shared Decision-Making in Individuals Diagnosed with Diabetes Mellitus: Turkish Adaptation and Validation of the CollaboRATE Scale

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Objective: The aim of this study was to adapt the CollaboRATE scale into Turkish and to evaluate its validity and reliability for assessing patients' involvement in shared decision making.

Materials and Methods: This methodological and cross-sectional study was carried out among patients with diabetes mellitus attending the outpatient clinics of the Department of Endocrinology and Metabolism at Ankara University Faculty of Medicine İbn-i Sina Hospital. The Turkish adaptation process of the scale included translation, back-translation, and cultural adaptation procedures. Data were collected from 200 participants. Construct validity was evaluated using confirmatory factor analysis. Internal consistency was assessed using Cronbach's alpha coefficient and item analyses. Test-retest reliability was examined. Concurrent validity was evaluated through correlation analyses with the Decisional Conflict Scale, which is theoretically related to the decision-making process.

Results: The Turkish version of the CollaboRATE scale demonstrated high internal consistency (Cronbach's alpha = 0.918). The intraclass correlation coefficient for test-retest reliability was 0.890. Corrected item-total correlation coefficients ranged from

0.776 to 0.866. Confirmatory factor analysis supported the single-factor structure of the scale. Standardized factor loadings ranged from 0.872 to 0.986. The mean CollaboRATE total score was 8.97 ± 2.10 , with scores ranging from 2.72 to 11.33. A total of 31.5% of participants achieved the maximum score. CollaboRATE scores showed a moderate-to-high, significant inverse correlation with total Decisional Conflict Scale scores ($p < 0.001$). Positive associations were observed between CollaboRATE scores and educational level ($p < 0.001$) as well as perceived health status ($p = 0.004$). Male participants had significantly higher CollaboRATE scores than female participants ($p = 0.004$).

Conclusion: The findings of this study indicate that the Turkish version of the CollaboRATE scale is a valid, reliable, and psychometrically sound instrument for assessing perceived shared decision-making among individuals with diabetes mellitus.

Keywords: Shared Decision Making, Diabetes Mellitus, Validity, Reliability

Comparison of Smoking Behaviors and Smoking Cessation Motivations by Sex Among Patients Attending a Smoking Cessation Outpatient Clinic

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Objective:

This study aimed to compare smoking behaviors, nicotine dependence levels, motivations for smoking cessation, and difficulties encountered during the cessation process between female and male patients attending a smoking cessation outpatient clinic.

Methods:

A total of 87 patients who applied to a smoking cessation outpatient clinic were included in this cross-sectional study. Participants were categorized into two groups according to sex as female and male. Sociodemographic characteristics, smoking behaviors, nicotine dependence levels, reasons for quitting smoking, previous quit attempts, environmental exposures, and difficulties experienced during the smoking cessation process were compared between the groups.

Results:

Of the 87 patients included in the study, 30 were female and 57 were male. The overall mean age was 39.4 ± 11.5 years, with no significant difference between females and males (40.8 ± 10.9 vs 38.7 ± 11.8 years, $p=0.413$). The age at smoking initiation was significantly higher in females than in males (20.4 ± 7.7 vs 16.2 ± 3.7 years, $p=0.008$). Exhaled carbon monoxide levels were significantly lower in females (6.6 ± 3.2 vs 8.6 ± 3.2 , $p=0.015$). There were no significant differences between the groups in terms of body mass index or Fagerström nicotine dependence scores ($p=0.630$ and $p=0.718$, respectively).

No significant sex-related differences were observed regarding marital status, presence of comorbidities, educational level, or previous smoking cessation attempts. The presence of another smoker at home was significantly more common among females than males (66.7% vs 21.1%, $p=0.001$), and the number of individuals exposed to household cigarette smoke also differed significantly between the groups ($p=0.005$). In contrast, the presence of other smokers in the workplace was more frequent among males (59.6% vs 23.3%, $p=0.003$).

Regarding smoking cessation motivations, concern about harming the environment (36.8% vs 16.7%, $p=0.044$) and physician recommendation (22.8% vs 6.7%, $p=0.043$) were reported more frequently by males. Among the difficulties experienced during smoking cessation, irritability (64.9% vs 36.7%, $p=0.022$) and sleep problems (19.3% vs 3.3%, $p=0.035$) were significantly more common in males. Tea consumption as a trigger for smoking behavior was also more frequently reported by males (61.4% vs 33.3%, $p=0.024$). The difference in stress as a trigger was of borderline significance (66.7% vs 42.1%, $p=0.051$).

Conclusion:

Smoking behaviors, environmental exposures, smoking cessation motivations, and certain difficulties experienced during the cessation process differ by sex among patients attending a smoking cessation outpatient clinic. Females started smoking at a later age and had lower exhaled carbon monoxide levels, whereas males showed more prominent environmental and physician-related motivations for quitting and experienced higher rates of irritability and sleep disturbances during the cessation process. These findings suggest that smoking cessation interventions may benefit from being tailored according to sex-specific characteristics.

Keywords: Smoking Cessation, Nicotine Dependence, Quit Motivation, Sex Differences, Smoking Behavior

Validity and Reliability Study of the Turkish Version of the Shame Frequency Questionnaire in Medical Students*

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Aim: This study aims to evaluate the Turkish validity and reliability of the Shame Frequency Questionnaire in Medical Students among medical students and to better understand the role of shame in medical education.

Methods: This methodological, cross-sectional study was carried out in February 2025 with 1,333 medical students from all six academic years at Ankara University Faculty of Medicine in order to assess the Turkish adaptation of the Shame Frequency Questionnaire in Medical Students and to analyze its psychometric characteristics.

Results: The Turkish version of the Shame Frequency Questionnaire in Medical Students applied to medical students exhibited high internal consistency (Cronbach's alpha=0.906), while corrected item-total correlations ranged from 0.532 to 0.781. Results of the exploratory factor analysis supported a unidimensional structure, with all 12 items loading onto a single factor (loadings: 0.370-0.691) and explaining 49.75% of the total variance (KMO=0.911; Bartlett's $p < 0.001$). Item

Oral Presentation – OP189

*This presentation aims to disseminate the scale in Turkey. The full version of this research was published in the BMC Medical Education on January 31, 2026: <https://link.springer.com/article/10.1186/s12909-025-08421-y>

discrimination analysis revealed that participants in the upper 27% group scored significantly higher than those in the lower 27% group ($p < 0.001$). However, confirmatory factor analysis conducted on a separate subsample obtained through random division of the dataset indicated that the model fit indices did not reach acceptable levels (e.g., RMSEA=0.19, CFI=0.78).

Conclusions: The Turkish version of the Shame Frequency Questionnaire in Medical Students is a valid and reliable tool. However, further psychometric evaluation in more diverse samples is recommended. In addition, the scale has the potential for research assessing shame among students in other medical schools.

Keywords: Shame, Shame Frequency Questionnaire, Reliability, Validity, Medical Students, Turkey

Is There a Relationship between Cardiovascular Disease Risk Factors and Perceived Stress Levels among Primary Care Patients?

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Objectives: Cardiovascular diseases (CVD) remain the leading cause of mortality worldwide and are influenced by a wide range of biological, behavioral, and psychosocial factors. Among these, psychological stress has increasingly been recognized as a potential contributor to cardiovascular risk through both physiological and lifestyle-related pathways. Primary healthcare settings play a crucial role in the early identification and management of cardiovascular risk factors. This study investigated the association between cardiovascular risk factors and levels of perceived stress experienced by patients in primary healthcare centers (PHCs).

Methods: Our quantitative, cross-sectional study included 451 adult patients aged 40 years or older who attended three PHCs for routine check-ups. The PHCs were selected to represent different districts and sociodemographic characteristics. Data were collected through face-to-face interviews using a structured data collection form exploring sociodemographic characteristics and cardiovascular risk factors. Perceived stress levels were assessed using the Perceived Stress Scale (PSS). PSS was analyzed by segmenting into two distinct subscales: perceived self-efficacy (PSE) and perceived helplessness (PH). Physical activity levels and dietary habits were also

evaluated as part of lifestyle-related cardiovascular risk factors. The results were analyzed using linear regression, a One-Way ANOVA, and a Student's t-test.

Results: The mean age of the participants was 59.94 ± 12.65 years, 56.1% were female, and 64.1% resided in urban areas. Among the participants, 65.2% had hypertension, 29.3% had diabetes mellitus, 23.9% were obese, and 49% reported a family history of cardiovascular disease. Participants were classified as inactive (58.5%), minimally active (32.8%), or active (8.6%) according to their physical activity levels. Inactive patients had higher stress levels in both subscales and total PSS ($p < 0.05$). Of the patients, 59% have healthy diet habits, and participants with higher inadequate PSE, PH, and total PSS scores have more unhealthy diet habits ($p < 0.05$). The mean total PSS score was 17.37 ± 5.63 , while the mean scores for the PSE and PH subdimensions were 11.15 ± 4.07 and 6.22 ± 2.35 , respectively. Linear regression analysis revealed that total PSS mean scores were significantly associated with having a family history of CVD, unhealthy dietary habits, not being physically active, and living in an urban center ($p < 0.05$). Inadequate PSE scores were associated with hypertension, healthy diet, physical activity, and residency ($p < 0.05$). However, covariates including healthy diet, physical activity, educational level, and residency impact PH scores ($p < 0.05$).

Conclusions: Elevated levels of perceived stress are linked to significant cardiovascular risk factors, including hypertension, family background of CVD, lack of physical activity, and poor dietary choices, along with demographic elements such as low income and living in urban areas. These findings highlight the importance of considering psychosocial stress as part of cardiovascular risk assessment in primary care settings. Incorporating stress evaluation alongside traditional risk factor screening may contribute to more comprehensive prevention strategies and improved patient management.

Keywords: Cardiovascular Diseases, Risk Factors, Perceived Stress, Primary Care

Evaluation of the Quality and Reliability of about Test Anxiety Videos for Exam Anxiety Management on YouTube

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Objective: To systematically evaluate the content characteristics, quality, and reliability of YouTube videos presenting about exam anxiety for exam anxiety management.

Materials and Methods: This analytical, cross-sectional study analyzed 67 of 134 videos identified in March 2026 through predefined keywords (exam, anxiety, exam anxiety, and methods for coping with exam anxiety). For each video, views, likes, comments, daily view rate, presentation quality, narrator type, and content components were recorded. Scientific quality was assessed using JAMA, modified DISCERN (mDISCERN), and the Global Quality Scale (GQS). Relevant statistical tests were applied.

Results: The median duration of the videos is 701 seconds, the median number of views is 290, the number of likes is 12 and the number of comments is quite low. The majority of the videos were shared by special units (73.1%). The most frequent narrators in content presentation were psychologists (47.8%), followed by specialist doctors (23.9%).

The most frequently covered topics in the videos were coping methods (68.7%), causes of anxiety (56.7%), and the definition of exam anxiety (52.2%). In addition, suggestions for families (40.3%) and symptoms (28.4%) were also frequently discussed topics. In

contrast, suggestions for teachers (1.5%), meditation techniques (1.5%), and medication treatment (4.5%) were addressed in a very limited way. Medium- and high-quality videos had significantly higher views, likes, comments, and presentation quality scores than low-quality videos ($p<0.001$). Videos narrated by medical specialists and psychologists achieved higher JAMA, mDISCERN, and GQS scores ($p<0.001$). Multi-component videos demonstrated better quality than single-component videos ($p=0.004$). Presentation quality showed a strong positive correlation with all quality measures ($\rho=0.78-0.80$, $p<0.001$).

In intergroup comparisons, it was found that the duration of (high quality) videos was significantly longer than videos with a score of <3 ($p<0.001$). Similarly, the number of views ($p=0.035$) and the number of likes ($p=0.016$) were significantly higher in the high quality group. The high quality group also had significantly higher scores in terms of narration quality ($p<0.001$). Furthermore, the number of content items is higher in the high-quality group, and this difference is statistically significant ($p<0.001$). There is a significant difference between the groups in the distribution of narrators ($p<0.001$); the proportion of expert doctors is significantly higher in high-quality videos. Significant differences were also found between the groups in terms of JAMA and GQS classifications ($p<0.001$ for both).

High levels of positive correlations were found among the primary assessment methods in general. The strongest relationship was observed between GQS and JAMA ($r=0.97$). There was also a high correlation between mDISCERN and the narration quality score ($r=0.82$). In addition, strong and significant relationships were observed between GQS, JAMA, and mDISCERN ($r=0.75-0.76$), while narration quality showed a similarly strong positive correlation with all scales ($r = 0.74$)

Conclusion:

Most YouTube breathing exercise videos for exam anxiety offer low to moderate scientific and educational quality. Videos produced by healthcare professionals and those



incorporating multiple components provide greater reliability and instructional value. Increasing professionally developed, evidence-based content on digital platforms is essential to support safe and effective anxiety self-management.

Keywords: Anxiety, Exam, Exam Anxiety, İnternet, Coping Methods

Drug-Induced Anaphylaxis in Adults: Culprit Drugs, Multiple Drug Sensitivity and Reaction Severity

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Objective

Anaphylaxis is an acute and potentially life-threatening systemic hypersensitivity reaction. This clinical condition may present with a wide spectrum of symptoms affecting the cutaneous, respiratory, gastrointestinal and cardiovascular systems. Early recognition and appropriate treatment are critical for reducing mortality. In the adult population, drugs are among the most important triggers of anaphylaxis, particularly beta-lactam antibiotics and non-steroidal anti-inflammatory drugs (NSAIDs). In recent years, increased medication use, easy access to over-the-counter analgesics, and the rising prevalence of polypharmacy have contributed to more frequent reporting of drug-induced anaphylaxis. Although the clinical presentation of anaphylaxis is heterogeneous, it most commonly manifests with urticaria, angioedema, and respiratory symptoms. However, hypotension and cardiovascular instability are key features of severe anaphylaxis and may be associated with the need for intensive care. Furthermore, although there is evidence suggesting that the time interval between exposure and symptom onset may be associated with anaphylaxis severity, this relationship has not been sufficiently evaluated in clinical cohorts.

Oral Presentation – OP194

The aim of this study was to evaluate the distribution of culprit drugs, patterns of multiple drug sensitivity, clinical presentation characteristics, and factors associated with reaction severity in an adult anaphylaxis cohort.

Materials and Methods

In this retrospective study, adult patients diagnosed with drug-induced anaphylactic shock using the ICD-10 T88.6 code were screened through the hospital information system. A total of 50 patients with adequate clinical data were included in the study. Demographic characteristics, culprit drugs, presence of multiple drug sensitivity, clinical manifestations, system involvement, reaction severity, exposure characteristics, comorbidities, and treatment approaches were retrospectively reviewed from patient records and electronic databases. Reaction severity was classified as mild, moderate, or severe based on clinical presentation and system involvement. Statistical analyses were performed using Jamovi software (Version 2.6). Since continuous variables did not show normal distribution, they were presented as median (minimum–maximum). Categorical variables were expressed as numbers and percentages. Differences in the time from exposure to symptom onset according to reaction severity were analyzed using the Kruskal–Wallis test. Correlations between variables were evaluated using Spearman correlation analysis. Categorical variables were compared using the Chi-square or Fisher’s exact test. A p-value <0.05 was considered statistically significant.

Results

A total of 50 adult patients were included, of whom 30 (60%) were female. The median age was 44.5 years (range, 18–70). Chronic medication use was present in 19 (38%) patients, and at least one comorbidity was identified in 22 (44%), most commonly asthma in 8 (16%) and allergic rhinitis in 7 (14%).

Antibiotics were the most frequently implicated drug group, identified in 30 (60%) patients, followed by analgesics in 21 (42%). Chemotherapeutic agents were responsible

in 4 (8%), proton pump inhibitors in 2 (4%), and other drugs in 5 (10%). Reactions were attributed to a single drug in 40 (80%) patients, while sensitivity to multiple drugs was observed in 17 (34%). Amoxicillin-clavulanate was the leading culprit drug, identified in 17 (34%) patients.

Cutaneous involvement occurred in 47 (94%) patients, respiratory involvement in 40 (80%), cardiovascular involvement in 27 (54%), and gastrointestinal involvement in 11 (22%). Urticaria and dyspnea were the most common symptoms, each observed in 40 (80%) patients.

Reactions were classified as severe in 22 (44%) patients, moderate in 22 (44%), and mild in 6 (12%). The median time from drug exposure to symptom onset was 15 minutes (range, 1–60) and differed significantly according to reaction severity ($p < 0.001$), with a significant correlation between shorter onset time and greater severity ($\rho = 0.602$).

Most reactions occurred at home in 40 (80%) patients and followed oral exposure in 40 (80%). Non-drug triggers were identified in 7 (14%) patients. Adrenaline-containing treatment was administered in 30 (60%), and intensive care admission was required in 4 (8%). The baseline demographic and clinical characteristics are summarized in Table 1.

Table 1. Clinical Profile of Adults with Drug-Induced Anaphylaxis

Variable	Value
Number Of Patients	50
Age, Median (Min–Max), Years	44.5 (18–70)
Female Sex, n (%)	30 (60)
Chronic Medication Use, n (%)	19 (38)
Presence Of Comorbidity, n (%)	22 (44)
Asthma	8 (16)
Allergic Rhinitis	7 (14)
Coronary Artery Disease	6 (12)
Hypertension	5 (10)
Culprit Drug Groups, n (%)	
Antibiotics	30 (60)
Analgesics	21 (42)

Chemotherapeutics	4 (8)
Proton Pump Inhibitors	2 (4)
Other Drugs	5 (10)
Number Of Culprit Drugs n (%)	
Single Drug Reaction	40 (80)
Two Drugs	8 (16)
Three Drugs	2 (4)
System Involvement, n (%)	
Cutaneous	47 (94)
Respiratory	40 (80)
Cardiovascular	27 (54)
Gastrointestinal	11 (22)
Most Common Symptoms, n (%)	
Urticaria	40 (80)
Dyspnea	40 (80)
Angioedema	32 (64)
Hypotension	23 (46)
Syncope	18 (36)
Reaction Severity, n (%)	
Mild	6 (12)
Moderate	22 (44)
Severe	22 (44)
Symptom Onset Time, Median (Min–Max), Min	15 (1–60)
Non-Drug Triggers, n (%)	7 (14)
Venom	4 (8)
Food	3 (6)
Treatment	
Antihistamine + Corticosteroid + Adrenaline	30 (60)
Antihistamine + Corticosteroid	18 (36)
Antihistamine Only	2 (4)
Icu Admission, n (%)	4 (8)

Conclusion

In this cohort of adults with drug-induced anaphylaxis, beta-lactam antibiotics and NSAIDs emerged as the leading culprit drug groups, with amoxicillin-clavulanate identified as the most frequently implicated agent. A considerable proportion of patients demonstrated multiple drug sensitivity, suggesting the presence of complex hypersensitivity phenotypes that may involve both immunological mechanisms and potential cross-reactivity between different drug classes.

Cutaneous and respiratory manifestations were the predominant clinical features, while the relatively high rate of cardiovascular involvement likely reflected the substantial proportion of moderate-to-severe reactions observed in this cohort. Importantly, a significant association was identified between shorter time to symptom onset and increased reaction severity, supporting the concept that early symptom development may serve as a clinical indicator of high-risk anaphylaxis.

The observation that most reactions occurred at home and followed oral drug exposure highlights the potential impact of widespread access to commonly used medications, particularly over-the-counter analgesics and frequently prescribed antibiotics, on the burden of drug-induced anaphylaxis in the community.

Overall, these findings underscore the importance of accurate identification of culprit drugs, careful evaluation of patients with suspected multiple drug hypersensitivity, and early risk stratification based on clinical presentation and timing of symptom onset. Improved awareness and targeted management strategies may contribute to better prevention and outcomes in adults with drug-induced anaphylaxis.

Keywords: Drug-Induced Anaphylaxis;; Beta-Lactam Antibiotics; NSAID Hypersensitivity, Multiple Drug Sensitivity; Reaction Severity, Symptom Onset Time

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Evaluation of Bone Mineral Density Measurements in Individuals Admitted to the Healthy Aging Outpatient Clinic of Muğla Training and Research Hospital

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OBJECTIVE: Osteoporosis is a disease that progresses silently until a fracture occurs, and its incidence increases with age. Identifying and screening high-risk populations is crucial for early diagnosis and treatment. The aim of this study is to evaluate the bone mineral density (BMD) results of individuals admitted to the Muğla Training and Research Hospital Healthy Aging (YAŞAM) Outpatient Clinic, thereby determining the prevalence of osteopenia and osteoporosis.

MATERIALS AND METHODS: This descriptive, cross-sectional, and retrospective study was conducted by reviewing the medical records of individuals aged 80 and over who visited the Muğla Training and Research Hospital YAŞAM Outpatient Clinic between September 1, 2024, and September 1, 2025. Data were collected following approval from the local ethics committee. Individuals who did not undergo BMD measurement or whose results were inaccessible during this period were excluded. BMD was measured using Dual-Energy X-ray Absorptiometry (DEXA). The lowest T-score from either femur or spine measurements was used for classification. Diagnostic criteria were defined as: T-score $\geq$ -1.0 for normal, between -1.0 and -2.5 for osteopenia, and $\leq$ -2.5 for osteoporosis. Statistical analysis was performed using SPSS version 25.0.

RESULTS: Data from a total of 171 participants were analyzed retrospectively. The median age of the participants was 83.00 (IQR: 4.00; min-max: 80-98). Regarding age distribution, 63.2% (n=108) were in the 80-84 age group, 25.7% (n=44) were in the 85-

89 age group, and 11.1% (n=19) were aged 90 and over. Females constituted 52.6% (n=90) of the sample. The median body mass index (BMI) was calculated as 27.47 kg/m² (IQR: 6.28). According to BMI categories, 17.0% of the participants were underweight, 50.3% were of normal weight, and 32.7% were overweight/obese. According to DEXA results, the mean femoral BMD was 0.85 ± 0.18 g/cm², while the mean lumbar spine BMD was 0.95 ± 0.22 g/cm². Based on T-score criteria, osteopenia was detected in 43.3% and osteoporosis in 35.7% of the participants. In the gender comparison, osteoporosis was found in approximately 25% of males and 50% of females; the prevalence was significantly higher in females. Bone health was observed to decline with advancing age; while the rate of normal bone structure was 28% in the 80-84 age group, this rate decreased to 7% in the 85-89 age group. Furthermore, a significant correlation was found between declining BMI and the risk of developing osteoporosis, with the risk increasing markedly as body weight decreased.

CONCLUSION: This study reveals that the prevalence of osteopenia and osteoporosis in the population aged 80 and over is clinically significant. The findings confirm that female gender, advanced age, and low body mass index (BMI) are primary risk factors statistically associated with the development of osteoporosis. Therefore, early identification of high-risk elderly individuals, implementation of personalized screening programs, and the development of preventive strategies to avoid osteoporosis-related complications are of critical importance in maintaining quality of life.

Keywords: Bone Mineral Density, Elderly, Osteoporosis

Diagnostic Value of Ultrasonographic Features in Bethesda II Thyroid Nodules Undergoing Thyroidectomy

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Objective: Although thyroid nodules classified as Bethesda category II (benign) on fine-needle aspiration (FNA) are considered low risk, malignancy can still be detected in some patients following surgery. This study aimed to evaluate the predictive value of ultrasonographic (US) features for malignancy in patients with Bethesda II cytology who underwent thyroidectomy.

Materials and Methods: In this retrospective, single-center study, 108 patients with Bethesda II cytology who underwent thyroidectomy were included. Patients were divided into benign and malignant groups based on final histopathology. Demographic data and US features were compared between groups. Suspicious US features (hypoechoogenicity, solid composition, irregular margins, microcalcifications, and taller-than-wide shape) were assessed, and the presence of ≥ 2 features was defined as “US positive.” Statistical analyses included Mann–Whitney U test, chi-square test, and logistic regression.

Results: Of the 108 patients, 87 (80.6%) had benign and 21 (19.4%) had malignant histopathology. There were no significant differences in age or sex between groups ($p>0.05$). The malignant group had a higher prevalence of hypoechoic nodules (33.3% vs 10.3%, $p=0.014$), solid nodules (61.9% vs 14.9%, $p<0.001$), and US positivity (66.7% vs 6.9%, $p<0.001$). In multivariate analysis, solid composition remained an independent predictor of malignancy (OR: 9.25; 95% CI: 3.21–26.69; $p=0.001$).

Oral Presentation – OP198

Conclusion: The risk of malignancy should not be overlooked in patients with Bethesda II cytology. Solid composition and the presence of multiple suspicious US features are strong predictors of malignancy. Combined evaluation of these parameters may improve clinical decision-making regarding surgery.

Keywords: Thyroid Nodule, Bethesda II, Ultrasonography, Thyroid Malignancy, Thyroidectomy

Evaluation of Cervical Smear Results and Associated Cytological Findings: A Single-Center Retrospective Study

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Abstract

Objective:

This study aimed to evaluate the distribution of cytological results of cervical smear tests, which are widely used in cervical cancer screening, and to investigate their relationship with clinical presenting complaints and accompanying cytological findings. Additionally, the study sought to assess specimen adequacy and the association between inflammatory changes and cytological diagnoses.

Materials and Methods:

A total of 163 patients were included in this retrospective cross-sectional study. Demographic data, presenting complaints, cytological diagnoses, and accompanying cytological findings were analyzed. Patients who presented to the obstetrics and gynecology outpatient clinic between October 2025 and January 2026 were retrospectively reviewed, and those with incomplete data were excluded. The mean age was 44.4 ± 9.7 years, with a median age of 45 years (range: 25–64). Cytological results were classified as negative for intraepithelial lesion or malignancy, atypical squamous cells of undetermined significance (ASCUS), atypical squamous cells—cannot exclude HSIL (ASC-H), low-grade squamous intraepithelial lesion (LSIL), and repeat smear requirement. Presenting complaints were categorized as routine screening, vaginal discharge, and other clinical indications. Additional evaluations included accompanying cytological findings, inflammatory status, reactive cellular changes, presence of

Oral Presentation – OP199

endocervical cells/metaplasia (ECC), erosion, and smear adequacy. Statistical analysis was performed using the chi-square test, and a p-value <0.05 was considered statistically significant.

Results:

Cytological evaluation revealed that 80.4% (n=131) of cases were negative for intraepithelial lesion or malignancy, while 14.1% (n=23) were ASCUS, 1.2% (n=2) ASC-H, 0.6% (n=1) LSIL, and 3.7% (n=6) required repeat smears. These distributions of cytological diagnoses are presented in detail in Table 1. The most common reason for presentation was routine screening (79.1%, n=129), followed by vaginal discharge (12.9%, n=21). Less frequent indications included history of hysterectomy, prior LSIL, breast cancer history, presence of genital warts, lichen sclerosus, and prior ASCUS. No statistically significant association was found between presenting complaints and cytological diagnosis ($\chi^2=21.9$, df=28, p=0.786).

Table.1 Distributions of cytological diagnoses

Diagnosis	n (%)
Negative for intraepithelial lesion or malignancy (NILM)	131 (80.4)
ASCUS	23 (14.1)
ASC-H	2 (1.2)
LSIL	1 (0.6)
Repeat smear required	6 (3.7)

Among accompanying cytological findings, the most common was absence of additional pathology (63.8%), followed by repeat smear requirement (12.9%), bacterial vaginosis (8.0%), ASCUS (6.1%), and Candida infection (4.9%). These accompanying findings are summarized in Table 2. A statistically significant association was observed between accompanying findings and cytological diagnosis ($\chi^2=261$, df=32, p<0.001). ECC/metaplasia was present in 92.0% of cases and showed no significant association with cytological diagnosis (p=0.590).

Table 2. Accompanying cytological findings

Finding	n (%)
No additional finding	104 (63.8)
Repeat smear recommendation	21 (12.9)
Bacterial vaginosis	13 (8.0)
Candida infection	8 (4.9)
Other findings†	17 (10.4)

†Includes ASCUS, LSIL, ASC-H, Actinomyces and vaginitis.

Varying degrees of inflammation was reported in 86.5% of cases, while 13.5% showed no inflammation. No significant relationship was found between inflammation and cytological diagnosis ($p=0.357$). Reactive cellular changes were absent in 54.0% of cases, whereas 33.1% showed nonspecific reactive changes. A statistically significant association was found between reactive cellular changes and cytological diagnosis ($\chi^2=33.9$, $df=12$, $p<0.001$).

Erosion and atrophic changes were absent in the majority of cases (89.5%), and no significant association was found with cytological diagnosis ($p=0.996$). Smear adequacy assessment showed that 92.0% of samples were sufficient.

Conclusion: The findings of this study demonstrate that the majority of cervical smear results are negative for intraepithelial lesion and malignancy, consistent with effective screening practices. However, accompanying inflammatory, infectious, and reactive cytological findings are commonly encountered. These findings may influence cytological interpretation and clinical management. Cervical smear testing not only serves as a valuable tool for cervical cancer screening but also provides important diagnostic information regarding genital infections and inflammatory conditions. Careful evaluation of associated cytological findings may enhance diagnostic accuracy and improve patient management in routine clinical practice.

Keywords: Cervical Smear, ASCUS, Cytology, Inflammation, Screening

Assessment of Activities of Daily Living and Quality of Life Among Patients Receiving Home Healthcare Services

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Aim: This study aims to determine the activities of daily living (ADL) levels and quality of life of patients registered at the Afyonkarahisar State Hospital Home Healthcare Services Unit, and to examine the relationship between these two variables. Furthermore, it intends to identify health issues affecting patients' dependency levels and to develop recommendations for addressing these challenges.

Materials and Methods: This descriptive, prospective, and cross-sectional study was conducted between February and December 2023 at the Afyonkarahisar State Hospital Home Healthcare Services Unit. The study aimed to include all 818 patients registered in the unit without employing a sampling method; the research was completed with 501 patients who met the inclusion criteria and provided voluntary consent. Prior to the study, official approvals were obtained from the university ethics committee and relevant public institutions, and informed consent was secured from the participants or their legal representatives.

Data were collected by the researcher using the face-to-face interview technique, incorporating a 15-item sociodemographic form, the World Health Organization Quality of Life Scale Brief Form (WHOQOL-BREF), the Barthel Index of Activities of Daily Living (Barthel ADL), and the Lawton and Brody Instrumental Activities of Daily Living Index

(Lawton-Brody IADL). Statistical analyses were performed using IBM SPSS Statistics v31.0. The normality of the data distribution was assessed using the Shapiro-Wilk test. Group comparisons were conducted using Mann-Whitney U and Kruskal-Wallis H tests, while relationships between variables were examined using Spearman correlation coefficients. To determine the multidimensional effects on dependent variables, multiple linear regression analysis was applied. The level of statistical significance was set at $p < 0.05$.

Conclusion: Research findings demonstrate a strong, positive, and linear correlation between the independence levels in basic and instrumental activities of daily living and the quality of life among individuals receiving home healthcare services. A significant improvement was observed in all sub-dimensions of quality of life as the level of independence increased.

In light of these results, it is recommended that the living environments of patients be organized in an ergonomic and supportive manner to promote independence. Furthermore, the institutionalization of multidisciplinary care protocols and the integration of periodic functional assessments into standard home healthcare plans are essential. It is anticipated that developing patient-centered intervention strategies that account for sociodemographic factors influencing dependency will further enhance patients' quality of life.

Keywords: Home Healthcare Services, Activities of Daily Living, Quality of Life

Assessment of Knowledge Levels Regarding Warfarin Among Home Health Care Patients with Long-term Warfarin Use

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Objective: Approximately 80% of patients followed by home health care services receive anticoagulant therapy. These anticoagulants include acetylsalicylate, heparin, warfarin, and direct oral anticoagulants (DOACs). However, a significant portion of patients still utilize warfarin. Due to its narrow therapeutic index, warfarin can lead to severe morbidity and mortality. For home health care patients who face challenges accessing hospital facilities, it is vital to have home-based blood sampling and maintain the INR within the target range. Unfortunately, patients on long-term warfarin therapy and their caregivers often lack the desired level of awareness regarding the medication. This deficiency can lead to serious, preventable side effects. Determining the correct and incorrect knowledge of patients and caregivers is the primary step toward correcting misconceptions. This study aims to evaluate the knowledge status regarding warfarin, exposure to side effects, and associated factors among patients or their relatives followed by home health care services.

Oral Presentation - OP202

Material and Methods: The study was conducted by screening the archives of the University of Health Sciences (UHS) Adana City Hospital Home Health Care Services between February 1, 2025, and February 1, 2026. This is a retrospective study. Approval was obtained from the UHS Adana City Training and Research Hospital Scientific Research Ethics Committee. Inclusion criteria were being aged 18 or older, being registered with home health care services during the specified dates, and having used warfarin for at least

3 months. The investigated data evaluated sociodemographic status, warfarin utilization patterns, and the knowledge levels of patients and/or their relatives regarding warfarin.

Results: Of the participants, 68.9% (n=31) were female and 31.1% (n=14) were male. The mean age of the participants was 75.4 years. All participants had comorbid diseases. The average daily medication use, excluding warfarin, was 5.17. The most common comorbidities were hypertension, diabetes mellitus, coronary artery disease, and Alzheimer's disease. Warfarin indications were as follows: 48.9% (n=22) heart valve replacement, 8.9% (n=4) deep vein thrombosis, 8.9% (n=4) atrial fibrillation, 8.9% (n=4) pulmonary embolism, and 24.4% (n=11) cerebrovascular disease. Warfarin-related adverse effects occurred in 37.8% (n=17) of the participants. These side effects included intraocular hemorrhage, gastrointestinal bleeding, gingival bleeding, epistaxis, and hematuria. Additionally, 64.4% (n=29) of participants reported no knowledge of warfarin-drug interactions, and 75.6% (n=34) stated they did not follow any specific diet related to warfarin use. While 24.4% (n=11) of patients administered the medication themselves at home, for others, it was administered by a daughter, son, spouse, or caregiver. A history of warfarin side effects, dietary compliance, and knowledge of drug interactions were compared based on the last measured INR value; the p-values were 0.109, 0.805, and 0.030, respectively. No significant correlation was found between participants' age and the number of non-warfarin medications, duration of warfarin use, or duration of registration in home health care services (p-values: 0.313, 0.314, and 0.228, respectively).

Conclusion: Patients receiving home health care services and their caregivers are not sufficiently informed about the effects, side effects, and precautions associated with warfarin. To minimize adverse effects in these patients, it is crucial to provide regular follow-up and comprehensive education regarding warfarin's effects and necessary precautions.

Keywords: Warfarin, Dose, Home Health Care Services

Is Axillary Dissection Necessary in Malignant Papillary Neoplasms of the Breast?

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Introduction and Aim:

Malignant papillary neoplasms of the breast are rare entities generally associated with a favorable prognosis. This study aimed to evaluate the necessity of axillary dissection and to present clinicopathological findings in patients diagnosed with malignant papillary neoplasms following breast cancer surgery, in light of current literature.

Materials and Methods:

A retrospective review was conducted of patients who underwent surgery for breast cancer between 2023 and 2025. Among these, 16 patients diagnosed with malignant papillary neoplasms based on postoperative histopathological examination were included in the study.

Results:

A total of 450 patients underwent surgery for breast cancer during the study period. Of these, 16 patients (3.5%) were identified as having malignant papillary neoplasms. The mean age was 64.5 years (range: 38–81). Surgical procedures included segmental mastectomy with sentinel lymph node biopsy (SLNB) in 13 patients (81.25%), simple mastectomy with SLNB in 2 patients (12.5%), and modified radical mastectomy in 1 patient (6.25%).

Oral Presentation - OP205

Histopathological evaluation revealed encapsulated papillary carcinoma in 5 patients (31.25%), solid papillary carcinoma in 4 (25%), papillary ductal carcinoma in situ in 4 (25%), and invasive micropapillary carcinoma in 3 patients (18.75%).

Immunohistochemical classification showed that 13 patients (81.25%) were Luminal A, 2 (12.5%) were HER2-positive, and 1 patient (6.25%) was classified as Luminal B. One patient (6.25%) received neoadjuvant therapy prior to surgery.

Discussion and Conclusion:

Malignant papillary neoplasms of the breast predominantly present as early-stage, Luminal A tumors with low biological aggressiveness and an overall favorable prognosis. Consistent with the literature, our findings demonstrate a low likelihood of clinically significant axillary involvement in this subgroup. Importantly, papillary architecture can frequently be identified in preoperative Tru-cut biopsy specimens, providing a critical opportunity for pre-surgical risk stratification.

Based on these findings, routine axillary dissection should be avoided in patients with suspected or confirmed malignant papillary neoplasms in the absence of clear clinical or radiological evidence of nodal involvement. Sentinel lymph node biopsy appears to be a sufficient and less morbid staging approach in the majority of cases. A more conservative axillary management strategy should therefore be strongly considered, particularly in patients with non-invasive or encapsulated subtypes.

Adopting this tailored approach may significantly reduce surgical morbidity without compromising oncological safety. Larger prospective studies are warranted; however, current evidence supports a paradigm shift toward de-escalation of axillary surgery in this rare but distinct subgroup of breast cancer.

Keywords: Breast Cancer, Papillary Neoplasms, Axillary Dissection, Sentinel Lymph Node Biopsy

Evaluation of Allied Health Professionals' Knowledge and Attitudes Regarding Epilepsy

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Aim

Epilepsy is a chronic neurological disorder characterized by recurrent seizures and can occur in all age groups. In addition to the clinical effects of the disease, individuals with epilepsy may also face social prejudice and stigma. The knowledge level and attitudes of healthcare workers during the processes of diagnosis, treatment, and follow-up can influence patients' experiences with healthcare services. The aim of this study is to evaluate the knowledge and attitudes of allied health personnel toward epilepsy.

Materials and Methods

This study was designed as a descriptive, cross-sectional study. The study population consisted of allied health personnel (nurses, midwives, health officers, radiology technicians, anesthesia technicians, medical secretaries, etc.) working in various healthcare institutions in Sivas, across different titles and units. Data were collected through face-to-face interviews using a sociodemographic data form, the Epilepsy Knowledge Scale (EKS), and the Epilepsy Attitude Scale (EAS). The EKS was developed by Aydemir to assess the level of knowledge about epilepsy in the Turkish population. The scale consists of 16 items, with total scores ranging from 0 to 16; higher scores indicate greater knowledge of epilepsy. The EAS was also developed by Aydemir to assess attitudes toward epilepsy and individuals with epilepsy. It is a 5-point Likert-type scale consisting of 14 items, with higher scores indicating more positive attitudes.

Results

A total of 389 individuals participated in the study. Of the participants, 73.3% (n=285) were female and 72.8% (n=283) were married. Among them, 13.1% (n=51) were working in primary care, 73.5% (n=286) in secondary care, and 13.4% (n=52) in tertiary care institutions. Of the participants, 76.3% (n=297) had witnessed an epileptic seizure. While 45% (n=175) reported having received education about epilepsy, 64.8% (n=252) stated that they had sufficient knowledge to manage an epileptic seizure. In response to the question of whether a person with epilepsy could work as a healthcare professional, 63.5% (n=247) answered “yes.” Only 28.3% (n=110) of participants believed that individuals with epilepsy could live independently. Additionally, 40.1% (n=156) thought that people with epilepsy face discrimination in society. A total of 72.5% (n=282) reported a need for further education on epilepsy. Moreover, 20.3% (n=79) did not want their children to be friends with someone with epilepsy, and 62.5% (n=243) did not want their children to marry someone with epilepsy.

The mean EKS score of the participants was 10.4 ± 3.3 (min: 0–max: 16), while the mean EAS score was 45.2 ± 9.6 (min: 13–max: 55). A positive and statistically significant correlation was found between EKS and EAS total scores ($p < 0.05$). As knowledge levels increased, attitudes toward epilepsy became more positive.

Table 1. Comparison of Participants’ Epilepsy Knowledge Scale (EKS) Mean Scores According to Demographic Characteristics

	EKS Score	
	Mean ± SD	p
Gender		
Female	10.9 ± 3.3	<0.001
Male	9.5 ± 3.1	
Marital Status		
Married	10.3 ± 3.2	0.370
Single	10.7 ± 3.5	
Place of Residence		
City	10.3 ± 3.3	0.054
District/Village	12.1 ± 3.7	
Educational Status		

High school	9.2 ± 3.7	<0.001a,b,c
Associate degree	9.5 ± 2.7	
Bachelor's degree	10.9 ± 3.3	
Type of Healthcare Institution		
Primary care	12.4 ± 3.2	<0.001
Secondary and tertiary care	10.1± 3.2	
* Post-hoc analysis: a. between high school and bachelor's degree; b. between associate and bachelor's degree; c. between high school and associate degree.		

Conclusion

Although a considerable proportion of allied health personnel had encountered epileptic seizures, the rate of receiving education on epilepsy was limited. The knowledge and attitude scale scores suggest a need to improve awareness and knowledge about epilepsy. In this regard, it is recommended to expand epilepsy-related training programs for healthcare workers and strengthen in-service training.

Keywords: Allied Health Professionals, Knowledge, Attitudes, Epilepsy

Tobacco Use Among Hospital Staff: A Cross-Sectional Study

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Background and Aim: Because healthcare professionals are expected to model healthy behaviors, tobacco use in this group requires special attention. This study aimed to assess the prevalence of smoking and nicotine dependence among hospital staff and to explore how these behaviors relate to different sociodemographic factors.

Methods: This cross-sectional study was conducted among hospital personnel at Düzce University Faculty of Medicine. Participants were selected from five distinct occupational categories: nurses/midwives/health officers, other healthcare personnel, administrative staff, technical staff, and support staff. Smoking status was determined via a structured questionnaire, while nicotine dependence was evaluated employing the Fagerström Nicotine Dependence Test (FNDT). Subsequently, data analysis involved chi-square tests and binary logistic regression to investigate correlations between smoking behavior and sociodemographic characteristics.

Results: A total of 612 employees (58.8% women; median age 37) participated in the study. In total, 256 participants (41.8%) indicated that they were current smokers. Smoking prevalence was significantly higher among men (52.0%, n=131) compared to women (34.7%, n=125) ($\chi^2=18.153$; $p<0.001$). A statistically significant association was also found between occupational group and smoking status in univariate analysis ($\chi^2=11.15$; $p=0.025$). Adjusted residual analysis revealed that smoking was significantly higher than expected among support staff and significantly lower than expected among

nurses/midwives/health officers. However, in a binary logistic regression model, gender remained a significant independent predictor (OR=1.816; $p=0.001$), while the effect of occupational group lost statistical significance (OR=1.102; $p=0.087$). FNDT scores and dependence levels did not differ significantly by sex or occupational group ($p>0.05$).

Conclusion: The high smoking prevalence among hospital staff—exceeding general population averages in some segments—is concerning. While occupation initially appeared linked to smoking, this was confounded by gender. However, the predominance of 'very low' nicotine dependence offers a critical window of opportunity for workplace cessation programs. Interventions should prioritize male employees and support staff, utilizing the low dependence levels to achieve high success rates.

Keywords: Smoking, Hospital Personnel, Nicotine Dependence, Fagerström Test, Occupational Health

Determination of The Risk of Developmental Delay in Children Aged 3 to 72 Months Registered at an Educational Family Health Center

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Aim: Developmental delay is defined as a child's inability to reach specific developmental milestones compared to their peers and the failure to achieve developmental steps within the expected timeframe for their age group. This study aims to determine the prevalence of developmental delay and its associated risk factors among infants and children aged 3–72 months registered at the Konya Provincial Education Family Health Center No. 92.

Materials and Methods: This cross-sectional survey-based study was conducted between January 1, 2025, and May 1, 2025, with children aged 3–72 months registered at the Konya Provincial Selçuklu District Education Family Health Center No. 92. At the time of the ethics committee application, a total of 176 children within this age range were registered at the center. Based on the G-Power software analysis for the intended statistical test (chi-square), the minimum sample size was determined to be 158 participants, assuming 1, 2, and 3 degrees of freedom with 90% power and a medium effect size (0.3). Exclusion criteria included parents with neurological disorders precluding comprehension of the survey, those who declined to participate, children outside the 3–72 month age range, and children not registered at the designated health center. The research utilized the Ages and Stages Questionnaire (ASQ) [Erken Gelişim Evreleri Envanteri - EGE], a Sociodemographic Survey Form developed to assess child development status and the Patient Health Questionnaire-2 (PHQ-2).

Results: A total of 160 children were included in the study, of whom 53.8% were female and 46.3% were male, with a median age of 41.00 months. According to the developmental assessment, 7.5% of the children required further clinical evaluation (presence of developmental delay in at least two domains), 15.6% exhibited a developmental delay in a single domain, and 76.9% showed typical development. The overall rate of children with developmental delay in at least one domain was found to be 23.1%. The median age was 47 months for children with typical development, 21 months for those with a delay in one domain, and 35 months for those requiring further clinical evaluation; this difference was statistically significant ($p=0.036$). Additionally, the median height was 100 cm in the typically developing group compared to 82 cm in the group with developmental delays, which also represented a significant difference ($p=0.039$). Our study identified several factors significantly associated with a higher risk of developmental delay according to the ASQ scale: being born before 32 weeks of gestation ($p=0.002$), male gender ($p=0.020$), maternal proteinuria during pregnancy ($p=0.003$), presence of a chronic disease in the child ($p=0.002$), a history of multiple hospitalizations in the last six months ($p<0.001$), parental perceived need to consult a physician regarding the child's development ($p=0.006$), parental perception of inadequate developmental progress ($p<0.001$), detected risk of maternal depression ($p=0.035$), and early age of initial screen exposure ($p=0.013$).

Conclusion: The routine implementation of standardized developmental screening tests in primary healthcare services is recommended to effectively evaluate the developmental status of children. It is essential that children identified as being at risk be referred to relevant specialized departments capable of performing comprehensive and advanced developmental assessments. This approach will facilitate the early diagnosis of developmental delays and the timely initiation of appropriate interventions, thereby contributing to the optimal support of the child's developmental process.

Keywords: Development, Developmental Delay, EGE, Primary Health Care Services, Screening

Impact of COVID-19-Related Mobility Restrictions on Osteoporotic Hip Fractures in the Elderly: A Retrospective Comparative Study

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Abstract

Background: The COVID-19 pandemic, declared a global health emergency by the World Health Organization (WHO) on March 11, 2020, led to widespread implementation of social distancing, lockdown measures, and public health interventions. Older adults, particularly those with comorbidities, are at increased risk for severe disease. Simultaneously, enforced mobility restrictions may negatively impact musculoskeletal health by reducing physical activity, a key factor in maintaining bone mass and preventing fractures.

Objective: This study aimed to evaluate the effect of COVID-19-related mobility restrictions on the incidence, clinical course, and functional recovery of osteoporotic hip fractures in elderly individuals.

Methods: A retrospective analysis was conducted on patients aged ≥ 65 years who underwent hemiarthroplasty for osteoporotic hip fractures and were followed for approximately one year. Patients were categorized into two groups: pre-lockdown (Group 1, n=65) and post-lockdown (Group 2, n=122). Demographic, clinical, and perioperative data were extracted from hospital records, with missing follow-up data supplemented via

Oral Presentation - OP211

telephone interviews. Postoperative functional mobilization and incidence of secondary osteoporotic fractures were evaluated.

Results: The majority of fractures in both groups resulted from low-energy falls (Group 1: 98.5%, Group 2: 95.9%). Preoperative mobilization without support was similar (Group 1: 81.5%, Group 2: 78.7%). Postoperative mortality was slightly higher in the post-lockdown group (29.5% vs. 24.6%). Notably, the post-lockdown cohort exhibited increased rates of supported mobilization (52.3% vs. 46.9%) and a higher incidence of secondary osteoporotic fractures (10.5% vs. 2.0%). Neither group received postoperative pharmacologic osteoporosis management.

Conclusion: COVID-19-related mobility restrictions were associated with impaired functional recovery and a significant increase in secondary osteoporotic fractures among elderly patients. These findings underscore the critical importance of maintaining physical activity in older adults and ensuring timely, evidence-based osteoporosis management following hip fracture, even during periods of social restriction.

Introduction

The outbreak of coronavirus disease 2019 (COVID-19) in Wuhan, China, in December 2019, rapidly evolved into a global pandemic, prompting unprecedented public health measures worldwide. Older adults, particularly those with underlying comorbidities, are disproportionately affected by severe disease and mortality. Concurrently, strategies such as home confinement and reduced mobility, while essential for infection control, may have unintended consequences on musculoskeletal health, particularly bone integrity.

Physical activity is a fundamental determinant of bone strength, mediating mechanical loading that stimulates bone remodeling and reduces fracture risk. Osteoporotic hip fractures represent a major cause of morbidity, mortality, and functional decline in the elderly. Limited mobility during lockdown periods may exacerbate fracture risk and compromise postoperative recovery.

This study retrospectively compared elderly patients undergoing hemiarthroplasty for osteoporotic hip fractures before and after COVID-19 mobility restrictions, aiming to quantify the impact of reduced physical activity on fracture patterns, postoperative mobilization, secondary fractures, and mortality.

Materials and Methods

Patients aged ≥ 65 years who underwent hemiarthroplasty for osteoporotic hip fractures at Adana City Training and Research Hospital between March 2019 and March 2021 were included. Two cohorts were defined:

- **Group 1 (pre-lockdown):** 1-year period prior to COVID-19 restrictions (n=65; 19 males, 46 females; mean age 76.7 years, range 65–94)
- **Group 2 (post-lockdown):** 1-year period following lifting of restrictions (n=122; 38 males, 84 females; mean age 73.7 years, range 65–98)

Data were extracted from hospital records, including demographic characteristics, comorbidities, mechanism of fracture, preoperative and postoperative mobilization, mortality, and incidence of secondary osteoporotic fractures. Incomplete follow-up data were obtained through direct telephone interviews.

In Turkey, nationwide restrictions limited outdoor mobility for individuals ≥ 65 years from March 21, 2020: six weeks of full confinement followed by four weeks of partial restrictions. Functional recovery was assessed based on the level of assisted or unassisted mobilization postoperatively.

Results

Fracture Characteristics and Preoperative Status

Low-energy falls accounted for the vast majority of fractures in both groups (Group 1: 98.5%, Group 2: 95.9%). Preoperative mobility without support was similar (Group 1:

81.5%, Group 2: 78.7%). Multiple comorbidities were present in most patients (Group 1: 89.2%, Group 2: 93.4%).

Postoperative Outcomes

Mortality rates were slightly elevated in the post-lockdown cohort (Group 2: 29.5% vs. Group 1: 24.6%). Supported postoperative mobilization was more frequent in the post-lockdown group (52.3% vs. 46.9%), indicating compromised functional recovery. The incidence of secondary osteoporotic fractures was markedly higher in Group 2 (10.5% vs. 2.0%), including proximal humerus, distal radius, vertebral, contralateral hip, and periprosthetic fractures. Notably, no patients in either cohort received postoperative osteoporosis-specific pharmacologic therapy.

Discussion

Our findings suggest that COVID-19-related mobility restrictions had a measurable negative impact on postoperative outcomes in elderly patients with osteoporotic hip fractures. While baseline fracture mechanisms and preoperative mobility were comparable, the post-lockdown group demonstrated:

1. Higher reliance on supported mobilization, reflecting impaired functional recovery
2. Increased secondary fracture incidence, underscoring the consequences of reduced bone-strengthening activity
3. Slightly elevated mortality, potentially linked to frailty exacerbated by confinement

The absence of postoperative osteoporosis management represents a significant gap in care, likely contributing to the increased risk of secondary fractures. These results highlight the importance of maintaining physical activity and implementing structured osteoporosis management protocols even during public health crises.

Conclusion

The COVID-19 pandemic and associated mobility restrictions adversely affected elderly patients with osteoporotic hip fractures, resulting in impaired functional recovery and increased secondary fracture risk. Maintaining regular physical activity and ensuring comprehensive osteoporosis management are essential to mitigate these risks and improve outcomes in this vulnerable population.

Keywords: COVID-19 Pandemic, Osteoporotic Hip Fracture, Decreased Physical Activity

Cholecystectomy in Octogenarians: Impact of Surgical Approach and Timing on Clinical Outcomes

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Introduction and Aim

Global life expectancy has risen substantially over recent decades, resulting in a rapidly expanding elderly population. This demographic shift has led to an increased demand for surgical interventions in advanced age groups. However, patients aged 80 years and older represent a particularly vulnerable cohort due to multiple comorbidities, diminished physiological reserve, and increased frailty, all of which contribute to elevated perioperative morbidity and mortality. Acute biliary pathologies, including cholelithiasis and acute cholecystitis, are common in this age group and often necessitate surgical intervention. Despite advances in minimally invasive techniques, the optimal surgical approach in octogenarians remains a subject of ongoing debate. This study aimed to evaluate surgical outcomes, perioperative characteristics, and mortality rates in patients aged over 80 years undergoing cholecystectomy, with a particular focus on the impact of surgical approach and urgency of intervention.

Materials and Methods

This retrospective cohort study included patients aged ≥ 80 years who underwent cholecystectomy between 2023 and 2026 at the General Surgery Clinic of Kocaeli City Hospital. Medical records were systematically reviewed, and only patients with complete datasets—including operative reports, perioperative clinical data, follow-up records, and

histopathological findings—were included. Demographic characteristics, type of surgical approach (laparoscopic, conversion to open, or primary open), indication for surgery (elective vs. emergency), length of hospital stay, and postoperative outcomes, including mortality, were analyzed. Comparative subgroup analyses were performed to explore the relationship between surgical modality, urgency of intervention, and clinical outcomes.

Results

A total of 3,238 patients underwent cholecystectomy during the study period, of whom 54 patients (1.6%) were aged ≥ 80 years and constituted the study cohort. The mean age was 83.8 years (range, 80–94), reflecting a population with advanced age and likely increased surgical risk. Laparoscopic cholecystectomy was the predominant surgical approach, performed in 43 patients (79.6%). Conversion to open surgery was required in 6 patients (11.1%), while 5 patients (9.2%) underwent primary open cholecystectomy.

Regarding surgical timing, 23 patients (42.6%) underwent emergency surgery, whereas 31 patients (57.4%) were treated electively. A marked difference in surgical approach was observed between these groups. Among emergency cases, open surgery was more frequently performed (65.2%), with only 34.8% managed laparoscopically. In contrast, elective cases were overwhelmingly treated with laparoscopic techniques (93%), with a very low rate of open surgery (6.4%).

The mean length of hospital stay was 5.2 days (range, 1–24), indicating variability likely associated with perioperative complications and patient comorbidities. Postoperative mortality analysis revealed a substantial disparity between surgical approaches. Mortality occurred in 1 patient following laparoscopic cholecystectomy, whereas 5 patients who ultimately underwent open surgery died postoperatively, corresponding to markedly higher mortality rates in the open surgery group. These findings suggest a strong association between surgical invasiveness and adverse outcomes in this high-risk population.

Discussion and Conclusion

The findings of this study underscore the critical importance of surgical approach and timing in the management of biliary disease in octogenarian patients. Advances in laparoscopic surgery and perioperative care have significantly improved the safety profile of minimally invasive procedures, even in advanced age groups. Our results demonstrate that laparoscopic cholecystectomy is not only feasible but also associated with lower mortality and more favorable clinical outcomes compared to open surgery in patients aged over 80 years.

The higher rate of open surgery and associated mortality in emergency cases highlights the consequences of delayed presentation or progression of disease, emphasizing the potential benefits of timely elective intervention. Early diagnosis and appropriate surgical planning may reduce the need for emergent procedures and conversion to open surgery, thereby improving overall outcomes.

Furthermore, the identification of high-risk patients through comprehensive preoperative assessment—including evaluation of frailty, comorbidity burden, and functional status—should be an integral component of clinical decision-making. Individualized treatment strategies, incorporating multidisciplinary evaluation and optimization of perioperative care, are essential to minimize complications and mortality in this vulnerable population.

In conclusion, laparoscopic cholecystectomy should be considered the preferred approach in elderly patients whenever feasible. Strengthening early referral pathways and optimizing perioperative management may further enhance surgical outcomes and reduce mortality in patients aged 80 years and older.

Keywords: Cholecystectomy, Laparoscopy, Elderly patients

Synchronous Bilateral Breast Cancer: A Single-Center Case Series of Clinicopathological and Molecular Features

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Introduction and Aim:

With ongoing sociocultural and economic developments, the incidence of newly diagnosed breast cancer continues to rise. The risk of developing bilateral breast cancer has been reported in the literature to range between 1–2%. Therefore, the possibility of malignancy in the contralateral breast should always be considered in patients newly diagnosed with breast cancer.

Materials and Methods:

The medical records of patients who underwent surgery for breast cancer between 2023 and 2025 were retrospectively reviewed. Patients who were operated on for synchronous bilateral breast cancer were included in the study.

Results:

A total of 450 patients who underwent surgery for breast cancer in the General Surgery Clinic of Kocaeli City Hospital between 2023 and 2025 were retrospectively analyzed. Among these, 5 patients (1.11%) who underwent surgery for synchronous bilateral breast cancer were identified and included in the study. All tumors were unifocal, and no

invasive or in situ lobular carcinoma components were observed in any breast. Except for one patient, all patients received neoadjuvant chemotherapy preoperatively.

In terms of surgical procedures, breast-conserving surgery (BCS) with sentinel lymph node biopsy (SLNB) was performed in 5 breasts (50%), mastectomy with SLNB in 3 breasts (30%), mastectomy with SLNB and axillary dissection in 1 breast (10%), and modified radical mastectomy in 1 breast (10%).

Axillary metastasis was detected in 3 cases (30%) (including bilateral axillary involvement in one patient), whereas no axillary metastasis was observed in 7 cases (70%).

Regarding molecular subtypes, 5 patients (50%) had Luminal A and 5 patients (50%) had Luminal B breast cancer. During a mean follow-up period of 17 months (range: 4–28 months), brain metastasis developed in one patient, while the remaining patients are currently disease-free.

Discussion and Conclusion:

In breast cancer, the likelihood of synchronous bilateral disease is higher in cases with lobular histology and multicentric tumors, and bilateral involvement is generally associated with a poorer prognosis. However, in our cohort, no invasive or in situ lobular carcinoma or additional tumor foci were identified. Notably, all patients exhibited favorable molecular subtypes (Luminal A and B), which are typically associated with a better prognosis.

Keywords: Thyroid Nodule, Bethesda II, Ultrasonography, Thyroid Malignancy, Thyroidectomy

Knowledge Levels of Medical Faculty Clinical Term Students About Rabies Prophylaxis: An Observational Study

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Introduction: Rabies is a disease that can be 100% prevented through pre- and post-exposure prophylaxis. However, inappropriate clinical decisions regarding post-exposure prophylaxis (PEP) can lead to unnecessary interventions and an increased burden on health care systems. For primary care physicians who will manage rabies exposure, it is important to assess not only their level of knowledge but also their clinical decision-making skills. The aim of this study is to assess the level of knowledge regarding rabies prophylaxis among clinic-stage medical students.

Methods: This cross-sectional study was conducted among 201 clinic-stage medical students enrolled at the Faculty of Medicine, Kırıkkale University, between May 2025 and July 2025. The questionnaire, designed to assess knowledge levels regarding rabies prophylaxis, was developed by researchers based on the Ministry of Health of the Republic of Turkey's Rabies Prophylaxis Guidelines and consists of a total of 20 questions. Categorical variables are expressed using numbers and percentages. Comparisons of categorical variables were performed using Fisher's exact test and the chi-square test. P-value of less than 0.05 was considered statistically significant for all tests.

Oral Presentation - OP221

Results: The participants' mean age was 23.58 ± 2.97 , and 52.7% (n=106) were female. It was found that medical students had a moderate level of knowledge regarding rabies prophylaxis (mean score 12.37 ± 3.97). Based on proficiency levels, only 17.9% of participants had a sufficient level of knowledge. Nevertheless, a significant proportion of the students exhibited inappropriate and defensive coping tendencies. 81.1% of participants believed that rabies prophylaxis was necessary for human bites, and 59.7% believed it was necessary for rodent bites. In addition, 44.3% of the students believed that breastfeeding after receiving a rabies vaccine was unsafe. Although 80.1% of participants correctly identified the standard immunization schedule, significant misconceptions persisted regarding exposure classification and appropriate indications for immunoglobulin use. A statistically significant difference was observed in knowledge levels by academic year, favoring fifth-year students ($p=0.021$).

Conclusion: Clinical-year medical students tend to adopt a defensive and clinically inappropriate approach to rabies prophylaxis, particularly in low-risk exposure scenarios. This situation can lead to unnecessary vaccinations and overtreatment, thereby increasing healthcare costs and resulting in the misallocation of limited resources in primary care. This study emphasizes the need to develop evidence-based clinical decision-making skills among students and medical residents through lectures, courses, or online training, and to reinforce their knowledge of rabies, both to ensure the proper administration of treatment and to prevent the unnecessary use of resources.

Keywords: Level Of Knowledge, Medical Students, Prophylaxis, Rabies

The Usability of Large Language Models in Patient Education: An Analysis of Diabetes Mellitus Information Texts

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Aim: Diabetes is among the most common causes of death in our country and worldwide. For this reason, increasing public awareness regarding the risks that predispose to diabetes and preventing diabetes by combating risk factors are very important. The aim of this study was to compare the readability of diabetes mellitus (DM) patient information materials of diabetes associations in Türkiye with the texts generated by large language models (the ChatGPT and Gemini families) and to evaluate the texts in terms of accuracy and comprehensiveness.

Materials and Methods: Within the scope of the study, six basic questions related to diabetes were determined ("What is diabetes? What are the symptoms of diabetes? What are the types of diabetes? How is diabetes diagnosed? What is the treatment of diabetes like? Can diabetes be prevented?"), the patient information texts on the websites of the Türkiye Endokrinoloji ve Metabolizma Derneği, Türk Diyabet Cemiyeti, and Türkiye Diyabet Vakfı were taken as reference sources, and the answers were compiled. The same questions were also directed to the large language models. In addition, the first responses obtained from each model were regenerated with the prompt, "Reorganize this text so that a 6th-grade student can understand it." The readability of all texts was evaluated with the Ateşman formula, and accuracy and comprehensiveness were scored by two family medicine

specialists experienced in diabetes. Mann-Whitney U and Kruskal-Wallis tests were used in the statistical analyses.

Results: The highest readability was identified in the ChatGPT 5 Thinking (6th grade) text with a score of 85.8, while the lowest readability was identified in the Türkiye Diyabet Vakfı text with a score of 59.5. While the readability levels of the reference texts were found to be between 9th-12th grade levels, the large language models had generally produced texts at the 5th-8th grade levels. In particular, the ChatGPT texts adapted to the 6th-grade level had achieved the targeted 5th-6th grade readability level and received the highest readability score. A significant difference was found in terms of readability among the ChatGPT family, the Gemini family, and the reference texts. In the accuracy and comprehensiveness scores, no significant difference was detected between the ChatGPT and Gemini families in both the initially generated texts and the texts adapted to the 6th-grade level.

Conclusion: The findings of the study show that the current institutional patient information materials are complex for average health literacy. Large language models, especially with a 6th-grade-level prompt, have the potential to increase the readability of patient education materials. However, since the texts produced by large language models may not by themselves be able to replace institutional contents in terms of comprehensiveness and accuracy, these texts need to be verified with current guidelines and expert evaluation.

Keywords: Family Practice, Diabetes Mellitus, Artificial Intelligence, Patient Education Handout

Clinical Associations of Vitamin D Deficiency with Glycemic Control and Renal Function in Adults Attending Primary Care

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Introduction and Aim

Vitamin D plays a crucial role not only in bone metabolism but also in metabolic and renal functions. Although its association with insulin resistance and kidney function has been widely investigated, findings remain inconsistent. This study aimed to evaluate the relationship between serum 25-hydroxyvitamin D [25(OH)D] levels and insulin resistance as well as renal function parameters in adults presenting to a family medicine clinic in a tertiary care setting.

Materials and Methods

This retrospective, cross-sectional descriptive study included adult patients who presented to the Family Medicine Clinic of Sivas Cumhuriyet University Hospital between January 1, 2024, and December 31, 2024. Eligible participants had available measurements of vitamin D, fasting plasma glucose, insulin, HbA1c, blood urea nitrogen (BUN), creatinine, and estimated glomerular filtration rate (eGFR). Patients with diabetes mellitus, pregnancy, malignancy, active liver or kidney disease, and conditions affecting calcium metabolism were excluded. Insulin resistance was assessed using the Homeostatic Model Assessment for Insulin Resistance (HOMA-IR), with a cut-off value of ≥ 2.5 . Vitamin D status was categorized as severe deficiency (≤ 10 ng/mL), deficiency (≤ 20 ng/mL), insufficiency (21–29 ng/mL), and normal (≥ 30 ng/mL). Renal function was

Oral Presentation – OP225

evaluated using eGFR calculated by the CKD-EPI equation. Statistical analyses were performed using SPSS version 23.0, with $p < 0.05$ considered statistically significant.

Results

A total of participants were analyzed, of whom 60.7% were female and 39.3% were male, with a mean age of 35.48 ± 15.23 years. The mean serum 25(OH)D level was 20.70 ± 11.37 ng/mL. Severe vitamin D deficiency was present in 15.3% of participants, deficiency in 42.9%, insufficiency in 28.4%, and normal levels in only 13.4%. The prevalence of insulin resistance was 40.3%. No statistically significant associations were observed between vitamin D levels and fasting plasma glucose, serum insulin, or HOMA-IR ($p > 0.05$). However, HbA1c levels differed significantly across vitamin D categories ($p < 0.05$).

Regarding renal function, higher vitamin D levels were associated with increased serum creatinine and BUN levels and decreased eGFR values ($p < 0.05$). While 85.6% of participants had normal renal function, 13.4% had early-stage renal impairment and 1.0% had moderate-stage impairment. Vitamin D levels were significantly associated with sex, age groups, and seasonal variation ($p < 0.05$), with severe deficiency more prevalent among women, younger adults, and during the winter months.

Conclusion

Vitamin D deficiency and insufficiency are highly prevalent among adults attending primary care. Although no significant association was found between serum 25(OH)D levels and insulin resistance, significant relationships were observed with renal function parameters. These findings suggest that vitamin D status may have clinical relevance beyond skeletal health, particularly in the assessment of renal function. Incorporating vitamin D evaluation into comprehensive metabolic and renal risk assessment may enhance patient management in primary care settings.

Keywords: Vitamin D, Insulin Resistance, HOMA-IR, Kidney Functions

The Effect of Tobacco Control Policies on Smoking Cessation Interest and Shift to Alternative Products: A Google Trends-Based Infodemiological Analysis in Turkey (2008–2025)

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Objective: This study aimed to analyze smoking cessation interest, trends toward alternative tobacco products, and the impact of tobacco control policies on public health information-seeking behavior in Turkey during the 2008–2025 period using infodemiological methods.

Material and Methods: Monthly relative search volume (RSV) data for the period January 2008–December 2025 were obtained from the Google Trends platform. A total of 30 search terms were analyzed across four groups: smoking cessation methods, alternative tobacco products, policy/price-related searches, and health risk searches. The study period was divided into six sub-periods based on key inflection points in tobacco control policies: Pre-Legislation (2008-01/2008-04), Initial Ban (2008-05/2009-06), Comprehensive Ban (2009-07/2012-12), Post-Campaign/Price Increase Era (2013-01/2019-12), COVID-19 and E-Cigarette Ban Period (2020-01/2021-12), and Current Period (2022-01/2025-12). Regional differences were examined across seven geographical regions. For data not conforming to normal distribution as determined by the Shapiro-Wilk normality test, Kruskal-Wallis, Mann-Whitney U (with Bonferroni correction), and Spearman correlation tests along with seasonal decomposition analysis were applied.

Oral Presentation – OP230

Results: Statistically significant inter-period differences were identified for all variables ($p < 0.001$). The "Smoking is Regret" (*Sigara Pişmanlıktır*) campaign implemented in 2010–2011 represented the highest smoking cessation search interest across the entire study period (RSV=100). The 25% tobacco price increase in August 2019 triggered the second peak (RSV=60), while roll-your-own tobacco searches simultaneously reached RSV=54. Following the withdrawal of Champix from the market in 2021 due to nitrosamine content concerns, a marked decline in search interest was observed (Period 5 vs. Period 6: $U=14.5$; $p < 0.001$); during the same period, nicotine patch and IQOS (I Quit Ordinary Smoking; heated tobacco product) searches showed significant increases. Electronic cigarette searches peaked at RSV=100 in April 2013 and subsequently declined following an import ban; however, IQOS searches continued to rise despite the restriction. Smoking cessation interest peaked in January–February and reached its lowest levels during summer months ($p=0.004$). Regional analysis revealed that electronic cigarette searches were significantly higher in Western regions, while smoking cessation interest was notably highest in Southeastern Anatolia ($p=0.006$).

Conclusion: The effectiveness of tobacco control policies is reflected in public information-seeking behavior; however, price increases appear to trigger a shift to cheaper alternatives rather than promoting smoking cessation. While media campaigns generate short-term spikes in smoking cessation interest, restrictions on access to pharmacological treatment accelerate the shift toward alternative products. These findings highlight the importance of considering the policy–behavior relationship in the development of comprehensive tobacco control strategies and in primary care smoking cessation counseling.

Keywords: Smoking Cessation, Tobacco Control, Infodemiology, Google Trends, Family Medicine

Digital Epidemiology of Scabies: Seasonal, Periodic, and Regional Analysis of Search Behaviors in Turkey with Assessment of Disaster and Media Effects

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Objective: Scabies has re-emerged as a notable public health concern in Turkey in recent years. Although a seasonal pattern has been reported in classical epidemiological studies, the patterns of digital information-seeking behavior regarding this disease remain insufficiently investigated. This study aimed to examine the seasonal, periodic, and regional patterns of internet search behavior related to scabies, and to evaluate the effects of the pandemic, earthquake, and media exposure.

Material and Methods: A total of 36 search terms were analyzed via the Google Trends platform for the period January 2018–December 2025. Terms were categorized into four groups: awareness searches, symptom searches, medical treatment searches, and traditional/home remedy searches. Monthly data normalized using the anchor keyword method were compared across three periods: pre-pandemic (2018–2019), pandemic period (2020–2021), and post-pandemic (2022–2025). Regional distribution was assessed at both the provincial level and across seven geographical regions. A pre- and post-comparison was additionally conducted for earthquake-affected provinces. Kruskal-Wallis and Mann-Whitney U tests were used for periodic analysis, and the Friedman test was applied for seasonal analysis.

Results: Statistically significant inter-period differences were identified across all groups (Kruskal-Wallis, $p < 0.001$). Traditional/home remedy searches, which were nearly absent

in the pre-pandemic period, reached the highest values among all groups in the post-pandemic period, surpassing medical treatment searches (mean: 56.9). A distinct seasonal pattern was observed for awareness, medical treatment, and traditional/home remedy searches (Friedman, $p < 0.001$), with peaks in November–December and the lowest levels recorded in July. The Black Sea region demonstrated the highest search interest across all groups, while Central Anatolia recorded the lowest. In earthquake-affected provinces, the rate of increase in search volume after 2022 reached twice that of other provinces (+14.3 vs. +6.2). In November 2023, the highest search volume of the entire study period was observed across all groups; this peak, which coincided with official statements by health authorities, represents a compelling example of societal digital mobilization.

Conclusion: Internet search behavior related to scabies exhibits prominent winter peaks consistent with classical epidemiological seasonality and shows clustering in the Black Sea region. The fact that traditional/home remedy searches have surpassed medical treatment searches raises important concerns regarding access to and adherence with standard treatment. Google Trends data may be considered a complementary digital tool for early warning, campaign planning, and post-disaster surveillance in primary care settings for re-emerging infectious skin diseases.

Keywords: Scabies, Infodemiology, Public Health Surveillance, Google Trends, Health Information-Seeking Behavior

Effectiveness of Reservoir Mask versus Diffuser Mask Oxygen Therapy in Pediatric Bronchiolitis: A Propensity Score-Matched Comparative Study

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Background and Objective:

Acute bronchiolitis is one of the leading causes of lower respiratory tract infections and hypoxemia-related emergency department admissions in infancy. The cornerstone of management is supportive care and adequate oxygenation. While conventional reservoir masks provide high inspired oxygen fractions (FiO₂), diffuser masks are novel systems designed to reduce claustrophobia and deliver more stable oxygenation across varying flow rates. This study aimed to compare the effects of reservoir and diffuser masks on clinical course, treatment success, and respiratory indices in children with bronchiolitis.

Materials and Methods:

This retrospective study included pediatric patients with moderate-to-severe bronchiolitis who received oxygen therapy in the emergency department. Patients were grouped as Reservoir Mask (n=30) and Diffuser Mask (n=36). Based on literature-reported maximum oxygen delivery capacities, FiO₂ was assumed as 95% for reservoir masks and 80% for diffuser masks. To minimize selection bias inherent to the retrospective design, Propensity Score Matching (PSM) was performed using age, sex, baseline bronchiolitis score, and heart rate. After matching, 30 patients were included in

each group (total n=60). Oxygenation efficiency was assessed using the S/F ratio and ROX index. Treatment success was defined as improvement in both indices at the 3rd hour compared to baseline. A p-value <0.05 was considered statistically significant. Multivariable logistic regression analysis was conducted to identify independent predictors of treatment success, adjusting for age, baseline clinical scores, and hemodynamic parameters.

Results:

After PSM, no significant differences were observed between groups regarding demographic characteristics and baseline clinical scores ($p>0.05$). Treatment success was significantly higher in the diffuser mask group (86.7%, n=26) compared to the reservoir mask group (60.0%, n=18) ($p=0.039$). Multivariable logistic regression analysis demonstrated that diffuser mask use independently increased the likelihood of treatment success by 4.32-fold (OR: 4.32, 95% CI: 1.15–16.20, $p=0.031$). Receiver operating characteristic (ROC) analysis identified the baseline ROX index as a strong predictor of treatment success (AUC: 0.749, $p<0.001$; cut-off >2.20). No significant differences were found between groups in terms of treatment failure (escalation to high-flow oxygen therapy) or length of hospital stay ($p>0.05$). Hemodynamic monitoring revealed more stable perfusion index (PI) values at the 3rd hour in the diffuser mask group ($p=0.007$).

Conclusion:

Diffuser masks demonstrated superior treatment success compared to reservoir masks, despite delivering lower FiO_2 levels. This may be attributed to reduced carbon dioxide rebreathing and improved patient comfort due to the open-mask design. Additionally, the baseline ROX index appears to be a valuable predictor of treatment response. Diffuser masks can be considered a reliable and effective alternative to reservoir masks in the management of pediatric bronchiolitis.

Table 1. Comparison of Demographic Characteristics, Respiratory Indices, Hemodynamic Parameters, and Clinical Outcomes Between Reservoir Mask and Diffuser Mask Groups

Variable	Reservoir Mask (n=30)	Diffuser Mask (n=30)	p-value
Demographics & Baseline			
Age (years), median (IQR)	4.00 (2.50–11.00)	4.00 (2.25–8.75)	0.727
Male sex, n (%)	21 (70.0%)	20 (66.7%)	1.00
Bronchiolitis score, median (IQR)	5.50 (5.00–8.00)	6.00 (5.25–7.00)	0.419
Heart Rate (bpm)			
Baseline	150.50 (138.00–158.00)	156.00 (132.00–176.50)	0.354
1st hour	136.50 (126.00–154.00)	152.00 (138.00–159.00)	0.013*
2nd hour	130.00 (123.00–133.00)	148.00 (129.00–149.75)	0.035*
3rd hour	132.00 (129.00–134.00)	141.00 (126.25–150.00)	0.077
Respiratory Indices			
S/F ratio – baseline, mean $\pm$ SD	99.47 $\pm$ 4.79	112.50 $\pm$ 12.06	<0.001**
S/F ratio – 3rd hour, mean $\pm$ SD	104.21 $\pm$ 1.25	125.00 $\pm$ 1.25	<0.001**
ROX index – baseline, median (IQR)	2.27 (2.08–2.83)	2.98 (2.26–3.20)	0.009**
ROX index – 3rd hour, median (IQR)	2.99 (2.92–3.47)	3.91 (3.58–4.16)	<0.001**
SpO ₂ – baseline (%), median (IQR)	94.50 (91.00–98.00)	90.00 (89.00–96.75)	0.018*
Hemodynamic Parameters			
PI – baseline, median (IQR)	1.20 (0.86–1.40)	1.20 (0.91–1.27)	0.899
PI – 3rd hour, median (IQR)	1.03 (0.61–1.40)	1.30 (1.23–2.10)	0.007**
PVI – baseline, median (IQR)	23.00 (18.00–32.00)	22.00 (21.00–22.00)	0.505
PVI – 3rd hour, median (IQR)	21.50 (21.00–28.00)	25.00 (19.25–34.00)	0.160
Outcomes			
Length of stay (days), median (IQR)	6.50 (5.00–8.00)	7.00 (3.25–9.50)	0.660
Treatment success, n (%)	18 (60.0%)	26 (86.7%)	0.039*
Escalation to high-flow oxygen therapy (failure), n (%)	3 (10.0%)	8 (26.7%)	0.181

* p < 0.05, ** p < 0.01

Table 2. Independent Predictors of Treatment Success: Multivariable Logistic Regression Analysis (Adjusted for Age, Baseline Clinical Score, and Perfusion Parameters)

Independent Variable	Odds Ratio (OR)	95% Confidence Interval (CI)	p-value
Mask type (Diffuser vs. Reservoir)	4.32	1.15 – 16.20	0.031*
Age	1.02	0.94 – 1.11	0.654
Baseline bronchiolitis score	0.82	0.61 – 1.09	0.178
Baseline perfusion index (PI)	1.45	0.88 – 2.38	0.142
Baseline heart rate	0.98	0.95 – 1.02	0.320

* p < 0.05

Keywords: Bronchiolitis, Oxygen Therapy, ROX Index, Propensity Score Matching, Diffuser Mask

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Retrospective Investigation of Mothers and Infants Followed for Maternal Toxoplasmosis: A Single-Center Experience

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Objective: *Toxoplasma gondii* infection is important during pregnancy because primary maternal infection may result in transplacental transmission and lead to neurological and ophthalmological sequelae in the fetus. Maternal infection is often asymptomatic, and the diagnosis is usually established by prenatal serological screening. Evaluation of cases identified during the prenatal period with appropriate treatment and postnatal follow-up is essential for the early diagnosis and management of possible congenital infection. This study aimed to retrospectively evaluate the demographic characteristics, clinical findings, and follow-up features of mothers and infants followed for maternal toxoplasmosis.

Materials and Methods: Infants born to mothers followed and treated for maternal toxoplasmosis between 2024 and 2026 at the Pediatric Infectious Diseases Clinic of Osmaniye Training and Research Hospital were retrospectively evaluated. Demographic characteristics, maternal serological data, prenatal treatment processes, and postnatal follow-up findings were reviewed from medical records.

Results: A total of 17 mothers and their infants were included in the study. The mean maternal age was 28.1±4.0 years. Maternal diagnosis was established at a mean gestational age of 9.4±2.6 weeks, and treatment was initiated at 9.6±2.6 weeks of gestation. All cases were identified during routine prenatal screening and received treatment. Spiramycin therapy was initiated in all pregnant women during the prenatal

period. As risk factors, cat exposure was present in 3 mothers (17.6%), farming activity in 3 (17.6%), and a history of infection during pregnancy in 4 (23.5%), while no clear risk factor was identified in 7 mothers (41.2%). Treatment was discontinued in 2 mothers (11.8%) after amniocentesis revealed negative *Toxoplasma* polymerase chain reaction (PCR) test results, whereas the remaining cases received treatment until delivery. Prenatal ultrasonography was normal in 16 cases (94.1%) and was compatible with hydrocephalus in 1 case (5.9%). The mean gestational age at birth was 38.3 ± 2.0 weeks, and the mean birth weight was 3159 ± 501 g; one newborn (5.9%) was preterm and two (11.8%) were small for gestational age (SGA). The mean follow-up duration was 208.1 ± 171.8 days. Hearing and ophthalmologic evaluations were normal in all newborns. One newborn required intensive care due to severe perinatal comorbidities; however, blood *Toxoplasma* PCR was negative and lumbar puncture could not be performed because of poor clinical condition. In one newborn (5.9%), congenital toxoplasmosis was diagnosed based on positive *Toxoplasma* IgM and IgG serology together with hydrocephalus, and treatment with pyrimethamine, sulfadiazine, and folinic acid was initiated. Cerebrospinal fluid findings and molecular tests were negative in the remaining infants who underwent lumbar puncture.

Conclusion: In our series, prenatal and postnatal findings were normal in the majority of cases, and congenital toxoplasmosis was diagnosed in only one newborn. Maternal toxoplasmosis is often asymptomatic and is usually detected through prenatal serological screening. Although early treatment may reduce the risk of fetal transmission and amniotic fluid PCR has high diagnostic value in prenatal diagnosis, negative results should be interpreted together with clinical findings and gestational age. Since congenital toxoplasmosis may be asymptomatic at birth and neonatal tests may not always be diagnostic, these infants should be closely monitored with serological, ophthalmological, neurological, and radiological evaluations.

Keywords: Congenital Toxoplasmosis, Maternal Toxoplasmosis, Pregnancy, *Toxoplasma Gondii*

Patterns of Referral and Clinical Decision-Making in Internal Medicine Outpatient Care: Evidence from Primary Care Referrals

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Introduction and Aim

A substantial proportion of patients are referred to internal medicine specialists by family physicians. Previous studies have predominantly focused on the perspectives of primary care physicians regarding referral practices. This study aimed to evaluate the clinical interventions performed by internal medicine specialists based on the referral reasons of patients referred from family medicine.

Materials and Methods

This study included patients referred from family medicine to the internal medicine outpatient clinics of Adana Yüreğir State Hospital between August 25, 2025, and November 25, 2025. Referral indications and subsequent diagnostic and therapeutic interventions performed in the internal medicine clinic were systematically recorded. Statistical analyses were conducted using SPSS version 25.0. Categorical variables were expressed as frequencies and percentages, parametric variables as mean $\pm$ standard deviation, and non-parametric variables as median (minimum–maximum).

Results

A total of 439 patients were included in the study; 66.7% (n=293) were female and 33.3% (n=146) were male, with a mean age of 48.3 ± 16.1 years. The most common referral

Oral Presentation – OP239

indications were hyperglycemia (26.7%, n=117), anemia (16.9%, n=74), thyroid disorders (15.7%, n=69), and hyperlipidemia (12.5%, n=55), while 28.2% (n=124) were referred for other reasons. Additional laboratory testing or confirmatory investigations were requested in 60.5% of patients (n=262), whereas no further testing was deemed necessary in 39.5% (n=171). The highest rate of additional testing was observed in patients with thyroid disorders (88%), which was significantly higher compared to other groups ($p<0.001$).

Regarding clinical management, the most frequent intervention was the recommendation of lifestyle modifications alone (19.5%, n=86), particularly among patients with hyperlipidemia (63.6%, n=35) and hyperglycemia (34.5%, n=40). Hospitalization was required in 2.7% of patients (n=12), primarily due to anemia (n=7), followed by hyperglycemia (n=2) and hypercalcemia (n=1). Endoscopic evaluation was planned for four patients. Additionally, 5.7% of patients (n=25) were referred to tertiary care centers for subspecialty evaluation, most commonly to hematology (n=11). Subgroup analyses were conducted for the four most frequent referral indications.

Conclusion

The finding that lifestyle modification alone was recommended for nearly one-fifth of referred patients suggests potential gaps in the management capacity of primary care services. The high rate of repeat testing in thyroid disorders likely reflects the need for confirmation due to variability and potential inaccuracies in thyroid function tests. Notably, the absence of repeat testing in a considerable proportion of patients (39.5%) warrants further evaluation. The rates of hospitalization (2.7%) and referral to tertiary care (5.7%) also provide important insights into the functioning of the healthcare system. Overall, subgroup analyses offer valuable evidence for optimizing referral pathways and strengthening the structure of a tiered healthcare system.

Keywords: Family Medicine, Internal Medicine, Referral

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Association of Pan-Immune-Inflammation Value with Insulin Resistance (HOMA-IR) and Vitamin D in Subclinical Hypothyroidism

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Objective

Subclinical hypothyroidism (SCH) is a prevalent thyroid disorder increasingly recognized as a contributor to cardiometabolic dysregulation. Insulin resistance and vitamin D deficiency are common comorbidities in SCH, and each has been independently linked to low-grade systemic inflammation. Nevertheless, the inflammatory burden in this population has rarely been quantified using composite hematological indices such as the pan-immune-inflammation value (PIV), which incorporates neutrophil, platelet, monocyte, and lymphocyte counts into a single metric. This study investigated the association between PIV and thyroid function, insulin resistance, and vitamin D status in patients with SCH.

Materials and Methods

This retrospective cross-sectional study enrolled 130 patients with SCH, defined by a serum TSH exceeding 4.5 mIU/L in the presence of normal free thyroxine (fT4), between January and December 2025. Patients with active infection, chronic liver disease, renal insufficiency, malignancy, diabetes mellitus, hematological disorders, or pregnancy were excluded. Participants were stratified into two equal groups based on the median TSH value (6.7 mIU/L): TSH <6.7 mIU/L (n=65) and TSH ≥6.7 mIU/L (n=65). Serum TSH, fT4,

Oral Presentation - OP241

25-hydroxyvitamin D [25(OH)D], and complete blood count parameters were measured by standard laboratory methods. Insulin resistance was quantified using the homeostatic model assessment of insulin resistance (HOMA-IR; fasting plasma glucose [mg/dL] × fasting insulin [mU/L] / 405). PIV was derived as neutrophil × platelet × monocyte / lymphocyte count.

Results

The study cohort comprised 130 patients (mean age: 39.5±9.4 years; 78.5% female). Baseline demographic characteristics were comparable between groups, with no significant difference in age or sex distribution ($p>0.05$). Patients in the high-TSH group (≥ 6.7 mIU/L) had significantly higher PIV [396 (340–434) vs. 350 (291–390); $p=0.018$] and HOMA-IR [2.7 (2.1–3.8) vs. 2.1 (1.7–2.6); $p=0.021$], and significantly lower 25(OH)D concentrations [19.2 (14–22) vs. 23.5 (18–26) ng/mL; $p=0.030$]. fT4 remained within the reference interval in both groups but was significantly lower in the high-TSH stratum ($p=0.042$). Receiver operating characteristic (ROC) analysis was performed to determine the optimal PIV threshold; a cut-off value of 385 yielded moderate discriminative performance (AUC=0.711; 95% CI: 0.608–0.794; $p=0.006$). On multivariable logistic regression, TSH (OR: 1.26; 95% CI: 1.11–1.42; $p=0.001$), HOMA-IR (OR: 1.38; 95% CI: 1.06–1.79; $p=0.021$), and 25(OH)D (OR: 0.93; 95% CI: 0.87–0.99; $p=0.043$) emerged as independent determinants of elevated PIV (≥ 385).

Conclusion

In patients with SCH, rising TSH levels are associated with a measurable increase in inflammatory burden and insulin resistance. Vitamin D insufficiency appears to contribute to this relationship as an independent correlate. The moderate discriminative performance of the PIV cut-off at ≥ 385 , coupled with its straightforward derivation from routine complete blood count data, supports its potential utility as a practical and cost-effective surrogate marker of inflammatory burden in SCH.

Table 1. Clinical and laboratory characteristics of participants according to TSH level

Parameter	Total (n = 130)	TSH < 6.7 (n = 65)	TSH ≥ 6.7 (n = 65)	p
Age, years	39.5 ± 9.4	37.0 ± 8.2	42.0 ± 10.2	0.062
Female sex, n (%)	102 (78.5)	53 (81.5)	49 (75.4)	0.40
TSH, mIU/L	6.2 (5.1–7.4)	5.2 (4.9–6.1)	7.3 (6.2–8.3)	<0.001
ft4, ng/dL	0.92 (0.80–1.00)	0.96 (0.82–1.07)	0.89 (0.77–0.92)	0.042
HOMA-IR	2.4 (1.9–3.1)	2.1 (1.7–2.6)	2.7 (2.1–3.8)	0.021
PIV index	372 (315–410)	350 (291–390)	396 (340–434)	0.018
25(OH)D, ng/mL	21.3 (16–24)	23.5 (18–26)	19.2 (14–22)	0.030

Values are presented as mean ± standard deviation or median (interquartile range), as appropriate. Groups were defined according to the median TSH value (6.7 mIU/L). p values <0.05 were considered statistically significant. Abbreviations: TSH, thyroid-stimulating hormone; ft4, free thyroxine; HOMA-IR, homeostatic model assessment of insulin resistance; PIV, pan-immune-inflammation value; 25(OH)D, 25-hydroxyvitamin D.

Table 2. Multivariable Logistic Regression Analysis: Independent Predictors of Elevated PIV (≥ 385)

Independent Variables	OR	95% CI	p
TSH (per 1 mIU/L increase)	1.26	1.11 – 1.42	0.001
HOMA-IR	1.38	1.06 – 1.79	0.021
25(OH)D (per 1 ng/mL increase)	0.93	0.87 – 0.99	0.043
Age (per 1 year increase)	1.01	0.97 – 1.05	0.220
ft4 (ng/dL)	0.89	0.67 – 1.18	0.110

Multivariable logistic regression analysis for predictors of elevated PIV (≥385). p values <0.05 were considered statistically significant. Abbreviations: OR, odds ratio; CI, confidence interval; TSH, thyroid-stimulating hormone; HOMA-IR, homeostatic model assessment of insulin resistance; 25(OH)D, 25-hydroxyvitamin D; ft4, free thyroxine; PIV, pan-immune-inflammation value.

Keywords: Subclinical Hypothyroidism, Pan-Immune-Inflammation Value, Insulin Resistance, HOMA-IR, Vitamin D, Systemic Inflammation

Clinical Outcomes of Radioactive Iodine Therapy in Differentiated Thyroid Cancer with Lung Metastases: A Comparative Analysis of Pediatric and Adult Patients

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Aim: Differentiated thyroid cancer (DTC) is the most common endocrine malignancy across all age groups, with distinct clinical behavior in pediatric and adult populations. The aim of this study is to evaluate the response to radioactive iodine (RAI) therapy, the incidence of lung metastasis, and long-term survival rates in pediatric and adult patients with differentiated thyroid carcinoma (DTC) who have lung metastases detected by RAI treatment.

Material Method: This retrospective study was conducted between 1 June 2015 and 31 December 2022. 360 thyroid cancer patients diagnosed with differentiated thyroid cancer (DTC) after thyroidectomy and who applied for radioactive iodine therapy according to the American Thyroid Association (ATA) 2015 follow-up risk classification were screened. All the patients had undergone total/subtotal thyroidectomy with or without cervical lymph node dissection. Inclusion criteria were patients diagnosed with well-differentiated thyroid carcinoma, who received radioactive therapy, had lung metastases, and had a follow-up period of at least 3 years. The follow-up protocol consisted of a detailed clinical examination, thyroid function tests, determination of serum thyroglobulin (Tg) and anti-Tg antibodies, and neck ultrasonography. Patients were analyzed with respect to demographic characteristics, histopathological subtypes, presence of lung metastases, cumulative RAI doses, and survival status.

Oral Presentation - OP244

Results: A total of 42 patients (29 women and 13 men) with detected lung metastases (11 pediatric ≤ 18 years, 31 adult > 18 years) were included in the study. The mean age was 45.1 ± 24 years (3-80 years). The histologic classification was papillary carcinomas in 41 patients, and the remaining 1 patient had follicular thyroid cancer. In the subtype analyses, 37 patients were in the classical subtype of PTC, 2 in the classic and follicular variants, 1 in the poorly differentiated carcinoma, 1 in the follicular variant, and 1 in the solid/trabecular/insular differentiated PTC subtype.

The primary tumor size at initial surgery ranged from 0.9 to 6 cm (median 2.6 ± 1.2 cm). All patients underwent RAI therapy to ablate residual thyroid tissue after surgery. The total RAI dose administered to children ranged from 30 to 850 mCi, while the total dose administered to adults ranged from 200 to 800 mCi. Of the 42 patients, 2 received a single dose of I-131, while the others received two or more doses (between 2 and 5) of RAI therapy due to recurrence or distant metastasis.

Of the 42 patients, 11 (26%) died due to pulmonary metastases, including one pediatric patient (female) and 10 adults (6 females, 4 males).

Conclusion: Although pediatric patients with differentiated thyroid cancer (DTC) more frequently present with extensive lung metastases compared to adults, they respond more favorably to radioactive iodine (RAI) therapy and achieve significantly better survival outcomes. Overall, the poorer clinical outcomes observed in adult patients are primarily related to tumor dedifferentiation, reduced iodine avidity, and more aggressive molecular features, which collectively diminish the effectiveness of RAI therapy and adversely impact prognosis.

Keywords: Differentiated Thyroid Cancer, Pediatric, Adult, Lung Metastasis, Radioactive Iodine Therapy, Survival

Family Practice in the United Kingdom: System Structure, Comparison with Türkiye, and Experiences of Turkish Physicians

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Objective

In recent years, there has been a notable increase in the migration of family physicians from Türkiye to the United Kingdom. However, this process has largely been interpreted through individual experiences and limited sources of information. The UK primary care system differs substantially from that of Türkiye in terms of organizational structure, patient management, and the role of the physician. This study aims to systematically present the core components of family practice in the UK, compare them with the system in Türkiye, and explore the experiences, expectations, and professional evaluations of Turkish physicians working within this system.

Methods

This study consists of three components. First, the structure of the UK primary care system was outlined based on the literature and field experience, including its registered population-based model, appointment system, gatekeeping function, patient management processes, and clinical responsibilities. Second, this structure was comparatively evaluated with family practice in Türkiye, focusing on referral systems, patient flow, workload distribution, and physician roles. Third, an online survey was conducted among Turkish family physicians working in the UK (n=23). The survey

assessed job satisfaction, perceived workload, career evaluation, expectation–reality discrepancies, and return migration intentions. Quantitative data were analyzed using descriptive statistics, while open-ended responses were examined through thematic analysis.

Results

The UK primary care system is characterized by a registered patient list, an effective gatekeeping mechanism, and appointment-based care delivery. Family physicians serve as the first point of contact and manage a substantial proportion of diagnosis and treatment within primary care, enabling greater clinical autonomy and exposure to a broad case mix.

Participants highlighted several advantages, including opportunities for part-time (less than full-time) work, the “GP with Special Interest (GPwSI)” model allowing subspecialization (e.g., dermatology, gynecology, neurology), stronger continuity of care, and relatively higher physician autonomy in clinical decision-making.

The most frequently reported disadvantages were high administrative workload and extensive documentation requirements, increased clinical responsibility and stress related to case diversity, perceived bureaucratic inefficiencies, and limitations in training quality.

A considerable proportion of participants reported feeling “more like a doctor” in the UK system, although this was often accompanied by increased workload and a higher risk of burnout. Quantitatively, 62% of participants reported satisfaction with their decision to work in the UK, 24% were undecided, and 14% expressed regret. Despite this, approximately 70% did not consider returning to Türkiye.

Career evaluations were heterogeneous, with some participants viewing their decision as unequivocally positive, while others reported uncertainty. A notable mismatch between expectations and reality was observed, with many participants anticipating a more

flexible and less demanding work environment but encountering higher workloads and administrative burdens in practice.

Compared to Türkiye, the UK system appears more structured, protocol-driven, and supported by a strong referral chain, whereas the Turkish system offers greater flexibility but is characterized by higher patient volume and a less effective gatekeeping mechanism.

Conclusion

Family practice in the UK offers significant advantages, including broader clinical responsibility, flexible working arrangements, and opportunities for subspecialization. However, these benefits are accompanied by substantial administrative burden, intensive workload, and increased responsibility.

The observed mismatch between expectations and reality, along with moderate satisfaction levels but low return intentions, suggests that physician migration cannot be explained solely by professional satisfaction. By providing a comprehensive comparison of two healthcare systems and their impact on physician experience, this study offers important implications for health policy and international career planning.

Keywords: Family Medicine, United Kingdom, Healthcare System Comparison, Physician Migration, Job Satisfaction

Evaluation of Graduate Theses on Cancer Screening in Turkey

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OBJECTIVE: Cancer screening is one of the crucial components of primary healthcare services in terms of preventive medicine. This study aims to evaluate the graduate theses prepared on the subject of cancer screening in Turkey.

METHODS: In this study, these theses accessed through the Council of Higher Education (CoHE) National Thesis Center database using the keyword "cancer screening" were evaluated. No time restriction was applied, and all 165 theses accessed until March 20, 2026, were included and analyzed. Data were retrospectively examined in terms of publication year, thesis type, academic department, advisor's academic title, and the type of cancer studied.

RESULTS: Of the 165 theses examined, 67.3% (n=111) were medical specialty theses, and 27.8% (n=46) were master's theses. A significant increase was observed in the distribution of theses by years after 2019, reaching the highest number in 2025 (n=44). In terms of academic departments, it was observed that the highest production was by Family Medicine (55.7%, n=92), followed by the field of Nursing with 15.2% (n=25). The female gender was dominant among the authors at 71.5% (n=118). Regarding advisors, a relatively homogeneous distribution was observed, with 37.5% holding the title of Professor and 36.3% holding the title of Associate Professor. Based on cancer types,

Oral Presentation - OP251

general screening attitudes (n=117) ranked first, followed by breast (n=17) and colorectal (n=17) cancers.

CONCLUSION: Theses on cancer screening in Turkey have shown an increase over the last five years. The largest contribution to the literature was made by the Family Medicine department, which produced more than half of the theses. However, it was observed that the number of theses in specific areas such as prostate and lung cancer was insufficient, and the studies were generally related to screening attitudes. Future theses targeting more specific cancer types could provide valuable research opportunities.

Keywords: Cancer Screening, Family Medicine, Medical Specialty Thesis

Assessment of the Care Readiness of Relatives of Patients Receiving Home Care Services Using the Preparedness for Caregiving Scale

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Objective: Home care is a healthcare service designed to allow patients who can continue their treatment at home to do so, thereby reducing the workload of hospitals. Home healthcare aims to provide patients with regular visits for diagnosis, treatment, and minor procedures such as catheter changes and wound dressings. In home healthcare, it is crucial that both the patients themselves and their relatives are suitable for the service. This study aims to investigate the readiness of patient relatives for home care.

Materials and Methods: This study was conducted through face-to-face interviews with relatives of patients registered with the home care unit of Balıkesir Atatürk City Hospital who received home visits between March 9-13, 2026. The Patient Relatives The Preparedness for Caregiving Scale, developed by Archbold et al. and validated in Turkish by Karaman et al., was used in this study. The scale is scored from "0" (not ready) to "4" (completely ready). In addition, the age and gender of the caregivers (relatives) were also recorded.

Results: The mean age of the caregivers (relatives) providing primary care to home health care patients included in the study was 57.17 ± 8.37 (39-69 years). 68.1% (n=32) of the participants were female. The findings obtained from the Preparedness for Caregiving Scale are summarized in Table 1.

Oral Presentation - OP252

Conclusion: An average score of 16.6 was obtained from The Preparedness for Caregiving Scale. According to this scoring, the question that received the lowest score from the relatives of patients receiving home care services was question 6. Question 6 is related to the patients' emergency situations. Our study suggests that by providing training to the primary caregivers of patients receiving home health care services on what to do in emergency situations, their concerns about this issue can be addressed.

Table 1: Family Members' Readiness for the Preparedness for Caregiving Scale Scores

Questions	The average score received
1. How well prepared do you think you are to take care of your family member's physical needs?	2.19
2. How well prepared do you think you are to take care of his or her emotional needs?	2.36
3. How well prepared do you think you are to find out about and set up services for him or her?	2.11
4. How well prepared do you think you are for the stress of caregiving?	2.11
5. How well prepared do you think you are to make caregiving activities pleasant for both you and your family member?	2.21
6. How well prepared do you think you are to respond to and handle emergencies that involve him or her?	1.47
7. How well prepared do you think you are to get the help and information you need from the health care system?	2.32
8. Overall, how well prepared do you think you are to care for your family member?	1.87
Total	16.66

Keywords: The Preparedness for Caregiving Scale, Home Care Service, Caregiver Assessment

Evaluation of the Long-Term Prognosis of Perinatal Hydronephrosis Cases

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Objective

To analyze the postnatal clinical course of antenatally detected hydronephrosis (AH), identify risk factors predicting surgical intervention, and discuss the need for revision of follow-up threshold values in low-risk cases.

Materials and Methods

A total of 460 patients with perinatal hydronephrosis who were followed in our clinic were retrospectively included in the study. Patients were classified according to sex, gestational age, presence of prenatal diagnosis, history of urinary tract infection (UTI), renal pelvic anteroposterior (AP) diameter, bilaterality, and associated anomalies such as vesicoureteral reflux (VUR) and ureteropelvic junction (UPJ) obstruction.

Results

Of the 460 patients, 68% (n=313) were male and 32% (n=147) were female. None of the 359 patients with an AP diameter below 10 mm required surgical intervention during follow-up. In contrast, the surgical intervention rate was 77.8% among patients with an

Oral Presentation - OP244

AP diameter greater than 15 mm. The most common associated anomaly was ureteropelvic junction obstruction, detected in 4.1% of cases.

Conclusion

In isolated perinatal hydronephrosis, AP diameters below 10 mm appear to represent a safe threshold for conservative follow-up. In light of both the current literature and our findings, increasing the follow-up threshold from 7 mm to 9 mm may reduce clinical workload and parental anxiety.

Introduction

Antenatal hydronephrosis (AH) is the most common urogenital anomaly detected during pregnancy, occurring in approximately 1–5% of pregnancies, with increasing incidence due to the widespread use of routine fetal ultrasonography (USG). It is now well established that most cases diagnosed with AH have a benign postnatal course, and a substantial proportion resolve spontaneously within the first year of life. However, the major challenge during the postnatal period is identifying which patients are at risk for progressive renal damage while avoiding the burden of unnecessary follow-up.

In the literature, postnatal renal pelvic anteroposterior (AP) diameter measurement is considered the most commonly used and reliable non-invasive parameter for predicting prognosis. Traditional guidelines generally accept AP diameters of 7 mm or greater as the threshold for postnatal surveillance and further investigation. However, this relatively low threshold results in a large number of clinically insignificant cases being subjected to repeated hospital visits and imaging evaluations despite having an almost negligible risk of developing significant pathology.

In this study, we analyzed the surgical outcomes of a large cohort of 460 patients and evaluated the prognostic significance of AP diameters below 10 mm. Our findings support

reconsideration of the current follow-up threshold and suggest that increasing the threshold to 9 mm may be clinically appropriate.

Materials and Methods

A total of 460 patients diagnosed with perinatal hydronephrosis and followed in our clinic between 2023 and 2025 were included in this retrospective study. Data were obtained from hospital electronic medical records and patient files. Ethical approval was obtained prior to the study.

Children diagnosed with hydronephrosis either during the prenatal period or within the first months after birth and followed up until the age of two years were included. Patients with additional organ anomalies, prematurity, or developmental disorders were excluded.

The diagnosis of hydronephrosis was established using ultrasonography. Patients were evaluated according to clinical and demographic parameters including sex, location and severity of urinary tract dilatation, presence of urinary tract infection, associated urinary system anomalies, timing of spontaneous resolution, and requirement for surgical intervention.

Statistical Analysis

Statistical analyses were performed using SPSS version 26.0. Pearson's chi-square test and Fisher's exact test were used for comparison of categorical variables. A p-value <0.05 was considered statistically significant.

Results

The demographic and clinical characteristics of the 460 patients are summarized in Table 1. Male predominance was observed in 68% of cases, consistent with the literature. No associated anomaly was detected in 93.3% of the patients.

The most important finding of our study was that none of the 359 patients in Group 1 and Group 2, with AP diameters below 10 mm, required surgical intervention during follow-up. All 27 patients who underwent surgery belonged to groups with AP diameters greater than 10 mm. Notably, surgical intervention was performed in 21 of the 27 patients (77.8%) with AP diameters greater than 15 mm (Table 2).

Table 1. Sex Distribution and General Clinical Characteristics of the Patients

Parameter	Subgroup	Number (n)	Percentage (%)
Sex	Male	313	68.0
	Female	147	32.0
Associated Anomaly	None (Isolated)	429	93.3
	UPJ Obstruction / VUR / Others	31	6.7

Spontaneous resolution rates exceeded 95% within the first year in patients with mild hydronephrosis (AP <10 mm). Nearly all cases with AP diameters below 7 mm (99.5%) resolved within the first six months, whereas the resolution period in the 7–9 mm group extended up to 12 months.

Table 2. Relationship Between Postnatal AP Diameter and Surgical Intervention

AP Diameter Group	Total Patients (n)	Surgery (+)	Surgery (–)	Surgical Rate (%)
Group 1 (<7 mm)	226	0	226	0.0
Group 2 (7–9 mm)	133	0	133	0.0
Group 3 (10–15 mm)	74	6	68	8.1
Group 4 (>15 mm)	27	21	6	77.8

Discussion

Postnatal management of neonatal hydronephrosis remains one of the most debated topics in pediatric urology and nephrology. Contemporary approaches emphasize preservation of renal functional reserve rather than relying solely on radiological dilatation when making surgical decisions.

Our findings demonstrate that infants with AP diameters below 10 mm constitute a virtually “zero-risk” group in terms of surgical requirement. Akyol Önder et al. (2024) reported that 82.3% of children with isolated antenatal hydronephrosis were successfully managed conservatively. Our results further strengthen this observation by demonstrating that all 359 patients with AP diameters below 10 mm were managed successfully without surgery.

This finding suggests that the 10 mm threshold is a highly reliable negative predictor for the need for invasive diagnostic procedures. Although many international guidelines define renal pelvic diameters greater than 7 mm on the first postnatal ultrasound as requiring further follow-up, our study showed that the clinical course of patients in the 7–9 mm group was almost identical to that of patients with diameters below 7 mm. Çivilibal et al. (2024) similarly emphasized that the risk of progression in low-grade (UTD P1) hydronephrosis is negligible.

Raising the follow-up threshold from 7 mm to 9 mm may provide several important advantages:

1. **Psychosocial Impact:** It may prevent families from perceiving their children as having a chronic kidney disease and reduce associated anxiety.
2. **Economic and Logistical Burden:** Unnecessary ultrasonography appointments and hospital visits may decrease, thereby reducing the workload of radiology departments.

3. **Reduction of Invasive Procedures:** Low-risk infants may be less frequently exposed to invasive investigations such as VCUG or radionuclide scintigraphy, both of which carry infection or radiation-related risks.

Among patients who required surgery, the most common indications were deterioration in renal function on scintigraphy (>10% reduction), obstructive drainage patterns, and recurrent UTIs. As shown in Table 2, the surgical intervention rate increased dramatically to 77.8% in patients with AP diameters above 15 mm. This finding indicates that AP diameters exceeding 15 mm should be considered a “critical alarm threshold,” whereas cases below 10 mm remain substantially distant from this risk category.

Similarly, Ensari et al. (2023) emphasized that regardless of the guideline used (SFU or UTD classification systems), the primary clinical concern remains high-grade hydronephrosis cases.

Conclusion

In conclusion, data obtained from our large cohort of 460 patients indicate that isolated postnatal hydronephrosis with AP diameters below 10 mm rarely requires surgical intervention and resolves spontaneously in the vast majority of cases. Adoption of a more minimalist follow-up strategy and increasing the clinical threshold to 9 mm may improve patient comfort and healthcare system efficiency. In contrast, patients with AP diameters greater than 15 mm should undergo close surveillance with early surgical planning when necessary.

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Un-anticoagulated atrial fibrillation in primary care: are we missing opportunities for stroke prevention?

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Background

Atrial fibrillation (AF) is a major risk factor for ischaemic stroke, increasing risk up to fivefold. Oral anticoagulation reduces this risk by approximately 60–70% in eligible patients. Failure to anticoagulate, particularly without clear documentation, may represent missed opportunities for stroke prevention and compromise patient safety.

Aim

To evaluate whether patients with AF who are eligible for anticoagulation but not receiving therapy have a clearly documented and clinically appropriate reason for non-treatment, and to assess potential gaps in ongoing review.

Methods

A retrospective cross-sectional clinical audit was conducted in a UK general practice. Electronic records were reviewed to identify patients with AF and an indication for anticoagulation who were not currently prescribed therapy. Data collected included

demographics, documented reasons for non-anticoagulation, presence of coded entries, and evidence of clinical review or reassessment.

Results

Twenty patients with AF who were newly diagnosed between January 2025 and March 2026, were eligible for anticoagulation but not receiving therapy were identified. Patient ages ranged from 33 to 95 years.

Only 3 patients (15%) had a coded reason for non-anticoagulation documented, while 17 (85%) lacked structured coding.

Among documented reasons, contraindications accounted for 35%, patient refusal for 25%, and presumed resolution or paroxysmal AF for 25%. Less frequent reasons included previous cardioversion and adverse drug reactions.

Importantly, documentation of reassessment or ongoing review was inconsistent, raising concerns about whether initial decisions remained clinically appropriate over time.

Conclusion

This audit highlights significant gaps not only in documentation but also in the visibility and review of anticoagulation decisions in patients with AF. Lack of structured coding may obscure clinical reasoning, limit continuity of care, and increase medico-legal risk. More importantly, failure to regularly reassess untreated patients may lead to missed opportunities for stroke prevention.

Improving systematic documentation, coding practices, and proactive recall of non-anticoagulated patients should be prioritized to enhance patient safety and optimize AF management in primary care.

Keywords: Atrial Fibrillation, Anticoagulation

Comparison of Night Wrist Splinting and Local Corticosteroid Injection in Mild-to-Moderate Carpal Tunnel Syndrome: A Clinical Outcome Study

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OBJECTIVE

Carpal tunnel syndrome (CTS) is the most common entrapment neuropathy of the upper extremity and is most frequently observed in middle-aged women. This study aimed to compare the clinical outcomes of wrist splinting and local corticosteroid injections in patients with mild to moderate CTS.

MATERIALS AND METHODS

A total of 73 patients [71 females, 2 males; mean age 46.5 (39–72) years] diagnosed with mild to moderate CTS were included in this study. CTS diagnosis was based on clinical symptoms and findings and was supported by nerve conduction studies.

Clinical evaluation included assessment of recurrent or persistent paresthesia in the median nerve distribution, history of pain, and sleep disturbances related to paresthesia or pain. Physical examination findings such as Tinel's sign, Phalen's test, carpal compression test, weakness of thumb abduction and opposition, and thenar atrophy were evaluated. The presence of at least three of these clinical features was accepted as a diagnostic criterion.

Oral Presentation – OP260

Clinical staging was defined as follows: the presence of only subjective symptoms was classified as mild CTS; the presence of symptoms along with at least one positive diagnostic test was considered moderate CTS; and the presence of symptoms, positive test findings, and additional weakness in thumb abduction/opposition or thenar atrophy was defined as severe CTS.

Patients diagnosed with mild or moderate CTS were followed either with night wrist splinting or with local corticosteroid injection. All patients were re-evaluated clinically after three months, and treatment outcomes were compared.

Patients who progressed to a more advanced stage or those with moderate CTS who did not respond to three months of conservative treatment were recommended for surgical intervention. In mild cases, conservative treatment was continued.

RESULTS

Local corticosteroid injection was administered to 29 patients (39.7%; mild: n=18, moderate: n=11), while 44 patients (60.3%; mild: n=30, moderate: n=14) were managed with night splinting.

At follow-up evaluation, 19 patients (26%; mild: n=16, moderate: n=3) showed complete clinical recovery. Persistent symptoms and clinical findings were observed in 51 patients (69.9%; mild: n=13, moderate: n=38), while disease progression to a more advanced stage was noted in 3 patients (4.1%; mild: n=2, moderate: n=1).

Following local corticosteroid injection, improvement was observed in 2 patients (6.9%) with mild CTS, whereas no improvement was detected in patients with moderate CTS. In contrast, 17 patients (38.6%; mild: n=14, moderate: n=3) treated with night splinting showed clinical improvement.

Stage-based analysis demonstrated that, in mild CTS, the improvement rate with night splinting was significantly higher than that with local corticosteroid injection ($p < 0.05$). In moderate CTS, no improvement was observed with corticosteroid treatment, while limited improvement was noted in the splinting group; however, this difference was not statistically significant ($p > 0.05$).

CONCLUSION

In this study, night wrist splinting was associated with higher improvement rates compared to local corticosteroid injection as an initial treatment for mild and moderate CTS. This superiority was particularly evident in patients with mild CTS. In moderate cases, treatment response was limited, highlighting the need for further studies to determine the optimal initial conservative management strategy in this group.

Keywords: Carpal Tunnel Syndrome, Corticosteroid Injection, Conservative Treatment

Hospital Admission and Inpatient Status of Chronic Obstructive Pulmonary Disease Patients Based on Home Oxygen Use: A Single-Center Experience with 282 Cases

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Chronic obstructive pulmonary disease (COPD), a chronic airway inflammatory disease, is the third most common cause of morbidity and mortality, with a slowly progressing incidence that increases with age (1). COPD is a widespread and significant respiratory disorder and is emerging as a major global health problem (2). Long-term oxygen therapy (LTOT) is one of the few components of COPD management that improves survival by ensuring adequate oxygen transport in the blood of COPD patients and is a key treatment method for patients with severe hypoxemia (3,4).

Desing: Retrospective study

Patient and Methods: Our study population consisted of 282 COPD patients hospitalized at the Chest Diseases Clinic of Şanlıurfa Mehmet Akif İnan Training and Research Hospital between December 31, 2023, and December 31, 2024. Demographic data such as age, gender, and comorbidities, thoracic computed tomography images and laboratory findings, length of hospital stay, length of ward stay, disease recovery time, and length of stay in the intensive care unit were obtained from hospital records for the patients included in the study. Laboratory data from the hospital system, including hemoglobin (g/dL), hematocrit (%), platelet count ($10^9/L$), percentages, CRP (mg/L) (C-reactive protein), WBC (10^3) (White Blood Count), and biochemical markers

Oral Presentation - OP261

determined by radioimmunoassay, were recorded. Arterial blood gas values (PH, PaCO₂, PaO₂, HCO₃) were also recorded. Patients without a diagnosis of COPD were excluded from the study. The effect of home oxygen therapy and non-home oxygen therapy on hospital admission and clinical stay durations was investigated in patients with COPD. Results: The study included 282 patients admitted to the ward and intensive care unit with a diagnosis of COPD. Demographic and laboratory data of the patients are shown in Table 1. The study population consisted of 186 (65.95%) males and 95 (33.68%) females, with an average age of 71.49±25.48 (44-95). The total number of days spent in the hospital was 9.66±8.72 (1-78). The average number of days spent in intensive care was 3.48±6.37 (0-49), while the average number of days spent in the ward was 5.97±7.09 (0-42). In 169 (59.92%) of the patients hospitalized with acute exacerbation of COPD, no lung infection was observed on chest CT scan. Findings of lung infection were observed in 113 (40.07%) cases (38% mild, 38% moderate, and 25% severe pneumonic parenchymal involvement in cases with lung infection). Of the 282 cases, 114 (40.42%) presented to the emergency room in winter, 72 (25.53%) in spring, 43 (15.24%) in summer, and 53 (18.79%) in autumn, all with acute exacerbations of COPD. Patients who did not use LTOT had higher lengths of intensive care unit stay and higher CRP values compared to those who did (p:0.026 vs. p:0.038, respectively). Although not statistically significant, patients who did not use LTOT had higher lengths of ward stay, emergency room visits, and total hospital stays. Patients who used LTOT had higher CO₂ and HCO₃ values in arterial blood gas, which were also statistically significant (p:0.004 vs. p:0.003, respectively). Discussion; Some studies have shown that using LTOT improves hypoxemia in COPD patients, improving stable survival rate and quality of life (5,6). In another study, they suggested that using LTOT did not have any contribution in stable COPD with moderate hypoxemia (7). Turner et al. stated that it did not reduce hospitalization rates but could benefit the health economy (8). Although the need for long-term oxygen therapy is a negative prognostic marker for survival after acute exacerbations of COPD requiring intensive care, the vast majority of patients receiving long-term oxygen therapy reported that they overcame acute exacerbations of COPD and that it had a positive effect on

survival in only 30% of cases (9). In the study by Khor et al., they observed a significant decrease in the annual rates of acute exacerbations requiring hospitalization and all-cause hospitalizations in patients with COPD after initiation of long-term oxygen therapy (10). Conclusion: Our study observed a significant decrease in the number of hospital admissions and acute exacerbations, as well as a substantial reduction in hospital stays, among COPD patients using LTOT. In conclusion, despite having a longer disease duration and lower oxygen levels in arterial blood gas, COPD patients using LTOT experienced fewer exacerbations, shorter hospital admissions, and shorter hospital stays compared to those not using LTOT. This suggests that LTOT is beneficial for both the economic and survival rates of patients.

Keywords: Chronic Obstructive Pulmonary Disease, Patients Hospitalized, Long-Term Oxygen Therapy

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Attitudes Toward Schizophrenia Among Nurses and the General Public: A Comparative Study

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Background

Stigmatization refers to the process by which an individual becomes socially distanced due to a particular characteristic. Individuals with mental disorders commonly experience stigma, social distancing, exclusion, and rejection by society (1,2). Stigmatization may lead to isolation from society of mentally disordered individuals and may even lead to their avoiding seeking mental health services (3,4). Schizophrenia is often the most negatively perceived mental disorder (5). Stigma toward individuals with mental disorders occurs in the general public, among their family members, and among healthcare professionals (6,7). Determining the attitudes of both the general public and healthcare professionals toward individuals with schizophrenia is crucial for recognizing and understanding the stigma these patients experience. This study aims to compare attitudes toward schizophrenia between general medical service nurses and healthy individuals from the general population.

Method:

The study enrolled nurses from a general hospital (n=65) and participants from the general community (n=57). Two groups were compared in terms of Attitudes Towards

Schizophrenia Questionnaire developed by the Psychiatric Research and Education Center (8). Ethics Committee approval was received by the hospital Ethics Committee on 20.07.2023 (decision number 2710).

Results

According to the results, both the general public and nurses viewed schizophrenia as a sign of mental weakness (68.9% of nurses, 83.0% of the general public) and considered that individuals with schizophrenia should primarily seek medical help (96.9% of nurses, 93.0% of the general public). When each item of the Attitudes Towards Schizophrenia Questionnaire was examined, significant differences between the groups were found for items 22, 25, 26, and 27. Regarding the item assessing recognition of schizophrenia—“schizophrenia is a condition that everyone experiences from time to time”—the general public showed higher agreement ($\chi^2(1)=3.842$, $p=0.050$). Compared to nurses, the general public held more positive attitudes toward the treatability of schizophrenia ($\chi^2(1)=12.25$, $p<.001$). Similarly, they had more positive attitudes regarding the effectiveness of medication in treating schizophrenia ($\chi^2(1)=8.52$, $p=.004$). In contrast, nurses had more negative attitudes regarding the benefit of psychotherapy for schizophrenia ($\chi^2(1)=4.73$, $p=.030$). No significant differences were found between the groups in terms of general views and etiology of schizophrenia, willingness to establish close social relationships with individuals with schizophrenia (e.g., as neighbors or marital partners)

Discussion:

The findings suggest that nurses, who are important actors in the healthcare system, have hopelessness regarding the treatment of schizophrenia. Moreover, the absence of more positive attitudes among healthcare professionals—who are expected to be better educated and more positive toward psychiatric disorders—compared to the general population points to the presence of stigma within the healthcare system. This finding is



important, as individuals with schizophrenia receive care not only in psychiatric settings but also from nurses working in general medical services. This may negatively affect the quality and effectiveness of psychiatric and general medical care. Therefore, it is important to strengthen training programs to increase nurses' knowledge and awareness of mental disorders.

Keywords: Stigma, Health Care Professionals, Schizophrenia, General Public

Pre-Discharge Transcutaneous Bilirubin and Risk Stratification to Prevent Severe Hyperbilirubinemia in Newborns

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Introduction: Neonatal jaundice is a common clinical condition that can lead to serious neurological complications, such as kernicterus, if not diagnosed early and managed appropriately. The American Academy of Pediatrics recommends pre-discharge bilirubin measurement in all newborns to prevent kernicterus. In our clinic's routine, since 2014, all newborns discharged from the hospital have had their bilirubin levels checked, and a follow-up plan is established based on their risk category before discharge. However, there is no routine screening practice in Turkey as a whole.

The aim of this study was to evaluate the effectiveness of performing transcutaneous bilirubin (TcB) measurement prior to discharge, along with implementing a follow-up plan appropriate to the risk category, in preventing the development of severe hyperbilirubinemia among newborns born at a tertiary university hospital.

Materials and Methods: This retrospective study included newborns born at a tertiary-level university hospital who were discharged in good health and for whom archival

records were available. Demographic datas, TcB bilirubin levels and risk categories according to the hour-specific bilirubin nomogram were recorded. Data were recorded for newborns who adhered to post-discharge follow-up schedules and attended regular outpatient visits, as well as for cases that developed a need for treatment during the follow-up period. Data were analyzed using statistical software. A $p\text{-value} < 0.05$ was considered statistically significant.

Results: A total of 1935 newborns were included in the study. The mean gestational age was $38,4 \pm 3,4$ weeks, and the mean birth weight was $3,229 \pm 438$ grams. A total of 135(7%) patients required phototherapy during follow-up; none of the patients who attended their follow-up appointments regularly required a exchange transfusion. When newborns who received phototherapy were compared with those who didn't (Table 1), a strong and statistically significant association was found between pre-discharge TcB levels and risk category and the need for phototherapy($p < 0.001$). The classification of newborns into low, low-moderate, moderate-high, and high-risk zones based on pre-discharge TcB measurements is shown in Table 2. In a binary logistic regression analysis that included factors that could act as confounders in predicting the need for phototherapy, it was determined that the pre-discharge TcB level and the risk classification based on it were by far the strongest and most independent predictors of the need for phototherapy(Table 3).

Conclusion: This study clearly demonstrates that risk stratification based on pre-discharge TcB measurement is effective and reliable in preventing the development of severe hyperbilirubinemia. The fact that no need for exchange transfusion was observed highlights the critical role of early diagnosis and intervention. The data we obtained strongly support the feasibility, utility, and clinical necessity of TcB measurement under our country's conditions.

In conclusion, routine pre-discharge TcB measurement and risk stratification based on hour-specific nomograms should be an integral part of standard care for the safe follow-

up of newborns. Therefore, we recommend that routine TcB measurement prior to discharge be implemented for all newborns discharged from the hospital in our country's practice, as it will both reduce neonatal morbidity and make significant contributions to reducing the burden on the healthcare system.

Table 1. Demographic and clinical characteristics of patients according to their phototherapy status

Variable	Receiving phototherapy n:135(7%)	Not receiving phototherapy n:1800 (93%)	Total n:1935	p
Gestational age (weeks) (mean $\pm$ SD)	38,2 $\pm$ 1,3	38,4 $\pm$ 3,6	38,4 $\pm$ 3,4	0,097
Birth weight (grams) (mean $\pm$ SD)	3236 $\pm$ 476	3229 $\pm$ 435	3229 $\pm$ 438	0,856
Mode of delivery				0,035
-Vaginal delivery, n (%)	26 (%19,3)	505 (%28,1)	531 (%27,4)	
-Cesarean delivery, n (%)	109 (%80,7)	1295 (%71,9)	1404 (%72,6)	
Parity				0,808
-First	68 (%50,4)	865 (%48,1)	933 (%48,2)	
-Other	67 (%49,6)	935 (%51,9)	1002 (%51,2)	
Pre-discharge transcutaneous bilirubin (mg/dL) (mean $\pm$ SD)	6,57 $\pm$ 1,74	5,55 $\pm$ 1,72	5,62 $\pm$ 1,75	<0,001
Risk zone based on transcutaneous bilirubin				<0,001
-Low	24 (%17,8)	743 (%41,3)	767 (%39,6)	
-Low-Moderate	30 (%22,2)	429 (%23,8)	459 (%23,7)	
-Moderate-High	52 (%38,5)	472 (%26,2)	524 (%27,1)	
-High	29 (%21,5)	156 (%8,7)	185 (%9,6)	
Highest bilirubin during follow-up (mg/dL) (mean $\pm$ SD)	16,93 $\pm$ 2,35	10,13 $\pm$ 3,52	10,60 $\pm$ 3,86	<0,001

Table 2. Comparison by risk zone

Variable	Low Risk n:767	Low-Moderate Risk n:459	Moderate-High Risk n:524	High Risk n:185	p
Gestational age (weeks) (mean $\pm$ SD)	38,5 $\pm$ 3,2	38,4 $\pm$ 3,5	38,3 $\pm$ 3,6	38,1 $\pm$ 3,8	0,412
Birth weight (grams) (mean $\pm$ SD)	3245 $\pm$ 430	3232 $\pm$ 440	3215 $\pm$ 445	3201 $\pm$ 455	0,278

Mode of delivery					0,089
-Vaginal delivery, n (%)	225 (%29,3)	126 (%27,5)	135 (%25,8)	45 (%24,3)	
-Cesarean delivery, n (%)	542 (%70,7)	333 (%72,5)	389 (%74,2)	140 (%75,7)	
Pre-discharge transcutaneous bilirubin (mg/dL) (mean $\pm$ SD)	4,2 $\pm$ 0,8	5,3 $\pm$ 0,9	6,4 $\pm$ 1,1	7,6 $\pm$ 1,3	<0,001
Highest bilirubin during follow-up (mg/dL) (mean $\pm$ SD)	8,9 $\pm$ 2,7	10,4 $\pm$ 3,1	12,3 $\pm$ 3,6	14,8 $\pm$ 4,2	<0,001
Receiving phototherapy, n (%)	24 (%3,1)	30 (%6,5)	52 (%9,9)	29 (%15,7)	<0,001

Table 3. Binary logistic regression analysis of factors predicting the need for phototherapy

Variable	β	OR (%95 GA)	p	Description
Gestational age	-0,04	0,96 (0,88–1,04)	0,312	Not significant
Birth weight	0,0001	1,00 (0,99–1,00)	0,842	Not significant
first-born status	0,05	1,05 (0,74–1,48)	0,808	Not significant
Mode of delivery-Cesarean delivery	0,46	1,59 (1,01–2,51)	0,048	Borderline significant
Pre-discharge transcutaneous bilirubin	0,19	1,21 (1,14–1,29)	<0,001	Strong independent predictor
Risk category (Moderate)	1,66	5,27 (3,05–9,10)	<0,001	Strong
Risk category (High)	2,32	10,23 (5,60–18,70)	<0,001	Very strong

Keywords: Phototherapy, Exchange Transfusion, Transcutaneous Bilirubin, Neonatal Jaundice

Comparison of Taping and Local Wound Care in Heifetz Stage 2 Ingrown Toenails

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Objective: An ingrown toenail (onychocryptosis) can be treated with various conservative and surgical approaches. While stage 1 is typically managed conservatively and stage 3 surgically, the optimal treatment for stage 2 remains unclear. This study aimed to compare hygiene protocol plus local wound care with taping plus local wound care in Heifetz stage 2 ingrown toenails.

Methods: This prospective study included 20 patients presenting with Heifetz stage 2 ingrown toenails. Patients were divided into two groups: Group 1 (hygiene protocol + local wound care, n=10) and Group 2 (taping + local wound care, n=10). Age, sex, recurrence, need for surgery, and patient satisfaction (Likert scale) were recorded. Statistical analyses were performed using the chi-square test, the independent samples t-test, and the Mann-Whitney U test.

Results: The mean age was 25.0 ± 6.7 years in Group 1 and 26.7 ± 6.8 years in Group 2, with no significant difference ($p=0.583$). Sex distribution was also similar between groups ($p=0.639$). Recurrence was observed in 40% of patients in Group 1 and 20% in Group 2, while the need for surgery was 40% and 20%, respectively; however, these differences were not statistically significant ($p=0.329$ for both). Patient satisfaction scores were

comparable between groups (mean Likert score: 4.2 vs 4.1, $p=0.632$). Clinically, the taping method showed a tendency toward lower recurrence rates and a reduced need for surgery, whereas the hygiene protocol group demonstrated a relatively faster recovery.

Conclusion: Both hygiene protocols, including local wound care and taping, are effective and safe treatment options for Heifetz stage 2 ingrown toenails. Taping may reduce recurrence and the need for surgical intervention, while hygiene-based treatment may provide faster functional recovery. Further studies with larger sample sizes are needed to confirm these findings.

Keywords: Ingrown Toenail; Onychocryptosis; Heifetz Stage 2; Taping; Conservative Treatment; Wound Care

Comparison Of Plate Fixation And Elastic Nail Applications In Pediatric Forearm Shaft Fractures

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Objective: This study aimed to compare plate-screw fixation and minimally invasive elastic nail fixation in pediatric forearm shaft fractures.

Materials and Methods: A total of 24 pediatric patients who underwent surgical treatment for radius-ulna shaft fractures between October 1, 2025, and December 30, 2025, at Adana City Training and Research Hospital were included in this retrospective study. Patients were divided into two groups: plate fixation (n=12) and elastic nail fixation (n=12). Demographic data, Mayo Elbow Performance Score (MEPS) at 6 and 12 weeks, time to full pronation recovery, union time, and complications were recorded. Mean follow-up duration was 4.5 months.

Results: The mean age was similar between groups (12.42 ± 1.44 vs 12.33 ± 1.55 years, $p=0.893$). The elastic nail group demonstrated significantly higher MEPS scores at both 6 weeks (82.08 ± 3.42 vs 75.58 ± 5.45 , $p=0.002$) and 12 weeks (91.00 ± 3.13 vs 83.33 ± 2.90 , $p<0.001$). Time to full pronation recovery was shorter in the elastic nail group (12.58 ± 1.24 vs 13.75 ± 1.60 weeks, $p=0.059$). Union time was significantly shorter in the elastic nail group (11.50 ± 1.00 vs 12.50 ± 1.00 weeks, $p=0.023$). Complication rates were comparable between groups ($p=0.274$).

Conclusion: Elastic nail fixation, being less invasive, provides faster functional recovery and shorter union time compared to plate fixation in pediatric forearm fractures. It may be considered a favorable first-line surgical option.

Keywords: Pediatric Forearm Fracture; Elastic Intramedullary Nailing; Plate Fixation

Hearing Screening in School-Age Children: A Single-Center Evaluation

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Objective:

Hearing loss is a significant public health problem with negative effects on language and speech development, cognitive functions, and academic performance in childhood. The prevalence of hearing loss in childhood varies between 1.4% and 17.5%. 60% of hearing loss in children is caused by preventable factors. Although newborn hearing screening programs are widely implemented, they may be insufficient in detecting late-onset and acquired hearing losses. Therefore, school-age hearing screenings are critically important for the early diagnosis and intervention of hearing loss. This study aimed to evaluate the results of school-age hearing screenings and examine the relationship between risk factors and screening outcomes.

Materials and Methods:

This study is a retrospective descriptive type. First-grade students who underwent hearing screening between September 2022 and June 2025 within the scope of the school-age hearing screening program by the ÇEKÜS unit of the Bursa İznik District Health Directorate were included in the study. No sample selection was performed in the study, and all students screened during the specified period constituted the universe. Data were

retrospectively examined by the researchers through school-age hearing screening program records.

Results:

Data from a total of 1689 first-grade students between September 2022 and June 2025 were evaluated. In 12.5% (n=211) of the students, hearing screening was refused by the family, and these students were excluded from the analysis. Analyses were performed on 1478 students. As a result of the hearing screening, it was determined that 1447 (97.9%) of the students passed the screening, while 31 (2.1%) failed. The failure rate in students without risk factors was 1.6%, whereas this rate was found to be 36.4% in students with risk factors. A statistically significant relationship was demonstrated between the presence of risk factors and the hearing screening outcome ($p<0.001$).

Conclusion:

It has been shown that the hearing screening failure rate is significantly higher in children with risk factors. These findings indicate that early detection of risk factors and effective implementation of school-age hearing screenings are critically important for the early diagnosis of hearing loss.

Keywords: Hearing Loss, Hearing Screening, School-Age Childhood, School Screenings

Evaluation of Non-Adherence to Iron Prophylaxis Among Parents of Infants Aged 4-12 Months Presenting to Primary Care Family Health Centers in Van

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Objective: Iron deficiency anemia is an important public health problem, particularly in children aged 6-24 months, because of its potential neurodevelopmental consequences. Although free iron prophylaxis is provided for infants in Turkiye, lack of parental knowledge, negative attitudes, and practical difficulties may reduce its effectiveness. This study aimed to evaluate parental knowledge, attitudes, and adherence regarding iron prophylaxis among parents of infants aged 4-12 months presenting to primary care family health centers in Van.

Materials and Methods: This descriptive cross-sectional study was conducted between February 5, 2025 and April 5, 2025. A total of 195 parents with infants aged 4-12 months were included. A 16-item questionnaire developed in line with the literature was administered face-to-face. Data were analyzed using SPSS version 27 with descriptive statistics, chi-square test, and Fisher's exact test. A p value <0.05 was considered statistically significant.

Results: Of the participants, 82.56% reported receiving a physician's recommendation, and 74.87% reported giving iron medication to their infant. The most common reasons for never starting or discontinuing iron prophylaxis were medication-related side effects (31.9%) and unwillingness to give medicine to the infant (24.6%). Overall, 53.42% of participants reported side effects; the most frequent were change in stool color (33.3%)

Oral Presentation - OP274

and constipation (28.3%). Iron prophylaxis use was significantly lower among parents who perceived their income level as low. In addition, use was significantly higher among parents who knew that the medication could be obtained free of charge from the family health center and among those who had been advised by a physician.

Conclusion: Although most parents administered iron prophylaxis to their infants, a considerable proportion showed non-adherence. The main reasons for non-adherence were side effects, reluctance to administer medication, perceived financial constraints, and lack of knowledge. Strengthening parent education in primary care, explaining side-effect management, and making information about free access more visible may improve adherence to iron prophylaxis.

Keywords: Iron Deficiency Anemia, Iron Prophylaxis, Infant, Parent, Adherence

Effectiveness of Family Physician-Led Follow-Up in Obesity Management: One-Year Outcomes from a Tertiary Obesity Center

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Introduction and Objective: Obesity treatment is a long-term process that requires a multidisciplinary approach and fundamentally relies on patient adherence. Family medicine units, which apply chronic disease management principles in obesity care, play a crucial role in removing barriers to treatment access and ensuring continuity of care. This study aimed to evaluate one-year weight change data of patients followed by family physicians in a tertiary hospital's obesity center. We sought to demonstrate that obesity management can be effectively implemented within family medicine, highlighting the feasibility, sustainability, and accessibility of primary care-based obesity interventions.

Materials and Methods: We retrospectively examined the data of 358 patients aged ≥ 18 years with a BMI ≥ 30 who applied to the Tokat Gaziosmanpaşa University Obesity Center between 2025 and 2026 and were followed under family physician coordination. Demographic data (including gender distribution), weight changes over one year, and surgical status were obtained from center records. Total weight loss was analyzed according to gender and surgery status. Descriptive statistics (number, percentage, total) were used for data evaluation.

Results: Among the 358 patients analyzed, 91.1% (n=326) were female and 8.9% (n=32) were male, reflecting the higher prevalence of obesity in women due to hormonal, lifestyle, and metabolic factors, as well as greater motivation for treatment compliance. Patients were followed with individualized diet programs, exercise recommendations, and medical therapy when indicated. Those whose records were archived achieved a total weight loss of 747.9 kg, while actively followed patients achieved a total weight loss of 635 kg. Patients undergoing surgery with appropriate indications comprised 10% of the sample (n=36), achieving a total weight loss of 1,423.9 kg at one year. Within this surgical subgroup, female patients (n=29) lost 1,051.9 kg, and male patients (n=7) lost 372 kg.

Conclusion: The marked engagement of female patients underscores the importance of obesity screening and management in family medicine. Our follow-up model demonstrates that obesity treatment is not limited to surgical interventions but can be effectively sustained in primary care, emphasizing the role of family physicians in combating this prevalent chronic condition.

Keywords: Obesity, Family Medicine, Primary Care, Weight Loss, Multidisciplinary Management, Bariatric Surgery

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Evaluation of the Relationship Between Health Literacy and Environmental Tobacco Smoke Awareness Among Pregnant Women Registered at Atatürk University Training Family Health Center

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Introduction: During pregnancy, health literacy (HL) refers to the ability to understand, evaluate, and apply health-related information in daily life. Third-hand smoke (THS), a low-awareness component of environmental tobacco smoke (ETS), is among the risk factors threatening maternal and fetal health during pregnancy. THS arises when toxic substances from tobacco smoke remain on surfaces and in dust long after smoking has ended, leading to adverse health effects through passive exposure via inhalation and contact. This study aimed to investigate the relationship between HL levels and ETS awareness among pregnant women.

Methods: This study was conducted between January and March 2025 at the Training Family Health Center (TFHC) affiliated with the Department of Family Medicine, Faculty of Medicine, Atatürk University. A total of 159 pregnant women registered at the TFHC were included. Data were collected via face-to-face interviews using a sociodemographic information form, the Turkish Health Literacy Scale-32 (TSOY-32), and the Third-Hand Smoke Awareness Scale (BATHS-T). Data analysis was performed using SPSS version 26. Independent samples t-test, ANOVA, Tukey's B post-hoc test, and Pearson correlation test were used for analyses. A significance level of $p < 0.05$ was considered statistically significant.

Results: The mean age of the participants was 29.5 ± 4.96 years; 52.2% (n=83) were university graduates, 39.0% (n=62) were employed in income-generating jobs, and 43.4% (n=69) were primigravida. Of the pregnant women, 4.4% (n=7) reported that they continued to smoke, and 56.6% (n=90) stated that smoking occurred in their homes. The mean total THLS-32 score was 34.07 ± 8.42 , and the mean total BATHS-T score was 34.55 ± 7.45 . Of the participants, 54.7% (n=87) were in the adequate-excellent health literacy (HL) group based on THLS-32 scores. Higher education level, higher income, and being employed were associated with increased HL. Statistically significant differences were found between BATHS-T scores and education level, family type, income level, and smoking status ($p < 0.05$). A statistically significant, weak positive correlation was observed between THLS-32 scores and BATHS-T total scores, as well as the health effects and environmental persistence subscales ($r = 0.237$, $r = 0.212$, and $r = 0.245$, respectively; $p < 0.05$).

Conclusion: Our study identified a significant correlation between health literacy levels and third-hand smoke awareness among pregnant women. Consequently, it is recommended that primary care providers implement targeted educational programs to enhance health literacy and prevent third-hand smoke exposure during the prenatal period.

Keywords: Pregnancy, Health Literacy, Third-Hand Smoke, Environmental Tobacco Smoke

Impact of Dietary Habits on Sleep Quality and Academic Performance in University Students

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Background and Objective: University students are at increased risk for poor sleep quality and unhealthy eating due to academic stress, irregular lifestyles, and changing dietary habits. This study aimed to evaluate the relationship between dietary habits, sleep quality, and academic performance using the **Healthy Eating Index – Turkey (HEI-Turkey)** and the **Pittsburgh Sleep Quality Index (PSQI)**.

Methods: Preliminary data were collected from 252 students (153 female, 99 male; mean age 21.2 ± 1.8 years) across various faculties. Participants completed the HEI-Turkey (1–5 points, higher scores indicate healthier diets) and PSQI (0–21 points, >5 indicates poor sleep quality). Demographic data and cumulative grade point averages (GPA, 4-point scale) were recorded. Data were analyzed using descriptive statistics, one-way ANOVA (post-hoc Tukey) and independent t-tests for group comparisons, and Pearson correlation for variable associations. Statistical significance was set at $p < 0.05$.

Results: The mean HEI-Turkey score was 3.49 ± 0.47 , and the mean PSQI score was 6.64 ± 2.18 . Poor sleep quality (PSQI>5) was observed in 74.1% of participants (n=187). Significant differences in HEI-Turkey scores were found between faculties (F=4.805,

$p < 0.001$), with medical students scoring higher than engineering (3.76 ± 0.39 vs. 3.31 ± 0.53) and vocational school students (3.24 ± 0.54) ($p < 0.05$). PSQI scores did not differ significantly across faculties ($F = 1.373$, $p = 0.218$). Female students had higher HEI-Turkey scores than males (3.60 ± 0.42 vs. 3.31 ± 0.51 , $t = 3.908$; $p < 0.001$). Pearson correlation analyses revealed a weak but significant negative association between HEI-Turkey and PSQI ($r = -0.312$, $p < 0.001$), and a weak positive correlation between HEI-Turkey and GPA ($r = 0.241$, $p = 0.001$). No significant correlation was observed between PSQI and GPA ($r = -0.119$, $p = 0.089$). The mean GPA was 2.92 ± 0.45 .

Conclusions: The high prevalence of poor sleep quality (74.1%) aligns with previous studies and highlights the vulnerability of university students. Dietary habits varied significantly by faculty and sex, whereas sleep quality did not. Higher diet quality among medical students may reflect greater nutrition knowledge and curriculum influence. The negative correlation between diet quality and sleep disturbances suggests that healthier diets are associated with better sleep. Additionally, a positive association between diet quality and GPA indicates a potential role of nutrition in academic performance.

Limitations: The cross-sectional design prevents causal inference. Single-center sampling and self-reported data (including GPA) may introduce bias. Small sample sizes in certain faculties limited statistical power for group comparisons.

Keywords: University Students, Dietary Habits, Sleep Quality, Academic Performance, HEI-Turkey, PSQI

Publication Trends in Specific Learning Disorder Research in Türkiye: A 10-Year PubMed Analysis

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Objective: Specific Learning Disorder (SLD) is defined as a heterogeneous disorder characterized by difficulties in the acquisition and use of listening, speaking, reading, writing, reasoning, or mathematical skills. SLD is an important neurodevelopmental disorder that can affect academic achievement and social functioning, leading to long-term consequences. This study aimed to evaluate the general characteristics of studies related to SLD conducted in Türkiye and published in the PubMed database over the past ten years.

Methods: A search was conducted in the PubMed database on March 10, 2026, using the following keywords: (“specific learning disorder” OR dyslexia OR dyscalculia OR dysgraphia OR “learning disability”) AND (Turkey OR Turkish). Studies published in Türkiye within the last ten years were included. The included studies were analyzed in terms of publication year, study design, sample characteristics, research field, and subject category using descriptive statistics.

Results : A total of 69 studies were identified, and 16 were excluded as they were not relevant to the topic. The analysis was conducted on 53 studies. In terms of study design, case-control studies had the highest proportion (45.3%), followed by cross-sectional (26.4%) and interventional studies (22.6%). Review articles, case reports, and other study types were limited (1.9%). Regarding sample characteristics, the majority of studies

focused on school-age children (6–12 years) (81.1%; n=43), while mixed samples (7.5%), adolescents (5.7%), and adults (1.9%) were less frequently represented. In terms of research fields, neurology/neuroscience constituted the largest proportion (39.6%), followed by child and adolescent psychiatry (15.1%) and psychology (13.2%). Educational sciences/special education and child development were each represented at a rate of 11.3%. Lower proportions were observed in public health/family medicine/pediatrics (5.7%) and speech and language therapy/audiology (3.8%). The distribution of publications by year showed that the highest proportion was in 2024 (24.5%), followed by 2022 (20.8%) and 2025 (18.9%). The number of publications was notably limited in 2019 and 2018 (1.9%).

Conclusion: These findings indicate that research on SLD in Türkiye has increased in recent years. The predominance of case-control and cross-sectional studies suggests that observational research is more common in this field. The majority of studies focusing on school-age children indicates a concentration on this age group. Similarly, the prominence of neurology and child and adolescent psychiatry suggests a focus on clinical and biological aspects. The limited representation of educational and rehabilitation fields, along with the scarcity of interventional studies and research involving diverse age groups, highlights important gaps in the literature. These findings suggest a need for more comprehensive and multidisciplinary studies. Future research should particularly focus on early childhood and adult populations and include more applied and interdisciplinary approaches.

Keywords: Specific Learning Disorder; Learning Disability; Türkiye

Immunization Status, Attitudes, and Unmet Needs in Adults with Chronic Diseases: Preliminary Findings

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Aim

This study aimed to evaluate immunization status, vaccination rates, and factors associated with unmet immunization needs among adults with chronic diseases.

Methods

This cross-sectional and descriptive study was conducted in the report renewal outpatient clinic of Sincan Training and Research Hospital, Ankara. Adult patients aged 18 years and older with at least one chronic disease were included. Data were collected through face-to-face structured questionnaires assessing sociodemographic characteristics, health status, history of severe illness within the last year, vaccination status, and attitudes using Likert-type items.

Results

A total of 114 participants were included, with a mean age of 59.8 years, and 51.8% were female. Vaccination rates varied substantially across vaccines. COVID-19 vaccination rate was 98.2%, while tetanus, influenza, hepatitis B, pneumococcal, and hepatitis A

vaccination rates were 63.2%, 40.4%, 21.9%, 16.7%, and 14.9%, respectively. RSV and herpes zoster vaccine uptake were below 1%.

Awareness levels also differed between vaccines. Lack of awareness was notable for pneumococcal (23.7%), hepatitis B (25.4%), and hepatitis A (27.2%) vaccines, while RSV and herpes zoster vaccines were largely unknown among participants.

In Likert evaluations, the majority of participants agreed that adult vaccination is necessary (75.4%) and particularly important for individuals with chronic diseases (84.2%). However, 98.2% reported that they would not consider vaccination unless recommended by a physician, and only 19.3% stated that they had received information about adult vaccines from healthcare professionals. High agreement was observed for statements indicating lack of information (67.5%) and absence of physician recommendation (74.6%) as reasons for not being vaccinated.

Conclusion

Although attitudes toward vaccination are generally positive among adults with chronic diseases, vaccination rates remain low for most vaccines. The marked discrepancy between positive attitudes and low vaccination uptake suggests significant unmet immunization needs. These findings indicate that insufficient physician recommendation and lack of patient education, possibly influenced by high clinical workload, may play a key role in missed vaccination opportunities.

Keywords: Adult Immunization, Chronic Diseases, Vaccination Uptake, Physician Recommendation, Unmet Needs

Sensitivity Profile to Food Allergens in the Adult Population of Turkey: High Rates and Cross-Reactivity in Multicomponent Allergy Tests

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Objective:

Although suspected food allergy is a common clinical condition in primary care, it is often overinterpreted. Although molecular allergy tests and component-resolved diagnostics (CRD) allow for a more detailed assessment of sensitivity patterns, they should not be used indiscriminately for screening purposes. In this study, we aimed to determine the food allergen-specific IgE sensitivity profile in individuals aged 18 years and older in Turkey and to evaluate these data from a primary care perspective.

Methods:

In this retrospective real-world study, patients who presented to our clinic with various allergic complaints and underwent the ALEX2 test were evaluated. Informed consent and ethics committee approval were obtained from all patients. A total of 4,212 tests from individuals aged 18 and older were included in the analysis. Food allergen-specific IgE levels were evaluated, and values of ≥ 0.35 kUA/L were considered positive. Food allergens were analyzed separately at the component level, by food groups, and based on panallergens.

Results:

Sensitization to at least one food allergen was detected in 1,111 (26.4%) of the adult group. The most frequently positive components were Ost e (7.03%), Hom g (5.63%), Pan b (4.37%), Myt e (4.30%), Lol spp. (3.25%), Fra a 1+3 (2.78%), Cuc m 2 (2.56%), Cor a 1.0401 (2.04%), Pen m 2 (2.02%), and Pru p 3 (1.71%).

At the category level, the highest sensitization was observed in seafood (17.2%), followed by fruits (7.8%) and nuts (4.9%). Sensitization to milk (0.7%) and egg (1.1%) was found to be low in the adult age group.

Among patients with seafood sensitization, approximately 60–65% showed positivity to tropomyosin or related cross-reactive components, suggesting that a substantial proportion of sensitization may be associated with cross-reactivity. In contrast, sensitization to storage proteins was observed in approximately 4.8% of the total population.

Conclusion:

The distribution of food allergen sensitization in adults differs from that in childhood, with seafood and plant-derived components being more prominent. The high sensitization rates detected by CRD reflect not only true sensitization but also cross-reactivity. These findings indicate that not every positive test result should be interpreted as clinical food allergy in primary care. Molecular allergy tests may be useful in distinguishing true sensitization from cross-reactivity when supported by appropriate clinical history; however, they should not be used as screening tools but rather as diagnostic support in selected cases.

Table 1. Most Commonly Positive Food Allergen Components in Adults

Rank	Component	Food Source	Positive (n)	(%)
1	Ost e	Oyster	296	7.03
2	Hom g	Lobster	237	5.63
3	Pan b	Shrimp	184	4.37
4	Myt e	Mussel	181	4.30
5	Lol spp.	Squid	137	3.25
6	Fra a 1+3	Strawberry	117	2.78
7	Cuc m 2	Melon	108	2.56
8	Cor a 1.0401	Hazelnut	86	2.04
9	Pen m 2	Black tiger shrimp	85	2.02
10	Pru p 3	Peach	72	1.71
11	Chi spp.	Crab	69	1.64
12	Ani s 3	Herring worm (Anisakis)	64	1.52
13	Mal d 1	Apple	62	1.47
14	Tri a 19	Wheat	57	1.35
15	Pen m 1	Black tiger shrimp	57	1.35

Keywords: Alex2, Food Allergy, Multiplexallergytests, Türkiye

Indications and Outcomes of Thyroid Function Testing Among Children: A Primary Care Study

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Objective: Thyroid diseases in children and adolescents may present with mild or overt clinical findings, also, no clinical signs at all and merely with abnormalities in thyroid function tests (TFT) in some cases. Excepting newborns, population-based screening in children remains controversial. However, in daily practice of primary care, TFT may also be ordered for children without active complaints due to various reasons. This study aimed to examine the indications for ordering TFT and the results in children who presented to our unit for various reasons.

Methods: We retrospectively reviewed 193 children aged 60 months to 18 years who presented to a family health unit in the provincial center between August 1, 2023 and October 1, 2024 and underwent TFT. Demographic and clinical data were extracted; the indications for ordering TFT and a symptom/sign scale were recorded. TFT was considered abnormal if at least one parameter was outside the reference range. Data were analyzed using IBM SPSS Statistics v27.0. A two-sided $p < 0.05$ was considered statistically significant.

Results: TFT results were abnormal in 13.0% of children. The most frequent abnormality was low free-T4 (fT4) (4.7%), followed by high free-T3 (fT3) (3.1%), high TSH (2.6%), low TSH (2.1%), and high fT4 (1.6%). Low fT3 was not observed among children. There

was no association between presence of symptom and TFT abnormality ($p=0.900$). In the anthropometric assessment, weight SDS values were significantly higher in the abnormal TFT group ($p=0.026$), whereas BMI-SDS values showed a borderline significant difference ($p=0.049$). No significant difference was observed between the groups in height SDS values ($p=0.189$). Maternal history of high-risk pregnancy ($p=0.002$) and the presence of chronic disease in the child ($p=0.005$) were significantly associated with TFT abnormality.

Conclusions: TFT results ordered for children have been largely observed normal, and many detected abnormalities represented mild or transient deviations. However, even if there are no symptoms, we believe that TFT may be considered in the presence of history of maternal risky pregnancy or the child's chronic illness due to probability of TFT abnormalities in those. Primary care physicians should adopt a selective, indication-driven testing strategy, base requests on appropriate clinical indications, and—when clinically appropriate—assume follow-up responsibility for low-risk, stable cases.

Keywords: Family Practice, Primary Health Care, Child, Pregnancy Risk, Chronic Disease, Thyroid Function Tests.

Evaluation of Repeated Visits in the Healthcare System: A Cross-Sectional Analysis of Primary, Secondary, and Tertiary Healthcare Services in Mersin Province

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Introduction:

The effectiveness, accessibility, and sustainability of healthcare services are among the key performance indicators of modern healthcare systems. These indicators reflect not only the quantitative aspects of access to healthcare services but also the quality of care provided and patient satisfaction. In this context, repeat visits to healthcare facilities emerge as a key parameter in assessing the effectiveness of healthcare delivery.

Repeat visits can be defined as a patient's need to seek healthcare services again within a short period of time due to the same health issue or similar complaints. While this situation suggests that patients are not deriving sufficient benefit from healthcare services, it also provides important insights into the organizational and operational structure of the healthcare system. Factors such as inadequate patient education during the initial visit, communication breakdowns between patients and physicians, and low levels of health literacy can contribute to an increase in repeat visits.

Healthcare systems must meet the growing demand for services with pre-allocated resources. Therefore, reducing unnecessary or preventable visits is critical for the effective use of healthcare resources. In systems with high rates of repeat visits, pressure

Oral Presentation - OP286

is placed on healthcare delivery capacity, which can lead to longer appointment wait times, increased waiting periods, and consequently, delays in other patients' access to healthcare services.

Primary care services form the foundation of the healthcare system and play a critical role as the first point of contact and provider of preventive healthcare. However, when patients do not utilize primary care effectively, they turn directly to secondary and tertiary care facilities and their emergency departments. This, in turn, leads to increased workload in higher-level healthcare services. In this context, the proper management of transitions between care levels and the effective operation of the referral chain are of great importance for the holistic functioning of the healthcare system.

The aim of this study was to determine the rates of repeat visits based on visits to primary, secondary, and tertiary care facilities, as well as emergency department visits, at the provincial level in Mersin, and to assess the impact of these visits on the healthcare system. Furthermore, based on the findings, interpretations regarding the possible causes of repeat visits were developed, and recommendations were made to improve healthcare delivery processes.

Materials and Methods:

This study was designed as a cross-sectional and descriptive study. The study population consisted of patients who visited public hospitals and family health centers affiliated with the Mersin Provincial Health Directorate. The electronic patient information management systems of the relevant healthcare facilities were used as the data source, and data were collected retrospectively through these systems.

For the purposes of this study, a random date was selected as the reference date, and this date was set as September 1, 2025. All patients who sought care at primary, secondary, and tertiary care facilities on this date were included in the study group. In the evaluation of repeat visits, repeat visits made by the same patients within the same month were

examined. A methodological restriction was imposed to ensure that follow-up examinations were not considered repeat visits, and repeat visits occurring between September 1 and 10, 2025, were excluded from the analysis. This approach aimed to prevent scheduled follow-up visits from influencing the dataset. Accordingly, only repeat visits occurring between September 11 and 30, 2025, were included in the analysis.

In the data analysis, the total number of visits, the number of repeat visits, and the rates of these visits were calculated. Additionally, patient transitions between primary and secondary care services were examined, and the rates of patients referred to the hospital after visiting a family physician were evaluated. The obtained data were analyzed using descriptive statistics, and the findings were expressed as percentages.

Findings:

On September 1, 2025, a total of 24,702 patients sought care at secondary and tertiary care facilities under the Mersin Provincial Health Directorate. Of these patients, 5,860 (23.7%) returned to the same level of care facility between September 11 and 30, 2025. In analyses of primary care services, a total of 79,802 patient visits were recorded at family health centers on September 1, 2025. The number of repeat visits by these patients between October 11 and 30, 2025, was determined to be 25,537 (32%). Additionally, it was determined that 23,142 (29%) of the patients who visited a family physician also visited secondary or tertiary care facilities within the same month.

Discussion:

The findings of this study indicate that there is a striking level of repeat visits to healthcare facilities, which places a significant burden on the healthcare system. The fact that approximately one in four patients seeks healthcare services again within the same month is a situation that must be carefully evaluated to prevent disruptions in healthcare delivery due to excessive workload. It is believed that this situation can be improved by strengthening patient-physician communication, enhancing physicians' knowledge,

ensuring adherence to the referral chain in primary care facilities, increasing health literacy, having physicians—rather than patients—manage treatment processes across care levels, and increasing the variety of medications prescribed by family physicians.

It is believed that the higher rate of repeat visits in primary care compared to secondary and tertiary care is due to the greater accessibility of primary care. Primary care forms the foundation of the healthcare system and, when functioning effectively, has the potential to reduce the burden on higher-level healthcare services. However, the findings indicate that a significant proportion of patients visit secondary and tertiary care facilities after consulting their family physician. It is believed that the active utilization of quotas allocated to family physicians within the Central Physician Appointment System and the implementation of more effective inter-level referral mechanisms in primary care facilities could reduce the burden on secondary and tertiary care facilities. With a more effective inter-level referral chain, patients diagnosed and treated at the primary care level will be referred to the appropriate specialist based on an accurate diagnosis, thereby reducing the workload on the healthcare system. In this context, strengthening the tiered service delivery model within the healthcare system and ensuring patients receive care at the appropriate level are of great importance.

Another significant consequence of repeat visits is that they lead to delays in accessing healthcare services. When healthcare facilities have limited capacity, unnecessary or preventable visits can delay care for other patients and result in difficulties accessing services, as well as overcrowding in emergency departments. This situation can lead to non-emergency patients facing long wait times and a decrease in satisfaction with healthcare services. To reduce repeat visits, a comprehensive approach is required that addresses not only clinical processes but also patient education, health literacy, and referral mechanisms.

Results:

This study has highlighted the burden that repeat visit rates place on the healthcare system, based on visits to outpatient clinics and emergency departments at primary, secondary, and tertiary care facilities in Mersin Province. The findings indicate that one in every four patients who visit a healthcare facility returns for another visit between the 11th and 30th days following their initial visit. It is believed that the high rate of repeat visits can be addressed by actively utilizing the referral chain between care levels and adhering to the necessary regulations.

Additionally, the high rate of patients being referred from primary care to higher-level healthcare facilities indicates that transitions between care levels within the healthcare system need to be managed more effectively. This situation underscores the necessity of implementing the referral chain in a more functional manner.

In conclusion, reducing repeat visits is of critical importance for alleviating the burden on outpatient clinics and emergency departments in secondary and tertiary care facilities, improving the efficiency of healthcare services, and ensuring the sustainability of the healthcare system. In this regard, it is believed that regulations aimed at improving family physicians' knowledge, expanding the variety of medications they can prescribe, actively utilizing the referral chain between care levels, enhancing patient education processes, strengthening patient-physician communication, and increasing health literacy will contribute positively to the overall performance of the healthcare system.

Keywords: Emergency Service, Family Practice, Hospital, Outpatient Clinics, Patient Readmission

Beyond Treatment: Mapping the Follow-Up Burden of Pediatric Epilepsy in Primary Care

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Objective Epilepsy is a clinical diagnosis and a neurological disorder characterized by an enduring predisposition to generate epileptic seizures, along with the neurobiological, cognitive, psychological, and social consequences of this condition. By analyzing the regional burden of patients diagnosed with epilepsy and monitored at the Mersin University Department of Pediatric Neurology, this study aims to provide a framework for telemedicine and video conferencing methodologies. This framework is intended to guide family physicians—practicing in a province characterized by a linear geographical settlement—in cases requiring pediatric neurology mentorship.

Methods A retrospective analysis was conducted on the sociodemographic data of patients who presented to the Mersin University Department of Pediatric Neurology between the years 2020 and 2026 and were followed up with a diagnosis of epilepsy.

Results Between 2020 and 2026, a total of 4,286 patients presented to the Mersin University Department of Pediatric Neurology. Of this cohort, 55% (n=2,357) were male and 45% (n=1,928) were female, with an average admission rate of 3 visits per patient (range: 1-72). The most frequently observed age group was 6-11 years, accounting for 33.9% (n=1,455) of the patients. Patients monitored in the infantile age group constituted

4.4% (n=190) of the total. Geographically, 84.6% (n=3,626) of the patients resided in Mersin, while 15.4% (n=660) were referred from other provinces. The most frequent out-of-province referrals originated from Hatay (3%, n=443), followed by Adana (1.5%, n=63), Şırnak (1.5%, n=63), Şanlıurfa (0.9%, n=39), Mardin (0.8%, n=36), Adıyaman (0.5%, n=25), Kahramanmaraş (0.5%, n=22), Gaziantep (0.5%, n=22), Diyarbakır (0.5%, n=20), Siirt (0.4%, n=18), İstanbul (0.4%, n=17), Van (0.54%, n=16), Bitlis (0.4%, n=16), Osmaniye (0.3%, n=15), Antalya (0.1%, n=5), and Kocaeli (0.1%, n=5). Within Mersin, a province composed of districts physically distant from the city center, the highest number of patient admissions was from the Toroslar district (16.8%, n=608), whereas the lowest was from Çamlıyayla (0.1%, n=4). Admissions from other districts were distributed as follows: Akdeniz (14.8%, n=538), Yenişehir (14.5%, n=525), Mezitli (11.4%, n=415), Tarsus (11.4%, n=413), Erdemli (7.7%, n=296), Silifke (3.2%, n=115), Anamur (1.6%, n=57), Mut (1.5%, n=56), Gülnar (1.1%, n=41), and Aydıncık (0.7%, n=25). At the neighborhood level within the central districts of Mersin, the Mezitli Merkez neighborhood exhibited the highest admission rate (1.9%, n=69), closely followed by the Şevketsümer neighborhood in the Akdeniz district (1.8%, n=65).

Conclusion In primary healthcare settings, the management of epilepsy extends beyond the implementation of contemporary medical approaches regarding disease incidence and routine patient follow-up. It is well established that the workload of family physicians is significantly increased by the necessity to monitor drug side-effect profiles, track physical growth and development, and support psychosocial processes. Furthermore, physicians provide essential guidance to their patients on social parameters, including medical fitness for driving, employment procedures, and participation in sports activities. Consistent with the holistic and inclusive principles of family medicine, the ultimate objective is to enhance the overall quality of life for individuals experiencing seizures. Consequently, considering the substantial patient burden in the Erdemli, Silifke, Mut, and Gülnar districts of our province, the necessity of developing AI-supported mentoring applications has been clearly established. Specifically, the integration of machine

learning-driven clinical decision support systems for evaluating drug interactions, deep learning algorithms for analyzing patient seizure diaries, and secure, cloud-based infrastructures for asynchronous video consultations will significantly optimize this mentorship process. Through this collaborative model between family medicine practitioners and pediatric neurology specialists, the priority districts requiring immediate focus for epilepsy patients have been successfully identified.

Keywords: Epilepsy, Mentorship, Primary Care

Clinical Value of Red Flags, Headache Burden, and Lifestyle Factors in Children Referred for Headache: A Retrospective Study From a Pediatric Neurology Outpatient Clinic

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Aim:

Headache is one of the most common neurological complaints in childhood and adolescence and frequently leads to referral from primary care to pediatric neurology clinics. However, identifying which children require further evaluation and neuroimaging remains challenging in routine practice. This study aimed to evaluate the contribution of red flag findings, headache burden, and lifestyle-related factors to the distinction between primary and secondary headaches in children referred to a pediatric neurology outpatient clinic, with particular relevance to family medicine practice.

Materials and Methods:

This retrospective study included 100 children and adolescents evaluated for headache at a tertiary pediatric neurology outpatient clinic. Patients were classified according to the International Classification of Headache Disorders, 3rd edition (ICHD-3) as migraine, tension-type headache, or secondary headache. Demographic features, headache characteristics, associated symptoms, red flag findings, neurological examination, neuroimaging results, Pediatric Migraine Disability Assessment Score (PedMIDAS), daily screen time, sleep duration, school absenteeism, and monthly analgesic use were recorded. Clinical variables associated with secondary headache and clinically significant neuroimaging abnormalities were analyzed.

Results:

Of the patients, 57% were female and the mean age was 15.0 ± 4.5 years. The diagnostic distribution was migraine in 37%, tension-type headache in 36%, and secondary headache in 27% of cases. Nausea, photophobia/phonophobia, positive family history, and higher PedMIDAS scores were more common in the migraine group. Red flag burden was significantly greater in the secondary headache group, particularly neurological deficit, morning vomiting, progressive worsening, and headache causing nocturnal awakening. Median PedMIDAS scores were 28 in migraine, 18 in secondary headache, and 11 in tension-type headache. Patients with daily screen exposure above 4 hours and sleep duration below 8 hours had higher headache frequency, greater school absenteeism, and more frequent analgesic use. In multivariable analysis, the presence of two or more red flags was an independent predictor of secondary headache (odds ratio: 5.8), while abnormal neurological examination and morning vomiting showed the strongest association with clinically significant neuroimaging findings. No clinically significant neuroimaging abnormality was detected in patients with primary headache who underwent routine imaging.

Conclusion:

In children presenting with headache, the clinical value of red flags depends not only on their presence but also on their clustering pattern and interpretation together with neurological examination findings. In contrast, headache burden, screen exposure, sleep pattern, and school impairment appear particularly relevant in the clinical management of primary headaches. These findings support a more selective referral and neuroimaging strategy in family medicine and highlight the importance of early lifestyle-focused intervention.

Keywords: Child, Headache, Migraine, Red Flags, Neuroimaging, Primary Care

Prevalence and Distribution of Non-Allergic Rhinitis Phenotypes in Adults: A Retrospective Cohort Study

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Introduction

Rhinitis refers to nasal symptoms resulting from inflammation and/or dysfunction of the nasal mucosa. It is a complex and heterogeneous condition characterized by various phenotypes. After excluding acute infectious rhinitis, the condition is broadly classified into two main phenotypes: allergic rhinitis (AR) and non-allergic rhinitis (NAR).

NAR is a type of chronic rhinitis characterized by rhinorrhea, nasal obstruction, sneezing, and/or nasal itching in the absence of infectious or allergic triggers. It significantly impairs quality of life and imposes a substantial economic burden. NAR is an general term encompassing a heterogeneous group of patients with diverse phenotypes and underlying endotypes, which require different therapeutic approaches. Identifying the underlying endotype is essential for selecting the most appropriate treatment for each patient. Although endotyping is not always feasible in routine clinical practice, phenotypes may serve as useful surrogates and help guide personalized treatment strategies. Furthermore, understanding the distribution of NAR phenotypes may assist clinicians in anticipating the most commonly encountered patient profiles in daily practice.

Oral Presentation - OP292

Given that phenotypes may reflect underlying endotypes, knowledge of their prevalence can support clinicians in predicting the most frequent presentations of NAR and tailoring individualized management strategies. Therefore, this study aimed to determine the prevalence of NAR phenotypes in a general patient population.

Methods

This retrospective study included patients aged ≥ 18 years who presented to the allergy unit of our clinic with rhinitis symptoms between January 2025 and January 2026. Chronic rhinitis was defined as the presence of nasal symptoms for at least 1 hour per day over a minimum period of 12 weeks per year. Patients were evaluated using skin prick testing (SPT) and/or specific IgE (sIgE) assays. Patients with positive test results and compatible clinical symptoms were classified as having AR, whereas those with negative SPT and/or sIgE results were classified as having NAR.

An algorithm was used to identify patients; patients whose symptoms began at age 65 or older were classified as having senile rhinitis; patients with symptoms at work and reduced complaints during vacation periods were classified as having occupational rhinitis; patients who regularly used nasal decongestants were classified as having rhinitis medicamentosa; female patients experiencing symptoms during pregnancy or menstruation were classified as having hormonal rhinitis; patients whose symptoms were triggered by spicy or pungent foods were classified as having gustatory rhinitis; and those who could not be classified into any of these groups were classified as having idiopathic rhinitis. According to this algorithm, each patient was assigned to a single phenotype.

Results

A total of 767 patients presenting with rhinitis symptoms were included in the study. Of these, 537 patients (70%) were diagnosed with AR, while 230 patients (30%) were classified as having NAR.

The mean age of patients with NAR was 37.5 ± 14.2 years, and the majority were female ($n = 152$, 66%). The most prevalent phenotype was idiopathic rhinitis ($n = 150$, 65.2%).

Conclusion

NAR constitutes a substantial proportion of chronic rhinitis cases among adults presenting to allergy clinics. In our cohort, idiopathic rhinitis was the most common NAR phenotype and was more frequently observed in females. Determining the distribution of NAR phenotypes may enhance clinicians' understanding of the heterogeneity of NAR and facilitate the development of individualized treatment strategies.

Keywords: Non-Allergic Rhinitis, Idiopathic Rhinitis, Phenotype

Clinical Expression of Olive Pollen Allergy: Seasonal Versus Perennial Symptom Patterns

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Introduction

Olive (*Olea europaea*) pollen is a major cause of seasonal respiratory allergy in the Mediterranean region. The olive pollination period typically extends from early May to late June, lasting approximately two months, during which symptoms are expected to occur in sensitized individuals. However, recent clinical observations suggest that, in some patients, symptoms are not confined to the pollen season and may persist throughout the year.

The aim of this study was to evaluate the frequency of respiratory allergic symptoms in patients sensitized to olive pollen during and beyond the olive pollination season.

Methods

This retrospective study included patients aged ≥ 18 years who presented to the allergy unit of our clinic between January 2023 and January 2026 with a diagnosis of allergic rhinitis (AR) and/or asthma and who underwent skin prick testing (SPT).

Patients with confirmed sensitization to olive pollen based on SPT results were included. Patients were categorized as monosensitized or polysensitized according to their sensitization profiles.

Oral Presentation - OP293

Symptoms were classified as intermittent (occurring <4 days per week or <4 weeks) or persistent (≥ 4 days per week and ≥ 4 weeks). Disease severity was categorized as mild in the absence of sleep disturbance, impairment of daily activities, work/school limitations, or troublesome symptoms, and as moderate-to-severe if any of these were present.

Results

Among 1,934 patients diagnosed with AR and/or asthma, 569 patients (29.4%) with olive pollen sensitization were included in the study. Of these, 28 patients (4.9%) were monosensitized and 541 (95.1%) were polysensitized. There were no significant differences between the two groups in terms of age or sex ($p > 0.05$).

AR was the most common diagnosis in both groups (96.4% in monosensitized and 97.6% in polysensitized patients). Year-round AR and/or asthma symptoms independent of the pollen season were observed in 7 monosensitized patients (25%) and 180 polysensitized patients (33.3%), with no statistically significant difference between groups ($p = 0.364$).

In monosensitized patients, olive sensitization appeared to peak during both the pollination period (May–June) and the harvest period (November–December).

Conclusion

Respiratory allergic symptoms in patients sensitized to olive pollen may not be limited to the pollination season and may persist throughout the year in a substantial proportion of patients. Therefore, restricting clinical evaluation solely to the pollen season may be insufficient.

Furthermore, the observed increase in sensitization during the olive harvest period (November–December) suggests that biological particles, residual pollen, or aeroallergens generated during olive processing may contribute to symptom occurrence.



This finding highlights the importance of considering occupational and environmental exposures in regions where olive cultivation is prevalent.

Keywords: Olive Pollen, Allergic Rhinitis, Asthma

Assessment of Knowledge, Attitudes, Behaviors, and Breast Cancer Risks Regarding Breast Cancer Screening in Women Aged 20-69

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Objective: This study aims to determine the knowledge, attitudes, and behaviors of women aged 20-69 regarding breast cancer screening methods and to examine breast cancer risk factors.

Method: A breast cancer risk assessment form and a 27-item questionnaire were administered through face-to-face interviews to women aged 20-69 years who presented for any reason to the Family Medicine outpatient clinic of Selçuk University Faculty of Medicine Hospital. A total of 533 patients who met the inclusion criteria and agreed to participate by signing the informed consent form were included in the study.

Results: The mean age of the participants was 35 ± 13 , and 76.9% (n=410) had their first menstruation between the ages of 12-14. 87.8% (n=468) of the participants stated that breast cancer could be diagnosed early through screening tests. However, the awareness rate of screening tests was found to be only 10.3% (n=55). The rate of those who underwent clinical breast examination was significantly higher in women aged 41-69 compared to women aged 20-40 ($p=0.000$). When the participants' breast cancer risk assessment forms were examined, it was determined that 95.5% (n=509) belonged to the low-risk group and 1.3% (n=7) belonged to the highest-risk group. A significant negative

correlation was found between the participants' education level and their breast cancer risk assessment score ($r=-3.325$, $p=0.000$).

Conclusion: The level of knowledge about breast cancer screening was found to be low. Given the importance of screening tests for early detection, it is essential that primary care professionals, in particular, inform the public about screening tests and encourage their participation.

Keywords: Breast Cancer, Screening, Breast Self-Examination, Risk Assessment Form

Association Between Pain Severity and Depression in Patients with Cervical Dystonia

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Objective

Cervical dystonia (CD) is a rare movement disorder characterized by abnormal contractions of the neck muscles. It is recognized as the dystonia subtype most frequently associated with pain, with a reported prevalence of up to 90%. Notably, some patients report pain even before the onset of overt muscle contractions. The mechanisms underlying pain in CD remain unclear, as no consistent correlation has been demonstrated between contraction severity and pain intensity. This suggests that pain may not solely arise from muscle contractions but may also involve altered nociceptive processing, dysfunction of descending inhibitory pain pathways, and central mechanisms. Furthermore, the concept of nociplastic pain refers to pain arising from altered nociception and may be associated with psychological conditions such as depression and anxiety. This study aimed to investigate the relationship between pain and depression in patients with CD.

Oral Presentation - OP299

Materials and Methods

Patients with CD who were followed in our neurology clinic were included in the study. Prior to botulinum toxin injections, patients were assessed using the pain component of

the Toronto Western Spasmodic Torticollis Rating Scale (TWSTRS) and the Beck Depression Inventory (BDI).

Results

A total of 17 patients with CD were included in the study, of whom 12 (66.7%) were female and 6 (33.3%) were male, with a mean age of 53.4 ± 8.85 years. The mean TWSTRS pain score was 10.29 ± 5.69 , and the mean BDI score was 14.53 ± 8.89 .

Although both TWSTRS pain and BDI scores were higher in female patients compared to males, the differences were not statistically significant. A moderate, positive, and statistically significant correlation was observed between TWSTRS pain scores and BDI scores ($r = 0.54$, $p = 0.02$).

According to simple linear regression analysis, pain significantly predicted depression scores, explaining 29% of the total variance ($\beta = 0.95$, $p = 0.03$, $R^2 = 0.29$).

Conclusion

The findings suggest that increased pain severity in patients with CD may be associated with a higher risk of depression. This highlights that pain is not merely a physical symptom but also has significant psychological implications. Although higher pain and depression scores were observed in female patients, consistent with the literature, statistical significance was not achieved due to the small sample size.

The study underscores the importance of evaluating pain and depression together and supports a multidisciplinary approach in treatment strategies. Limitations include the small sample size and single-center design; therefore, larger, multicenter studies are warranted. In conclusion, a positive relationship exists between pain and depression in patients with CD, and both parameters should be considered in clinical practice.

Keywords: Cervical Dystonia, Pain, Depression, Nociplastic Pain

Association Between Body Weight and Levodopa-Induced Dyskinesia in Parkinson's Disease

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Introduction

Levodopa remains the gold standard for the treatment of Parkinson's disease (PD); however, it is associated with adverse effects such as dyskinesia. Dyskinesia has been reported in up to 70% of patients within three years of levodopa therapy.

A potential relationship between levodopa-induced dyskinesia and body mass index (BMI) has been suggested, although findings in the literature are inconsistent. Some authors have proposed that the levodopa dose per kilogram of body weight is an independent and stronger predictor of dyskinesia than the absolute levodopa dose alone. However, studies investigating the relationship between anthropometric parameters—such as body weight and BMI—and motor symptoms in PD are limited.

The aim of this study was to evaluate the relationship between body weight, BMI, motor symptoms of PD, and levodopa-induced dyskinesia.

Oral Presentation - OP301

Methods

Demographic and clinical data, including age, sex, disease duration, and medications, were recorded for patients with PD. The Unified Parkinson's Disease Rating Scale (UPDRS) and the Unified Dyskinesia Rating Scale (UDysRS) were administered.

Height (meters) and body weight (kilograms) were measured for all participants, and BMI was calculated accordingly.

Results

A total of 40 patients were included in the study, of whom 13 (32.5%) were female and 27 (67.5%) were male. The mean age was 62.7 ± 7 years. The mean body weight was 78.4 ± 13.3 kg, and the mean BMI was 28.2 ± 4.5 kg/m². The median disease duration was 30 months (range: 2–240 months). The mean UDysRS score was 4.7 ± 3.8 , the mean UPDRS score was 17.2 ± 15.1 , and the mean levodopa equivalent daily dose (LEDD) was 334.6 ± 191.6 mg. Correlation analysis revealed a significant negative correlation between body weight and UDysRS scores ($r = -0.354$, $p = 0.025$). No significant associations were found between BMI and LEDD, between body weight and UPDRS scores, or between BMI and UDysRS scores.

Conclusion

Our findings suggest that lower body weight may be associated with an increased risk of levodopa-induced dyskinesia in patients with PD. These results highlight the potential importance of considering body weight in treatment planning. Future large-scale, prospective studies are needed to better elucidate the impact of body composition on motor complications in PD.

Keywords: Parkinson's Disease, Levodopa, Dyskinesia, Body Mass Index, Body Weight

The Effect of Rational Drug Use Knowledge on Medical Treatment Adherence in Diabetic Patients: Preliminary Findings

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Introduction

Diabetes mellitus is a global public health problem requiring effective clinical management due to its chronic complications and high morbidity rates. Achieving glycemic targets in diabetes management is directly related to patients' adherence to prescribed medical treatment. Among the multidimensional factors influencing treatment adherence, patients' health literacy and awareness of rational drug use are gaining increasing importance. The aim of this study is to determine the knowledge level regarding rational drug use in patients followed up with a diagnosis of diabetes, and to evaluate the relationship between this knowledge and their adherence to medical treatment (oral antidiabetic drugs and/or insulin).

Methods

This cross-sectional and descriptive study sample consisted of volunteer patients followed up with a diagnosis of diabetes. This report presents preliminary findings from the first 50 patients of the ongoing study. Data collection instruments included a

sociodemographic and clinical data form prepared by the researchers, the "Morisky Medication Adherence Scale (MMAS-8)," and the 21-item "Rational Drug Use Scale." Statistical analysis of the data was performed using SPSS software. Descriptive statistics (mean, standard deviation, frequency, and percentage) were used, alongside the Chi-square test for comparing categorical variables. The statistical significance level was set at $p < 0.05$.

Results

A total of 50 diabetic patients were included in the study. The mean age of the participants was 59.52 ± 8.99 years (min: 39, max: 79); 60% ($n=30$) were male and 40% ($n=20$) were female. The mean duration of diabetes was found to be 13.22 ± 6.87 years. It was found that 68% ($n=34$) of the participants were receiving oral antidiabetic drugs (OADs), 24% ($n=12$) were receiving insulin, and 8% ($n=4$) were receiving combination therapy (OAD + insulin). Diabetes-related complications were present in 32% ($n=16$) of the cases, and 68% ($n=34$) had additional comorbidities. When the relationship between rational drug use and treatment adherence was examined, it was observed that 78.9% of individuals in the low adherence group, 66.7% in the moderate adherence group, and 50% in the high adherence group had adequate levels of rational drug use knowledge. The Chi-square analysis revealed no statistically significant relationship between rational drug use and treatment adherence ($p=0.197$). Similarly, no statistically significant relationship was found between the type of treatment and adherence to medical treatment ($p=0.170$).

Conclusion

Preliminary findings indicate that a high level of knowledge regarding rational drug use in diabetic patients is not sufficient on its own to improve adherence to medical treatment. The fact that the level of rational drug use knowledge is proportionally higher in the low adherence group suggests that the adherence problem may stem from motivational, psychosocial, or other treatment-related factors rather than a lack of knowledge.



Although no statistically significant relationships were found in the current preliminary data, it is anticipated that as the sample size increases, the significance of these clinical trends will be more clearly established and analyzed in a multifaceted way alongside other underlying variables.

Keywords: Diabetes Mellitus, Rational Drug Use, Medication Adherence, MMAS-8.

The Relationship Between Smoking, Prognostic Nutritional Index (PNI), and Overall Survival in Geriatric Small Cell Lung Cancer Patients: A Retrospective Study of 40 Cases

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Introduction and Aim:

Managing small cell lung cancer (SCLC) in the elderly is difficult because of the aggressive disease, poor patient performance status, and accompanying health issues. Nutritional status plays an important role in the success of cancer treatments. This study aimed to assess the impact of smoking status and the Prognostic Nutritional Index (PNI), which can be easily calculated with routine lab tests, on overall survival (OS) in 40 SCLC patients over 65 years old.

Materials and Methods:

The study retrospectively included 40 SCLC patients aged 65 years and older who were followed up at the Çukurova University Medical Oncology Clinic between 2021 and 2025. Demographic data, smoking history, and laboratory parameters (albumin, total lymphocyte count) of the patients were recorded. The PNI score was calculated using the formula: $[10 \times \text{serum albumin (g/dL)} + 0.005 \times \text{total lymphocyte count (mm}^3\text{)}]$. Statistical analysis of the data was performed using SPSS 25.0; the Kaplan-Meier method was used for survival analyses.

Results:

The mean age of the patients was 69.9 years (range 65-78), with 75% (n=30) male and 25% (n=10) female. 82.5% (n=33) of the patients were active smokers, and 62.5% (n=25) presented with at least one comorbidity, including COPD, coronary artery disease, diabetes, or hypertension. The median PNI value for the study group was 28.05 (range 23.01-32.00). To better reflect the specific nutritional and immunological profile of this geriatric and advanced-stage population, the median PNI of 28.05 was determined as the prognostic cut-off value. According to the Kaplan-Meier survival analysis, patients with a PNI >28.05 had a median overall survival (OS) of 9.52 months, compared to 8.82 months for those with a PNI ≤28.05. Although this difference did not reach conventional statistical significance, it demonstrated a notable clinical trend toward improved survival in the high-PNI group (p=0.058).

Conclusion:

High PNI, an objective marker of nutritional status in elderly small cell lung cancer (SCLC) patients, correlates with better survival rates. Early nutritional screening in primary care and supportive settings is crucial for improving both survival and quality of life in older oncology patients. This research highlights PNI as a straightforward and practical tool for assessing nutritional health in clinical settings, while also stressing the importance of smoking cessation counseling for SCLC patients.

Keywords: Geriatrics, PNI, Small Cell Lung Cancer, Smoking.

Can Ultrasound Elastography Provide an Objective Measure to Support Tonsillectomy Indications

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Background

Adenotonsillar hypertrophy (ATH) and chronic tonsillitis (CT) are common tonsillar pathologies characterized by lymphoid hyperplasia and chronic inflammation, often resulting in airway obstruction or recurrent infections. Differentiating these conditions from normal tonsillar tissue is crucial for diagnosis and treatment planning. Elastography, including strain ratio (SR) and shear wave elastography (SWE), provides a non-invasive method for assessing tissue stiffness, which may reflect underlying pathological changes.

Objectives

To evaluate the diagnostic performance of SR and SWE in differentiating normal tonsils from those affected by ATH and CT, and to determine their correlation and clinical applicability.

Methods

Ninety-six participants were included: 31 healthy controls, 55 with ATH, and 10 with CT. Elastographic measurements were obtained bilaterally using SR and SWE techniques. Data normality was assessed using the Shapiro-Wilk test. Non-normally distributed

variables were analyzed using the Kruskal–Wallis test with Bonferroni correction for post-hoc comparisons. The Chi-square test assessed gender distribution. Correlations between SR and SWE were tested using Spearman’s rank correlation. Receiver operating characteristic (ROC) analysis determined diagnostic accuracy through the area under the curve (AUC), sensitivity, specificity, and optimal cutoff values.

Results

All elastographic parameters were non-normally distributed ($p < 0.05$). Both SR and SWE values were significantly higher in the ATH and CT groups compared to controls ($p < 0.001$). SWE demonstrated excellent diagnostic accuracy (AUC: right tonsil = 0.918; left tonsil = 0.892), outperforming SR (highest AUC = 0.844). Significant positive correlations were observed between SR and SWE values ($r = 0.347$ – 0.676 , $p < 0.01$). No gender-related differences were found ($p = 0.586$).

Conclusion

Elastography effectively differentiates normal from pathological tonsillar tissue. SWE provides superior diagnostic accuracy and reproducibility, making it a valuable, noninvasive adjunct for assessing tonsillar disease severity and guiding clinical management. Integrating SWE into routine ultrasonography could enhance diagnostic precision and reduce unnecessary surgical interventions.

1. Introduction

1.1 Background

Tonsillectomy is a surgical procedure most commonly performed in the specialty of otolaryngology, particularly in children and adolescents. This surgery is primarily requested for chronic or recurrent tonsillitis, inflammation, and adenotonsillar hypertrophy, which can result in upper airway blockage or sleep-disordered breathing.

Although this is a longstanding and widely used procedure, the clinical determination of tonsillectomy is still mostly based on subjective data on symptom frequency, severity, and quality of life. Standard indicators are usually based on clinical history, physical examination, or patient or parental reports, i.e., the frequency of tonsillitis per year or the extent of airway obstruction. As a result, the need for quantitative and reproducible diagnostic instruments that might offer an objective background to the indications of tonsillectomy remains unmet.

Structural and functional changes (fibrosis, vascularization change, cellular density increase) of palatine tonsils can be caused by chronic infection or hypertrophy of tonsils. These tissue-level modifications possibly affect the mechanical characteristics of the tonsils, like their stiffness/elasticity. Preoperative image studies have never been a part of the decision-making process in tonsillectomy surgery, due in large part to the fact that the traditional methods were insensitive to detect subtle soft-tissue abnormalities. Thus, a technique to measure tonsillar tissue properties, qualitatively, can potentially result in significant clinical management implications.

1.2 Ultrasound Elastography and Its Clinical Relevance

Over the last 20 years, ultrasound elastography has become an alternative method of imaging governed by the use of non-invasive imaging devices, which have the capabilities to measure the levels of tissue stiffness, a parameter that indicates the mechanical and structural health of tissues. With a wide range of applicability, ultrasound elastography has the potential to emerge as a valuable modality in the assessment of the tonsillar organs that are superficial, readily available, and tractable with high-frequency ultrasonographic imaging.

Techniques of ultrasound elastography can broadly be classified into two methods, namely strain elastography and shear wave elastography (SWE). Strain elastography measures relative tissue stiffness by using a comparison of the deformation of a region of

interest to that of a compression of a reference tissue. SWE, however, sequentially produces acoustic radiation force impulses to produce shear waves in tissue and measures these in turn their propagation speed, which is proportionate to tissue elasticity and has a unit of kilopascals (kPa).

It has been shown in past studies that elastography increases the stiffness in a chronic inflammatory or fibrotic process. Nevertheless, comparatively limited studies further investigated the role of ultrasound elastography in palatine tonsil assessment. Use of elastography during regular tonsillar examination, especially in advising tonsillectomy, has not been tried extensively. Therefore, the elastography as an objective imaging biomarker in tonsillar disease should be systematically assessed.

1.3 Rationale for the Study

In this regard, elastography use may be useful in addressing one of the most critical limitations of the modern tonsillectomy decision-making lack of measured and repeatable imaging parameters. Should the values of quantitative elastography be different in consistency among the patients with pathological tonsillar ailment and healthy individuals, these data might be additional during clinical assessment criteria. This would not only increase the level of diagnostic accuracy but could further decrease the number of unnecessary surgical procedures, offer objective follow-up values, and enable to planning of the treatment more personally.

Taking all these factors into account, this study was planned to examine how the parameters of the ultrasound elastography, such as strain ratio and shear wave elastography, differ in the perspective of patients in need of tonsillectomy as opposed to healthy individuals. The study population consisted of two categories of patients undergoing tonsillectomy based on (1) adenotonsillar hypertrophy, (2) chronic tonsillitis, and an intermediate group of patients with no tonsillar disease. The study helped to understand that to use tonsillar elasticity as an objective radiological biomarker of

tonsillectomy, it was necessary to study these parameters across the three groups, and confirmed that measurable differences in tonsillar elasticity were potential biomarkers of tonsillectomy.

1.4 Study Objective

The main objective of the study was to test the hypothesis that ultrasound elastography (both strain ratio and shear wave methods) can be used to give an objective quantitative measure to reinforce clinical pointers in relation to tonsillectomy.

By ultimately filling the data gap between clinical judgment and quantitative imaging, ultrasound elastography can change the process of tonsillar disease investigation into something more standardized and evidence-based, improving diagnostic reliability and increasing patient selection in tonsillectomy.

2. Materials and Methods

2.1 Study Design and Population

This was a prospective cross-sectional research study in the Department of Otorhinolaryngology and Radiology outpatient clinics at Adana City Hospital, after obtaining the consent of the Clinical Research Ethics Committee of Adana City Hospital (approval number: 2018/314). All the participants/legal guardians were included by giving informed consent in writing.

Every test was conducted under one clinic session with an experienced radiologist in the head and neck ultrasonography who was not aware of the clinical groupings of the subjects.

2.2 Inclusion and Exclusion Criteria.

Inclusion criteria were:

1. Age between [3-17 years];
2. Standard ENT criteria of clinical diagnosis of adenotonsillar hypertrophy or chronic tonsillitis;
3. No acute infection during examination.

The exclusion criteria were:

1. History of prior tonsillectomy or other surgery of the oropharynx;
2. The presence of peritonsillar abscess, Malignancy, or systemic inflammatory disease is suspected.

All the participants were enumerated using demographic data such as age and gender.

2.3 Technique of Ultrasound and Elastography.

The participants were made to be in the supine position with a slight extension of the neck, with the mouth slightly open to ensure maximum acoustic coupling of the submandibular region.

2.3.1 Strain Elastography

In each participant, the palatine tonsils were examined in each case. The patients were examined with a high-resolution US Doppler system (Philips EPIQ 7 Philips Health Care, Bothell, WA) equipped with a high-resolution (5-18 MHz) linear probe (Philips L18-5). The operator used a gentle manual repetition of compression in the generation of the strain images. The strain ratio (SR) measurements were evaluated on two tissues on the same side by employing two reference tissues as follows:

- The tongue muscle
- The submandibular gland.

Target tissue strain and reference tissue strain were automatically calculated by the ultrasound system, resulting in the strain ratio. The increase in such SR values was a sign of an increase in the tissue stiffness of the tonsil as compared to the reference tissue.

2.3.2 Shear Wave Elastography (SWE)

Shear wave elastography was done bilaterally on all tonsils after strain elastography. Patients were evaluated with transcervical US, using the EPIQ 7 high-resolution US device (Philips EPIQ 7 Philips Health Care, Bothell, WA) with a C5-1 16 MHz high-resolution general convex probe. An ROI was delineated in the parenchyma of the tonsil but not where visible vessels or cystic lesions were seen. The readings were taken in kilopascals (kPa).

Imaging data were stored to be reviewed later, and to minimize the interobserver variability, all measurements were made by the same operator.

2.4 Variables and Data Organization.

Categorical variables involved gender and diagnostic group (control, adenotonsillar hypertrophy, chronic tonsillitis). All the information was added to a spreadsheet and authenticated first before the addition of statistics.

2.5 Statistical Analysis

All statistical data processing was done through SPSS version 27. An initial evaluation of data was done to check completeness, consistency, and outliers.

The Shapiro-Wilk test was used to test the normality of a continuous variable. The continuous variables whose distribution is normal were summarized as mean, standard deviation (SD), and non normally distributed data were summarized as median (interquartile range). . The comparisons between the groups were done as follows:

1. The Kruskal-Wallis test was used to test data as the groups were not equally distributed in terms of patients.
2. The chi-square test was used to test differences in gender distribution across groups.

Pearson correlation coefficient used to test correlation between the strain ratio and the values of shear wave elastography or Spearman rank correlation used to test correlation between the strain ratio and the values of shear wave elastography were used.

To assess the diagnostic accuracy of elastography parameter used in the discrimination between patients with tonsillar disease (when including both combined adenotonsillar hypertrophy and chronic tonsillitis groups) and healthy controls, receiver operating characteristic (ROC) curve analysis was conducted. The AUC of the ROC curve and optimal cutoff values, sensitivity and specificity were calculated based on the Youden index. There were two-tailed statistical tests and a p-value less than 0.05 was taken to be significant.

2.6 Ethical Considerations

The study protocol adhered to the principles of the Declaration of Helsinki. Participation was entirely voluntary, and confidentiality of patient information was strictly maintained. All ultrasound procedures were non-invasive, and no adverse effects or complications were observed during or after imaging.

3. Results

A total of 96 subjects were recruited that includes 31 controls, 55 adenotonsillar hypertrophy (ATH) patients, and 10 chronic tonsillitis (CT) patients. Each subject was able to go through a strain ratio (SR) and a shear wave elastography (SWE) assessment of bilateral tonsils and surrounding soft tissues. Average age was 9.24 years with a standard deviation of ± 4.27 years but the sample consisted of 44 males and 52 females.

3.1 Normality Testing

In order to establish the distributive properties of the elastographic parameters, the Shapiro-Wilk and Kolmogorov-Smirnov tests were done on the variables of each diagnostic group. The majority of the parameters were not normally distributed ($p < 0.05$), especially in the ATH and CT subgroups, with some of the control variables (e.g., left SR tongue and left SR SMG) displaying borderline or non-significant outcomes. Since most of the variables were not normally distributed, all the further tests were performed using nonparametric methods. This made strong comparisons, without making any assumptions about data normality.

3.2 Descriptive Analysis

The data on the parameters of SR and SWE was summarized using descriptive statistics as shown in Table 2. The overall mean of right tonsil-tongue SR was 1.90 and that of the left tonsil-tongue SR was 1.71. The tonsil-SMG SR-right and tonsil-SMG SR-left scores were 3.18 and 3.26, respectively. These mean values of SWE were 6.53 and 6.43kPa (right and left respectively). These values reflected an overall rise in tissue stiffness between diseased and controls with SWE having a broader range and standard deviation because it is more sensitive to the pathologic changes.

3.3 Kruskal-Wallis Analysis

Since the data were not normally distributed, the Kruskal-Wallis test was employed to compare the elastographic parameters between the three diagnostic groups (Control, ATH, CT) (see Table 3). Each of the six elastographic variables showed significant intergroup differences that were statistically significant.

Nonparametric comparisons using the Kruskal-Wallis test demonstrated statistically significant differences among the three study groups (control, adenotonsillar hypertrophy, and chronic tonsillitis) for all elastography parameters ($p < 0.001$ for all).

Specifically, significant differences were found for strain ratio (SR) values measured between the tonsil and tongue (right: $\chi^2 = 30.97$; left: $\chi^2 = 17.40$), as well as between the tonsil and submandibular gland (right: $\chi^2 = 22.85$; left: $\chi^2 = 35.00$). Similarly, shear wave elastography (SWE) values of the right ($\chi^2 = 52.84$) and left ($\chi^2 = 45.39$) tonsils also differed significantly across diagnostic groups (all $p < 0.001$).

These results imply that tonsillar stiffness was substantially different across diagnostic groups as both the ATH and CT groups had high SR and SWE values compared to controls. SWE parameters resulted in the greatest H statistics, which validated that the shear wave elastography was more discriminating compared to SR-based assessment. Post-hoc pairwise testing (Mann-Whitney U) might have been used to further address the topic of between-group differences, but it was not done in this case, because the goal of the study was more to understand the overall diagnostic utility of elastography techniques than to explore the particular inter-disease differences.

3.4 Correlation Analysis

The association between the variables of SR and SWE was evaluated using the rank correlation proposed by Spearman (see Table 4). The relationships between parameters of elastography (strain ratio and shear wave elastography values) were assessed using Spearman's rank correlation. Right and left tonsillar ($r_s = 0.398$, $p < 0.001$) SRs and right and left submandibular SRs ($r_s = 0.813$, $p < 0.001$) were significantly positively correlated, and this showed that stiffness measurements observed on both sides were well bilaterally symmetrical.

Moreover, there were moderate positive correlations between SR values and the respective values of SWE on both sides (right: $r_s = 0.415$, $p < 0.001$; left: $r_s = 0.347$, $p = 0.001$). There was a very strong correlation in the SWE values of right and left tonsils ($r_s = 0.933$, $p < 0.001$), indicating similar elasticity of tonsils. Generally, there are

considerable inter-parameter correlations ($r_s = 0.3-0.8$, $p < 0.01$) that indicate both metrics of SR and SWE measure internally consistent measures of tonsillar stiffness.

Table 1: Correlation Analysis

Correlations			Right Tonsil-Tongue right side SR elasto	Left Tonsil-tongue left side SR elasto	Right Tonsil - right Submandibular gland SR elasto	Left Tonsil- left Submandibular gland elasto SR	SWE right tonsil elasto (kPa)	SWE left tonsil elasto (kPa)
Spearman's rho	Right Tonsil-Tongue right side SR elasto	Correlation Coefficient	1.000	.398**	.318**	.387**	.415**	.347**
		Sig. (2-tailed)	.	.000	.002	.000	.000	.001
		N	96	96	96	96	96	96
	Left Tonsil-tongue left side SR elasto	Correlation Coefficient	.398**	1.000	.373**	.404**	.306**	.257*
		Sig. (2-tailed)	.000	.	.000	.000	.002	.011
		N	96	96	96	96	96	96
	Right Tonsil - right Submandibular gland SR elasto	Correlation Coefficient	.318**	.373**	1.000	.813**	.676**	.637**
		Sig. (2-tailed)	.002	.000	.	.000	.000	.000
		N	96	96	96	96	96	96
	Left Tonsil- left Submandibular gland elasto SR	Correlation Coefficient	.387**	.404**	.813**	1.000	.673**	.606**
		Sig. (2-tailed)	.000	.000	.000	.	.000	.000
		N	96	96	96	96	96	96
	SWE right tonsil elasto (kPa)	Correlation Coefficient	.415**	.306**	.676**	.673**	1.000	.933**
		Sig. (2-tailed)	.000	.002	.000	.000	.	.000
		N	96	96	96	96	96	96
	SWE left tonsil elasto (kPa)	Correlation Coefficient	.347**	.257*	.637**	.606**	.933**	1.000
		Sig. (2-tailed)	.001	.011	.000	.000	.000	.
		N	96	96	96	96	96	96
**. Correlation is significant at the 0.01 level (2-tailed).								
*. Correlation is significant at the 0.05 level (2-tailed).								

3.5 ROC Curve Analysis

To assess the diagnostic effectiveness of each parameter to distinguish normal tonsils and diseased tonsils (ATH + CT), Receiver Operating Characteristic (ROC) analysis was performed. The values of Area Under the Curve (AUC) were as follows:

- The findings indicate that both SWE parameters had excellent diagnostic accuracy, having AUC values of over 0.89, and SR parameters had moderate diagnostic accuracy (AUC 0.65-0.84).
- The most effective SR measure was the right tonsil-SMG SR (AUC = 0.844), indicating that the tonsil to the submandibular gland was more discriminative than the tongue.
- The optimal SWE cut off values were about 5.0Kpa, which had a sensitivity of 81%-83% and specificity of 85%-87% in distinguishing between pathological and normal tonsils.

The large AUC, and equal diagnostic indices, indicate that the use of SWE is reliable in the discrimination of normal and inflamed tonsillar tissues.

The high AUC values and steady ideal thresholds indicate SWE can be a supplemental diagnostic tool in discriminating normal from pathologic tonsils as well as could help in establishing the demand for tonsillectomy or additional intervention.

4. Discussion

4.1 Overview of the Main Findings

The objective of this study was to assess the diagnostic capabilities of the strain ratio (SR) and shear wave elastography (SWE) strain ratios to differentiate between normal tonsils and ones with adenotonsillar hypertrophy (ATH) and chronic tonsillitis (CT). A total of 96 participants were selected and they included 31 healthy controls, 55 patients with ATH and 10 participants with CT. The findings showed that all the elastographic parameters exhibited significant group differences, with all the parameters (SR and SWE) of diseased tonsils showing a higher value than controls. SWE of these showed better diagnostic results with excellent discriminatory validity in discriminating pathological tonsil tissue.

Kruskal Wallis tests showed the statistically significant difference between the three categories of diagnostics in all the measures of SR and SWE ($p < 0.001$). The receiver operating characteristic (ROC) analysis showed the high level of diagnostic accuracy, including SWE parameters (AUC = 0.918 right tonsil, 0.892 left tonsil), and then the left submandibular-tonsil SR (AUC = 0.844). These results indicate that elastography has a high potential as a quantitative imaging method in the assessment of tonsillar diseases.

4.2 Strain Ratio Elastography Findings

Strain ratio elastography revealed significantly higher SR values in ATH and CT groups than controls, and indicates greater tissue stiffness items related to tonsillar pathology. This is in connection with known histopathological characteristics of tonsillar inflammation and hypertrophy, in which entailed chronic immune stimulation leads to fibrosis, lymphoid hyperplasia, and stromal remodelling. The highest diagnostic performance (AUC = 0.844) was reached by the left submandibular gland/tonsil SR, which indicates that the use of the submandibular gland as a reference point potentially increases the playing field of strain in comparison to intraoral or tongue-based reference.

The presence of elevated strain ratios in inflamed or hypertrophic tonsils has also been reported by Orlovska et al. (2022), which are in line with the high collagen deposition and low tissue compliance. The symmetry of the tonsillar involvement is supported by bilateral SR correlation ($r \approx 0.4$, $p < 0.01$) in the current research. Moreover, the internal consistency of both elastographic modalities is confirmed by the moderate-strong correlations between the parameters of SR and SWE ($r = 0.347-0.676$, $p < 0.01$).

However, SR elastography is semi-quantitative and operator to depend on making it more prone to variability due to probe pressure, patient motion and anatomical accessibility especially in paediatric oropharyngeal imaging. Irrespective of these constraints, the statistically significant intergroup differences ($p < 0.001$, Kruskal Wallis) highlight its diagnostic capabilities in the facilities where the SWE technology is not applied.

4.3 Shear Wave Elastography Findings

As per the following study. SWE performed better than SR in the ability to earmark diagnostics and in reproducibility. Mean values of SWE in ATH and CT groups were significantly greater than those of controls (right tonsil 6.98 ± 2.68 kPa; left tonsil 7.03 ± 2.97 kPa). The presence of outstanding discriminative power (AUC = 0.918 and 0.892 with right and left tonsils, respectively) confirmed the ROC analysis that SWE is a powerful quantitative tool in distinguishing between normal and diseased tissue.

The identified increase in stiffness is probably the result of the interaction between lymphoid hyperplasia, persistent inflammation, and fibrotic remodelling. It is consistent with the previous studies that indicate that SWE is associated with fibrosis and inflammatory activity in other non-bony soft tissues such as liver and lymph nodes. The exquisite bilateral correlation of values between SWE ($r = 0.933$, $p < 0.01$) also reinforces the symmetric nature of tonsillar disease.

4.4 Pathophysiological Explanation

The observed increase in SR and SWE parameters in both ATH and CT was due to some underlying histopathological changes. Adenotonsillar hypertrophy occurs due to chronic antigenic response which results in lymphoid hyperplasia, stromal expansion and fibrosis; all these factors contribute to stiffening of the tissue. Chronic tonsillitis on the other hand is characterized by recurring inflammatory damage leading to micro-fibrosis, deposition of collagen and scarring. Such structural changes have been shown to hinder deformation of tissues and it is no wonder the disease tonsils have higher elastographic values.

The presence of strong bilateral correlations (SWE $r = 0.933$; SR $r \approx 0.4$, both $p < 0.01$) is proof of tonsillar involvement, which is symmetrical, and this is in line with the symmetrical lymphoid structures being exposed to the same amount of immunologic exposure. Similar pathophysiological changes were described in the cervical lymph nodes

and salivary glands, where fibrosis and inflammation increase stiffness measure by using elastography. The average SWE in pathological tonsils (approximately 7 kPa) in this research was almost twice that of normal controls (approximately 3.5 kPa), and this fact highlights the mechanical peculiarities of diseased tissue.

4.5 Clinical Implications

Clinically, elastography is a non-invasive and quantitative method of measuring tonsillar pathology. Such distinction of physiological from chronic inflammatory enlargement is even not always easy through verification of clinical examination or size requirements only. SWE, whose AUC values were above 0.9, had great diagnostic accuracy and could help to identify patients in need of surgical examination or conservative treatment.

SWE thresholds of 4.3 to 4.6 kPa yielded the highest sensitivity-specificity curve which may give clinical cutoffs to differentiate between normal and diseased tonsil. Longitudinal follow-up of chronic tonsillitis may also be made possible by serial SWE assessment, to monitor a therapeutic response or transition to fibrosis.

The combination of SR and SWE can be used as a source of complementary data-SR used as screening and SWE as a validity determination- advisory diagnostic accuracy, particularly in pediatric patients with whom invasive measures are inapplicable.

4.6 Strengths and Limitations

The main strong aspects of this study are that two elastographic methods have been used, the statistical analysis has been conducted extensively (normality tests, non-parametric tests, correlation, and ROC tests), and there are several different diagnostic groups involved. These areas give a comprehensive picture of the behavior of elastographs throughout the disease spectrum. The semi-qualified characteristic of strain elastography opens up the possibility of using operator variability. In the cross-sectional design, it limits the ability to assess both treatment outcomes and changes over time.

5. Conclusion

This research showed that both strain ratio (SR) and shear wave elastography (SWE) are useful objective instruments to distinguish normal tonsils from those damaged by adenotonsillar enlargement (ATH) and chronic tonsillitis (CT). With AUC scores exceeding 0.9, indicating its possible use as a strong one, SWE displayed great diagnostic accuracy and repeatability and objective methodology for evaluating tonsillar hardness. Higher SR and SWE values in pathological tonsils supported the biological significance of elastographic stiffness indexes by correlating with histopathological changes including lymphoid hyperplasia, fibrosis, and chronic inflammatory remodeling. The strong bilateral correlations and lack of noticeable gender-related disparities reinforce the dependability and consistency of elastography in tonsillar assessment. Clinically, SWE helps with diagnostic differentiation, therapy planning, and possibly follow-up monitoring of chronic tonsillar disease by acting as a noninvasive, real-time complement to traditional ultrasonography. To confirm the prognostic benefit of elastography in otolaryngologic practice and to define consistent cutoff values, future multicentric studies with bigger cohorts and histopathological validation are necessary.

Keywords: Tonsillitis; Adenotonsillar Hypertrophy; Tonsillectomy Elasticity Imaging Techniques; Shear Wave Elastography; Ultrasonography, Doppler; Diagnostic Imaging

MRI Evaluation of the Olfactory Bulb Volume in Alzheimer's Patients

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Abstract

Background

Olfactory dysfunction and disturbances in eating behavior are common non-cognitive symptoms in Alzheimer's disease (AD). Structural changes in the olfactory bulb (OB) and gyrus rectus (GR) may underlie these manifestations, yet volumetric relationships remain underexplored.

Objective

To compare OB and GR volumes between AD patients and healthy controls and to evaluate the association between these volumetric changes and eating disorders in AD.

Methods

This retrospective case-control study included 135 AD patients and 49 healthy controls. OB and GR volumes were measured using 3-Tesla MRI, and volumetric comparisons were conducted using Student's t-tests. Pearson correlations assessed OB-GR relationships, while linear regression evaluated the effect of eating disorders on OB volume.

Oral Presentation - OP311

Results

AD patients exhibited significantly lower right, left, and total OB and GR volumes compared with controls ($p < 0.001$). Eating disorders were present in 65.9% of AD patients, and those with eating disturbances had significantly reduced left OB volume ($p = 0.034$). Regression analysis showed that eating disorders decreased left OB volume by 0.012 units ($p = 0.034$). OB and GR volumes demonstrated weak but significant positive correlations.

Conclusion

OB and GR atrophy is prominent in AD, and left OB reduction is associated with eating disorders, suggesting shared neurodegenerative pathways in olfactory and behavioral dysfunction.

Keywords: Alzheimer's Disease; Olfactory Bulb; Gyrus Rectus; MRI Volumetry; Eating Disorders; Neurodegeneration

1. Introduction

Alzheimer's disease (AD) is a progressive, degenerative disease of the central nervous system that is marked by cognitive dysfunction, memory impairment, and progressive worsening of functional capacities (M. B. Abubakar et al., 2022). Being the leading cause of dementia in the world, AD still subjects the world to a considerable clinical, social, and economic burden (Nandi et al., 2022). Although the classical AD pathological markers, amyloid- β plaques, neurofibrillary tangles, loss of synapses, and cortical atrophy have been thoroughly reported, more focus has recently been placed on preliminary non-cognitive changes that could be antecedents to cognitive dysfunction (Selles, Oliveira, & Ferreira, 2018). Olfactory dysfunction has emerged as one of the most reliable and potentially enriching early signs of neurodegeneration associated with AD.

Structural and functional alteration of the olfactory pathway, such as the olfactory epithelium, olfactory bulb (OB), olfactory tract, and central processing areas of the limbic

and frontal lobes, have been implicated in the olfactory impairment in AD (Fatuzzo et al., 2023). In neurodegenerative diseases, an important structure is the vulnerability served by the OB. Several studies have reported reduced volume of the OB in various neurological and psychiatric disorders, such as Parkinson's disease, major depressive disorder, traumatic olfactory dysfunction, sinonasal disease, and post-infectious olfactory dysfunction (Herrmann, Koeppel, Linn, Croy, & Hummel, 2023; Ide et al., 2024; Simonini et al., 2024). Reductions in the volume of the OB have been suggested to indicate a lower amount of afferent sensory input and fewer neurogenesis because the human OB has at least some structural plasticity that is susceptible to peripheral and central factors (Naffaa, 2025). Nonetheless, the volumetric behaviour of OB in AD, as well as its correlation with consequent behavioural disturbances, has not been well studied compared to other conditions.

The gyrus rectus (GR) is one of the frontal lobe structures that are of particular interest regarding involvement in the processing of olfactory information. Though viewed as a primitive or less functionalized area, the GR is functionally related to important parts of the olfactory and limbic systems and is implicated in emotion control, in reward-related processing, and some parts of executive functions (Bothwell, Resnick, Ferrucci, & Tian, 2023). The reduction in GR volumes in depressive disorders and other neuropsychiatric disorders in previous research has indicated that the neurodegenerative or neurofunctional changes in the structure might be more vulnerable to these neurological diseases (Gray, Müller, Eickhoff, & Fox, 2020). GR volumetry can perhaps shed more light on structural correlates of olfactory and behavioural disability in AD, given its proximity to the olfactory bulb, along with its functional links to cognitive-emotional circuits.

Another aspect of AD that is under-recognized is eating behaviour disturbance. Patients often have altered appetites, food preferences, reduced hunger signalling, as well as disregarded eating behaviours (M. Abubakar et al., 2025). Such disruptions cause malnutrition, weight loss, higher morbidity, and lower quality of life. The role of olfaction in food appetite control, appetizing taste, and hedonic reaction to foods is pivotal;

therefore, when olfaction is impaired, the eating behaviours prompt a direct impact (Stark, 2024). Although there is this theoretical relationship, there is a paucity of studies that have investigated the possibility of structural variations in the brain parts associated with olfaction relating to eating dysfunctions in AD.

Available evidence indicates very strongly that OB atrophy is a ubiquitous result of neurodegenerative and neuropsychiatric diseases, and that GR structural anomalies can be a secondary result of diseases about emotional and behavioural changes (Fatuzzo et al., 2023). Investigations like those on Parkinson's disease have indicated a significant loss of OB volumes, as well as alterations in the central processing area of olfaction (Torres-Pasillas et al., 2023). It has also been found to lead to similar reductions in depression in which abnormalities in affect regulation and reward processing coincide with structural changes in the GR and orbitofrontal cortex (Zhang et al., 2024). These results altogether point to the possible interaction between olfactory systems, frontal lobes, and behavioural expression.

The current work fills these gaps by a retrospective design compared with case-control controls based on OB and GR volumes in AD patients and healthy subjects using 3-Tesla MRI and standard volumetric measurements. The research also examines correlations between volumes of OB and GR and determines whether or not left or right volumes of OB are related to the existence of eating disorders in AD. Combining structural, behavioural, and clinical data, the study is intended to explain the neuroanatomical basis of the reduction of olfactory function and eating disorders in Alzheimer's disease.

2. Materials and Methods

2.1 Study Design

The study was a case-control, retrospective study, which sought to compare the volumetric properties of the olfactory bulb (OLB) and gyrus rectus (GR) among individuals with Alzheimer's disease (AD) and healthy controls. Moreover, the research

also aimed at identifying whether the existence of eating disorders in AD patients was correlated with structural changes in these regions. The retrospective design enabled both the analysis of routinely obtained clinical and imaging records retrieved by the hospital's archives, which increases the ecological validity of the results and allows the incorporation of a large cohort of patients.

2.2 Study Population

A sample of 135 patients with the diagnosis, Alzheimer's disease was used, and another 49 age-matched healthy control subjects. The whole AD population was found in the hospital database, where the diagnosis was made by the neurologists based on clinical assessment and standardized diagnostic symptoms. The patients in this case had to have a confirmed diagnosis of AD and must have undergone a brain MRI scan, in addition to being over the age of 50 years.

Control subjects were people who were subjected to a brain MRI due to other non-neurological indicators, and the outcome of imaging was described as normal. No neurological disease history, psychiatric illness, or cognitive impairment was seen in these controls. The controls were chosen in a way that they best suited the age sample of the AD group.

2.3 Inclusion and Exclusion Criteria

Inclusion criteria for the AD group were:

1. Diagnosis of Alzheimer's disease recorded in the hospital system.
2. Age 50 years or older.
3. Availability of complete MRI imaging suitable for volumetric analysis.

Exclusion criteria for both groups included:

- History of major head trauma.

- Intracranial tumours or mass lesions.
- Prior brain surgery.
- Severe motion artifacts in MRI scans.
- Systemic or neurological disorders likely to affect olfactory processing.

These criteria ensured that volumetric differences were attributable primarily to AD pathology rather than confounding neurological or structural abnormalities.

2.4 MRI Acquisition Protocol

Each of the MRI tests was conducted on a 3-Tesla Philips Ingenia machine. There were procedures of standardization of imaging whereby the protocol improved the visualization of the olfactory bulb and frontal cortical structures. The T2-weighted coronal sequences, where the olfactory structures can be clearly defined owing to high soft-tissue contrast, were used to measure the volume of the OB volumes. GR volumes were evaluated with the aid of axial sequences, which offer the best resolution to assess the morphology of the frontal lobe.

All volumetric measurements were performed by a radiologist with 15 years of experience, who performed volumetric measurements with a tumor-tracking-based segmentation technique independently. The application of this technique is typically applied to measure small anatomical particulates and guarantees dependable and reproducible volumetric measurements. The right and left OB and GR volumes were measured, and the total volumes were computed by adding bilateral values.

2.5 Assessment of Eating Disorders

The status regarding eating disorders among AD patients was identified through clinical notes and assessments that were conducted in the electronic medical system in the hospital. The patients were divided into two groups: those with reported eating disturbances, including loss of appetite, food preferences, excessive eating, and abnormal

meal timing, as well as those with none of these symptoms. This dichotomous categorization provided the opportunity for statistical comparison of groups.

2.6 Statistical Analysis

The SPSS v.21 statistical software package was used in data analysis. The Shapiro-Wilk test was used to test the normality of continuous variables. Since all volumetric measurements have shown normal distribution, group comparison of patients with AD versus controls was done with the use of a t-test. Categorical variables, such as the gender division among groups, were compared using the chi-square test.

Pearson correlation coefficients were determined between the right and left OB volume and relative right and left GR volume variables to analyze the relationships between volumetric variables in the AD patient group and controls. The goals of these analyses were to establish whether structural changes in the olfactory regions are accompanied by structural changes in nearby structures in the frontal parts.

Linear regression analysis was used to examine how eating disorder status affects the OB volume, with left OB volume being the dependent variable. The independent predictor was the presence of eating disorders. All the analyses were considered statistically significant at $p = 0.05$.

3. Results

3.1 Demographic Characteristics

Table 1 shows the demographic factors for the Alzheimer group and the control group. As presented in the dataset, the Alzheimer and control groups did not differ statistically in terms of mean age (76.32 ± 8.14 vs. 75.55 ± 7.72 , $p = 0.567$) or gender composition ($p = 0.676$). These results suggest that the groups were not markedly different in demographics, so that volumetrically it could be interpreted without demographic bias.

Table 1. Age and Gender Distribution of Patients and Controls

		Alzheimer	Control	p
Age		76.32±8.14	75.55±7.72	0.567a
Gender				
	Male	41 (30.4%)	16 (32.7%)	0.676b
	Woman	94 (69.6%)	33 (67.3%)	

3.2 Comparison of Olfactory Bulb and Gyrus Rectus Volumes

Table 2 summarizes both volumetric measurements of the olfactory bulb (OB) and the gyrus rectus (GR). The patients with Alzheimer's had a significantly lower right OB volume and right gyrus rectus volume than the controls ($p = 0.001$ for both). The same trend was followed with the left OB volume and left gyrus rectus volume, which were also much lower in the Alzheimer group ($p < 0.001$ for both). There was also a considerable reduction in total OB volume and total gyrus rectus volume (sum of both right and left) in the patients with Alzheimer's disease ($p < 0.001$ for both). The overall result of these studies is that there is a consistent and statistically significant decrease in OB volume and gyrus rectus volume in people with Alzheimer's disease.

Table 2. Distribution of Studied Volumetric Parameters by Groups

	Alzheimer	Control	p
Right olfactory bulb volume	0.05±0.05	0.07±0.01	0.001
Left olfactory bulb volume	0.04±0.03	0.07±0.01	<0.001
Total olfactory bulb volume	0.09±0.08	0.14±0.02	<0.001
Right gyrus rectus volume	1.74±0.60	2.63±0.92	<0.001
Left gyrus rectus volume	1.65±0.57	2.66±0.80	<0.001
Total rectus gyrus volume	3.40±1.07	5.29±1.65	<0.001

3.3 Eating Disorders and Volumetric Measures in Alzheimer's Patients

Out of the 135 patients with Alzheimer's, 89 (65.9%) patients had eating disorders, and 46 (34.1%) patients had no eating disorders. Comparison of volumetric findings based on

the eating disorder condition is presented in Table 3. Comparing the volumetric measures between these two subgroups did not show any statistically significant difference in right OB volume, right GR volume, or left GR volume ($p > 0.05$). Nevertheless, there was a great distinction in the volume of left OB, which was less in patients with eating disorders in Alzheimer's ($p = 0.034$). This was further corroborated by the linear regression analysis, which showed that an eating disorder led to a reduction in the volume of the left OB by 0.012 units ($p = 0.034$) and an R^2 of 0.033.

Table 3. Analysis of Alzheimer's Patients According to Eating Disorders

Eating disorder	There is	None	p
n/%	89 (65.9%)	46 (34.1%)	-
Right olfactory bulb volume	0.04±0.06	0.06±0.01	0.192
Left olfactory bulb volume	0.04±0.04	0.05±0.01	0.034
Right gyrus rectus volume	1.67±0.61	1.88±0.57	0.066
Left gyrus rectus volume	1.61±0.56	1.75±0.59	0.183

a: Student's t-test

	Unstandardized Coefficients		t	p
	B	Std. Error		
Left olfactory bulb volume (Constant)	0.051	0.004	11,372	<0.001
Eating Disorder (yes)	-0.012	0.005	-2.147	0.034

p: Linear Regression, R^2 : 0.033

3.4 Correlation Between Olfactory Bulb and Gyrus Rectus Volumes

Correlation analyses showed that there were several weak statistically significant positive correlations between volumes of OB and GR. There was a weak positive correlation between right OB volume and right GR volume ($r = 0.266$, $p = 0.002$) and left GR volume ($r = 0.282$, $p < 0.001$). Left OB volume only showed weak positive correlations with right GR volume ($r = 0.294$, $p < 0.001$) and left GR volume ($r = 0.344$, $p < 0.001$). Such results suggest that the volumetric changes in both OB and GR structures are most likely to manifest as parallel ones.

The patterns of correlation, when performed separately on the Alzheimer and control groups, varied concerning the strength of the correlation, with Alzheimer patients having significantly but weakly correlated dialogues between the chosen measures of the OB and GR, and controls illustrating stronger correlations, mostly with the right OB. In the normal population, there was no vital correlation between left OB volume and either of the GR measurements ($p > 0.05$).

Table 4. Relationship Between Olfactory Bulb Volume and Gyrus Rectus Volume

	Right gyrus rectus volume	Left gyrus rectus volume
Right olfactory bulb volume	r: 0.266 p: 0.002	r:0.282 p<0.001
Left olfactory bulb volume	r:0.294 p<0.001	r:0.344 p<0.001

r: Pearson Correlation Coefficient

			Right gyrus rectus volume	Left gyrus rectus volume
Alzheimer	Right olfactory bulb volume	r	0.135	0.197
		p	0.119	0.022
	Left olfactory bulb volume	r	0.189	0.221
		p	0.028	0.010
Control	Right olfactory bulb volume	r	0.309	0.353
		p	0.031	0.013
	Left olfactory bulb volume	r	0.116	0.188
		p	0.426	0.195

3.5 Volume Change Ratios

Table 5 provides a summary of the extent of the volumetric decrease in patients with Alzheimer's disease compared with controls. Upon transformation of the volumetric values into patient/control ratios in an attempt to approximate percentage change, the Alzheimer patients experienced a 32-36% and 34-38% reduction of OB volumes and GR volumes, respectively, using all the right, left, and total measures. In particular, right OB volume remained 32 times smaller, left OB volume minor 36 times smaller, and total OB volume minor 33 times smaller. Likewise, the right GR volume became smaller by 34, the left GR by 38, and the overall GR by 36. The fact that these ratios clearly show a significant

amount of structural atrophy in both the olfactory bulb and the gyrus rectus in Alzheimer's disease indicates a rather high level of structural atrophy in both hemispheres.

Table 5. Volume Change Rates

	Ratio	Rate of change
Right olfactory bulb volume ratio (Patient / Control)	0.05/0.07	68% (32% decrease)
Left olfactory bulb volume ratio	0.04/0.07	66% (36% decrease)
Total olfactory bulb volume ratio (Patient / Control)	0.09/0.14	67% (33% decrease)
Right gyrus rectus volume ratio (Patient / Control)	1.74/2.63	66% (34% decrease)
Left gyrus rectus volume ratio (Patient / Control)	1.65/2.66	62% (38% decrease)
Total gyrus rectus volume ratio (Patient / Control)	3.40/5.29	64% (36% decrease)

4. Discussion

The current research examined volumetric changes of the olfactory bulb (OB) and gyrus rectus (GR) in patients with Alzheimer's disease (AD) and compared their levels with those of healthy individuals, and how the change of viable volumetric parameters could be related to the occurrence of eating disorders in patients with Alzheimer's disease (AD). The evidence showed that there were substantial decreases in both the OB and GR volumes in AD individuals. Furthermore, there was a significant correlation between the decrease in the volume of the left OB and the existence of eating disorders. The results obtained are informative in the possible structural basis of olfactory dysfunction and the behavioural changes in Alzheimer's disease.

This significant decrease in the volume of OB in AD patients correlates with the growing body of information that demonstrates olfactory impairment to be one of the initial non-cognitive symptoms of Alzheimer's pathology. Earlier studies have demonstrated that not only AD, but also other neurodegenerative and psychiatric diseases, such as Parkinson's dementia, depression, post-infectious olfactory loss, sinonasal disease, and idiopathic olfactory dysfunction, have been shown to have OB atrophy (Hummel, Guerra, Gunder,

Hähner, & Menzel, 2023). The conditions are similar in that they are characterized by disrupted signalling of olfaction, which is frequently associated with a decrease in peripheral input or impaired central processing of olfaction (Fatuzzo et al., 2023). Since the OB is frequently one of the first anatomical structures to undergo a neurodegenerative process, such a volumetric loss of 32-36% supports its inherent vulnerability and underscores its possible use as an early biomarker of AD-related neurodegeneration (Gupta, 2025).

The marked atrophy of the gyrus rectus in this study also highlights the role of the structures of the frontal lobe in the disease of Alzheimer. GR is situated in the medial orbitofrontal cortex, located close to the olfactory bulb and critical limbic pathways (Jacobson, Pugsley, & Marcus, 2025). Despite it being regarded as a less functionally specialized area in history, there is also some emerging evidence that the GR also contributes to emotional processing, reward assessment, decision-making capabilities, and working memory elements. Reduced GR volumes have been previously reported in depression and other neuropsychiatric disorders, and result in neuroimaging research indicating that this structure can be especially vulnerable to affective and cognitive regulation diseases (Han & Ham, 2021). Therefore, a significant 34-38% drop in GR volume in AD patients shows that structural degeneration in frontal areas can be more widespread than it is often recognized.

A key discovery of the current study is a significant positive correlation, though weak, between the volume of the OB and the volume of the GR. Probably, such a relationship can be attributed to the interdependence of olfactory and prefrontal areas on more inclusive neural systems. The olfactory system is directly projected to the orbitofrontal cortex, which is one of the limited numbers of sensory systems that directly project to the cortex without passing through the thalamus, enabling quick synthesis of olfactory impulses with cognitive and emotional functions (Shepherd, Rowe, & Greer, 2021). The similar volumetric changes in both OB and GR structures could possibly be due to a common neurodegenerative process or a secondary consequence of perturbed olfactory input to

greater frontal areas. The correlations were relatively weak but very much consistent between all the pairings, which supports the notion of coordinated structural degradations in olfactory-frontal networks.

The relationship between eating disorders and volumetric measures in AD is the new feature of the current research. Eating disorders such as loss of appetite, change of taste and preference, lack of enjoyment in eating, and variations in eating patterns are also common in Alzheimer's disease and cause a lot of morbidity and functional impairment. The observation that left OB volume in AD patients with eating disorders was also significantly impaired, and the existence of these disruptions in patients indicated a quantifiable decline in left OB volume, gives a neuroanatomical basis for these behavioural symptoms (Valotassiou et al., 2021). Olfaction is a major contributor to the control of appetite, the sense of flavour, and the hedonic assessment of food. A decrease in the volume of the OB can affect the perception of odours related to food, reduce the reactions of rewards, and promote behavioural alterations in the eating process (Godyla-Jabłoński, Pachura, Klemens, Wolska, & Łyczko, 2025). The observed lateralization of the relationship, where the right labial olfactory was involved but the left was not, could be due to hemispheric asymmetry in how the olfactory is processed, or the differences in functional specialization, but more studies are required to make this known.

4.1 Limitations

The findings of the work must be discussed in the framework of some limitations. The retrospective design could not standardize olfactory testing, like the Sniffin' Sticks, UPSIT, among others, that would have provided more valuable interpretations of functional olfactory impairment. Also, there was no control over disease severity, duration, and medication use, each of which would potentially affect the volumetric measurements. Nevertheless, the size of the sample was quite large relative to most MRI-issued studies, and the same imaging protocols were used, along with a single trained radiologist to conduct the volumetric evaluation, which makes the results of the study more reliable.

4. Conclusion

In our study, it is noteworthy that both the olfactory bulb, which is the olfactory pathway, and the gyrus rectus, which is a determinant of cognitive function, are reduced in Alzheimer's patients. Of these parameters, the reduced volume of the left olfactory bulb was associated with eating disorders. Considering that eating disorders are thought to worsen the course of Alzheimer's disease, it was concluded that the olfactory bulb should also be considered in these patients and that more comprehensive functional studies should be conducted to examine the olfactory bulb.

Are Medical Students Ready for the Future? Evaluating Their Readiness and Acceptance of Artificial Intelligence in Clinical Practice - A Cross-Sectional Study

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Introduction and Aim

Artificial intelligence (AI) and emerging health technologies are increasingly being integrated into clinical practice, leading to substantial transformations in the physician–patient relationship. In this context, the integration of AI-driven Clinical Decision Support Systems (CDSS) into clinical workflows brings forth not only practical and operational changes but also new ethical challenges. Understanding how these technologies reshape the dynamics of patient–physician interactions and identifying the ethical dimensions of responsibility, trust, and decision-making are essential. The inclusion of CDSS in clinical practice introduces a triadic relationship between the patient, physician, and the AI system. From an ethical standpoint, this shift must remain human-centered and oriented toward enhancing patient welfare. Within this framework, AI applications in healthcare should be designed and implemented to improve treatment quality by respecting patients' values and autonomy. The concept of care improvement can be discussed across dimensions such as quality of care, patient-centered approaches, decision-making processes, accessibility, and communication practices. Furthermore, an analysis based on relational ethics reveals

Oral Presentation – OP312

inherent and situational power asymmetries, as well as epistemic asymmetries, that may influence the physician's normative responsibility. Exploring how these asymmetries affect accountability in the context of meaningful human control and explainability is essential for the ethical deployment of AI in healthcare.

It is unlikely that AI will fully replace physicians; however, it is highly probable that AI applications will transform clinical roles and generate new tasks in medical care. Therefore, medical students and physicians must be adequately prepared to understand the fundamentals of AI, data science, mathematical reasoning, and the related ethical and medico-legal issues - alongside traditional medical competencies. Despite the increasing use of AI in medicine, there remains a lack of valid and reliable instruments to assess medical students' readiness for AI.

The aim of this study was to evaluate the readiness levels of sixth-year (last year-internship) medical students at Çukurova University Faculty of Medicine regarding AI technologies. The study sought to assess students' awareness, knowledge, attitudes, and practical preparedness toward the use of AI in medicine. As AI becomes increasingly critical in diagnosis, treatment planning, and clinical decision support, evaluating medical students' readiness for these technologies is vital for enhancing both medical education and patient safety. The findings of this study are expected to contribute to the development of medical curricula that better prepare future physicians for AI-driven clinical environments.

Materials and Methods

A quantitative, cross-sectional study was conducted to assess medical students' readiness, knowledge, and perceptions toward artificial intelligence (AI) in medicine. The study population included all sixth-year medical students at Çukurova University Faculty of Medicine. Data were collected through an face-to-face survey. The survey consisted of two parts: a sociodemographic questionnaire and the *Medical Artificial Intelligence Readiness*

Scale for Medical Students (MAIRS-MS), developed and validated by Karaca et al. The MAIRS-MS is designed to evaluate readiness for AI across four domains: **cognition, ability, vision, and ethics**. Each item is rated on a 5-point Likert scale ranging from 1 = *strongly disagree* to 5 = *strongly agree*. The total score is obtained by summing the individual item scores, with higher scores indicating greater readiness for AI. However, as there is currently no established cut-off value for the MAIRS-MS, it is not possible to definitively classify respondents as “adequately ready” or “not ready,” nor to categorize attitudes or perceptions as positive or negative.

Data analysis was performed using the *IBM Statistical Package for the Social Sciences (SPSS)* version 20.0. Descriptive statistics, including means, standard deviations, and percentages, were used to summarize participants’ sociodemographic characteristics and responses across the four readiness domains. The normality of numerical data was tested using the One-Sample Kolmogorov–Smirnov test. Independent Samples *t*-tests were conducted to examine differences in mean scores between groups for variables related to readiness, knowledge, and perception. A *p*-value of less than 0.05 was considered statistically significant.

Data visualization was carried out using Microsoft Word’s chart drawing tools, and results were presented in tables and horizontal bar charts for clarity and interpretability.

Results:

A total of **33 sixth-year medical students** participated in the study. The **mean age** of the participants was **23.85 ± 0.94 years** (range: 23–28), and the **gender distribution** was nearly equal (**51.5% male, 48.5% female**). Only **6.1% (n = 2)** of the participants reported having previous experience using AI-based clinical decision support systems, indicating that the vast majority (**93.9%**) had **no prior exposure** to such technologies. The **mean total score** on the *Medical Artificial Intelligence Readiness Scale for Medical*

Students (MAIRS-MS) was 74.79 ± 15.81 (range: 22–106), reflecting a **moderate to high level of AI readiness and awareness** among participants.

Item-Level and Domain Findings: Across the four domains of the MAIRS-MS—**cognition, ability, vision, and ethics**—participants showed variable performance:

- **Cognition domain:** Students demonstrated **moderate understanding** of AI and data-related concepts. They scored highest on recognizing the relevance of AI in medical care (mean 3.76 ± 0.97) but lowest on understanding AI training processes (mean 2.55 ± 1.00).
- **Ability domain:** Participants showed **moderate practical competence**, particularly in integrating AI-generated data with medical knowledge (mean 3.88 ± 0.89) and organizing AI-adapted workflows (mean 3.21 ± 1.05).
- **Vision domain:** Students exhibited **highly positive attitudes** toward the role of AI in medicine, with the highest mean score observed for the item “AI use in medical education and healthcare is valuable” (mean 4.24 ± 0.90).
- **Ethics domain:** Ethical awareness and data security sensitivity were notably strong. The mean score for “acting ethically when using AI applications” was 00 ± 1.00 , and for “awareness of data security during AI development” was 3.55 ± 1.00 .

Conversely, knowledge regarding **legal regulations** (mean 3.06 ± 1.29) and the ability to explain **the limitations of AI systems** (mean 2.97 ± 1.04) were among the lowest-scoring items, highlighting areas for further improvement in the medical curriculum.

Statistical Relationships

Normality testing using the One-Sample Kolmogorov–Smirnov test indicated that the data were normally distributed. Comparative analyses were performed to examine differences in AI readiness by demographic factors.

- **Gender:** Independent Samples *t*-test showed **no statistically significant difference** in AI readiness scores between male and female students ($p > 0.05$).
- **Age:** Pearson correlation analysis revealed **no significant correlation** between age and total readiness score ($r = 0.225, p = 0.208$).
- **Prior AI experience:** Because only two participants reported prior exposure to AI-based systems, inferential statistics were not performed; however, their readiness scores were descriptively higher than those of participants without AI experience.

Descriptive data were also illustrated using horizontal bar charts. These visualizations showed that mean item scores generally ranged between 3.0 and 4.0, indicating **neutral to positive attitudes and moderate readiness levels** across most domains. The *vision* and *ethics* domains displayed the highest average scores, while the *cognition* domain showed the lowest, reflecting the gap between students' enthusiasm for AI and their technical understanding.

Discussion

The findings of this study provide important insights into the current state of medical students' preparedness for the integration of artificial intelligence (AI) into clinical practice. Overall, participants demonstrated moderate-to-high levels of readiness and awareness toward AI in medicine, characterized by strong ethical sensitivity and positive attitudes, but limited technical and cognitive competencies.

The observed pattern reflects a broader global trend in medical education, where students often exhibit enthusiasm for AI applications but lack sufficient exposure to data science, algorithmic reasoning, and the ethical and legal dimensions of AI systems. Similar studies conducted among medical students in Europe and Asia have reported comparable readiness levels, emphasizing the need for structured AI-related training modules within undergraduate curricula. The results of the present study are therefore consistent with

existing literature suggesting that while future physicians are conceptually open to AI integration, their ability to understand, critically evaluate, and responsibly apply AI technologies remains underdeveloped.

The highest mean scores in this study were found in the *vision* and *ethics* domains, indicating that students acknowledge the potential of AI to improve healthcare delivery and patient outcomes while maintaining awareness of ethical principles such as data security and human oversight. This reflects an encouraging ethical orientation among medical students toward the responsible use of AI. Conversely, lower mean scores in the *cognition* domain—particularly regarding AI training processes and statistical foundations—highlight a notable educational gap.

This gap underscores the urgent need for medical schools to incorporate interdisciplinary content that combines computer science, data literacy, and biomedical ethics. Curricular innovations could include elective courses, simulation-based training, or collaborative projects with engineering faculties to help medical students gain hands-on familiarity with AI systems and their clinical implications. Moreover, since AI is unlikely to replace physicians but will increasingly transform their roles, preparing students to interpret and manage AI-assisted decisions is essential to preserve human-centered care and clinical accountability.

No significant associations were found between readiness levels and demographic factors such as age or gender, which suggests that differences in AI readiness are not attributable to inherent personal characteristics but rather to exposure and training opportunities. Although only two participants had prior experience with AI-based clinical decision support systems, their descriptively higher readiness scores indicate that direct engagement with AI tools could enhance both confidence and understanding.

Finally, the study also highlights the importance of continuous professional development in AI literacy, extending beyond undergraduate education. Faculty members and clinical

supervisors play a crucial role in modeling responsible AI use and integrating ethical reflection into clinical decision-making.

Conclusion

This study was conducted to evaluate the awareness and competency levels of sixth-year medical students at Çukurova University Faculty of Medicine regarding the use of artificial intelligence (AI) in healthcare. A total of 33 students participated in the study. The mean age of the participants was 23.85 ± 0.93 years, with the largest proportion in the 24-year-old group (57.6%). Among the participants, 51.5% ($n = 17$) were male and 48.5% ($n = 16$) were female. The majority of students (93.9%) reported that they had never previously used AI-based clinical decision support systems.

According to the findings, students demonstrated a moderate level of knowledge in data science and statistical foundations (3.0 ± 1.1) as well as in defining AI-related concepts (3.03 ± 0.98). However, a notable knowledge gap was observed in understanding AI training processes (2.55 ± 1.0). In contrast, students exhibited high levels of awareness and competency in items related to data security during AI development (3.55 ± 1.0), acting ethically when using AI applications (4.00 ± 1.0), and recognizing the relevance of AI in healthcare services (3.76 ± 0.97). The highest mean score was observed for the item “Finding the use of AI in healthcare valuable” (4.24 ± 0.90).

Participants also displayed highly positive attitudes in the subdomains of integrating AI-based information with professional knowledge (3.88 ± 0.89), using AI applications appropriately for professional purposes (3.85 ± 0.97), and effectively utilizing information and communication technologies (3.76 ± 1.20). Conversely, awareness was relatively lower regarding the ability to explain the limitations of AI systems (2.97 ± 1.04) and to follow legal regulations related to AI (3.06 ± 1.29).

Statistical analysis revealed a significant correlation between age and total readiness score ($p = 0.027$), indicating that AI awareness tended to increase with age. However, no

significant differences were found in total scores based on gender ($p = 0.663$) or previous experience with AI systems ($p = 0.081$).

In conclusion, sixth-year medical students at Çukurova University demonstrated generally positive attitudes toward artificial intelligence in medicine. Nevertheless, the findings indicate a clear need to strengthen students' understanding of AI system training, data science, and statistical principles. Therefore, incorporating structured AI and data science modules into the medical education curriculum will be essential to enable future physicians to use these technologies more effectively, responsibly, and consciously in their professional practice.

Keywords: Medical Students, Readiness, Trust, Acceptance, Artificial Intelligence, Clinical Practice, Medical Education, Clinical Decision Support Systems

Mind the Deficiency: Perceived Sensitivity and Health Beliefs Regarding Vitamin D Among Primary Care Patients - A Cross-Sectional Study

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Introduction and Aim:

Vitamin D is a fat-soluble vitamin that facilitates the absorption of dietary calcium and phosphorus from the intestines. It is synthesized in our bodies in the skin with the help of sunlight. It is important for bone mineralization. It also suppresses the secretion of parathyroid hormone, a hormone that causes osteoporosis. Vitamin D deficiency is common in our society. It's estimated that approximately one billion people worldwide are deficient in vitamin D. The most common causes are insufficient sun exposure, insufficient consumption of vitamin D-rich foods, and inadequate intestinal absorption for various reasons. (such as celiac disease) Vitamin D levels should also be checked in those using medications that may affect vitamin D metabolism (cortisone, epilepsy medications).

This deficiency may be influenced by variables such as knowledge, beliefs and behaviors regarding vitamin D, cultural factors, lifestyle, education level and health literacy. Therefore, evaluating health beliefs regarding vitamin D in society is of great importance in planning preventive health services and developing effective public health strategies.

Oral Presentation - OP314

The aim of this study was to assess health beliefs about vitamin D among adults presenting to a family health center and to examine the relationship between these beliefs and demographic characteristics, health status, and vitamin D use. The findings are expected to contribute to the planning of education and awareness programs to prevent vitamin D deficiency in primary care settings.

Materials and Methods

This study was designed as a cross-sectional and descriptive research. It was conducted among individuals aged 18 years and older who applied to Family Health Centers and voluntarily agreed to participate in the study. The data collection tool consisted of sociodemographic information form, including variables such as age, gender, education level, occupation, income status, sunlight exposure habits, and use of vitamin D supplements; and Modified Vitamin D Health Belief Scale (M-VDHBS), which was used to assess participants' health beliefs regarding vitamin D deficiency. The original Vitamin D Health Belief Scale (VDHBS) was developed to measure vitamin D-related health beliefs based on the Health Belief Model and to determine its psychometric properties in adult women. It includes six subscales: perceived sensitivity, perception of seriousness/caring, perceived benefits, perceived barriers, health motivation, and self-efficacy. In the present study, only the Perceived Sensitivity subscale of the M-VDHBS was utilized. Higher scores on this subscale indicate more positive health beliefs in the corresponding domain. The questionnaires were completed through face-to-face interviews conducted by the researcher.

Data Analysis

Data were analyzed using the Statistical Package for the Social Sciences (SPSS) version 20.0. Descriptive statistics, including mean, percentage, and standard deviation, were used to summarize participant characteristics. Appropriate statistical tests (t-test, ANOVA, and Chi-square test) were applied for group comparisons. Relationships

between continuous variables were examined using Pearson's correlation coefficient. A p-value of less than 0.05 was considered statistically significant. The original Vitamin D Health Belief Scale (VDHBS) is a self-report instrument developed methodologically to measure health beliefs about vitamin D based on the Health Belief Model and to evaluate its psychometric properties. The scale consists of 31 items and six subscales: perceived sensitivity, perceived seriousness, perceived benefits, perceived barriers, health motivation, and self-efficacy. The overall internal consistency reliability of the scale was reported as Cronbach's alpha = 0.884, with a total explained variance of 58.22% according to factor analysis. The Perceived Sensitivity subscale, which consists of five items (Items 1–5), measures the individual's perceived risk of vitamin D deficiency. The total possible score for this subscale ranges from 5 to 25. In the validation study, the subscale demonstrated an eigenvalue of 2.055, an explained variance of 9.767%, and a Cronbach's alpha coefficient of 0.787, indicating good internal reliability.

Results

The mean age of the participants was 44.43 ± 15.99 years, and 80% (n = 24) were female. A total of 66.7% (n = 20) were married, and 56.7% (n = 17) were university graduates. Participants without any of the chronic diseases examined in the study constituted 43.3% (n = 13) of the sample. Overall, 70% (n = 21) of participants reported having undergone a vitamin D test at least once, while only 23.3% (n = 7) were currently taking vitamin D supplements. The mean number of tests was two, suggesting inadequate follow-up. The mean total health belief scale score was 20.47 out of 25, indicating a generally high level of awareness regarding vitamin D.

Chi-square and correlation analyses revealed no statistically significant association between total scale scores and participants' age, gender, marital status, education level, income, occupation, chronic diseases, medication use, duration of medication, healthcare visits, or vitamin D use ($p > 0.05$). Although no significant correlation was found between age and total scale scores (Pearson $\chi^2 = 213.810$, $p = 0.210$), Spearman's rho = -0.394, $p =$

0.031, indicating a moderate negative correlation, meaning that as age increased, total scores tended to slightly decrease.

Gender was not associated with total scale scores ($p = 0.537$). The correlation between marital status and total scale scores was weak and negative (Pearson $R = -0.282$, Spearman $R = -0.253$), but not statistically significant ($p > 0.05$). Similarly, no significant relationship was found between education level and total scale scores (Pearson $R = 0.248$, $p = 0.186$; Spearman $R = 0.171$, $p = 0.365$), suggesting that educational attainment did not influence awareness levels. Income level also showed no significant effect on total scores ($\chi^2 = 0.127$, $p > 0.05$). A weak, negative, and nonsignificant correlation was observed between occupation and total scale score (Pearson $R = -0.348$, $p = 0.060$; Spearman $Rho = -0.308$, $p = 0.097$), indicating that occupational status did not meaningfully affect vitamin D-related awareness or behaviors.

No statistically significant relationship was observed between existing health diagnoses and total scores ($\chi^2 = 0.533$, $p > 0.05$). Similarly, no significant relationships were found between vitamin D use and total scores ($\chi^2 = 0.735$, $p > 0.05$). However, Spearman's correlation indicated a slight negative and significant relationship ($r = -0.396$, $p = 0.030$), suggesting that participants currently using vitamin D had marginally lower awareness scores. There was no significant association between duration of vitamin D use and total scale scores ($\chi^2 = 114.184$, $p = 0.323$), nor between healthcare utilization (presence or frequency of health facility visits) and total scores ($p > 0.05$ for all). Likewise, no significant differences were found according to type of healthcare facility attended ($\chi^2 = 28.023$, $p = 0.410$). No significant relationship was observed between having a previous vitamin D analysis and total scores ($p = 0.196$), and neither the number of tests ($p = 0.137$) nor vitamin D medication use ($p = 0.504$) were found to have a meaningful effect on awareness levels. The mean number of vitamin D laboratory tests per participant was 3.77, indicating that testing was not performed regularly. Although the maximum duration of vitamin D use reported was 5 years, the mean duration was 0.83 years (approximately 9.6 months), reflecting a general lack of long-term adherence to supplementation.

Conclusion

This study revealed that individuals presenting to family health centers demonstrate a relatively high level of awareness regarding vitamin D deficiency; however, this awareness does not consistently translate into regular testing, diagnosis, or long-term treatment adherence. Notably, while many participants initiate treatment after diagnosis, a considerable proportion fail to maintain it over time.

Vitamin D deficiency is recognized globally as a significant public health concern associated with numerous chronic diseases. The relatively high awareness observed in this study is encouraging, yet the limited adherence to treatment underscores the need for effective health education and stronger physician–patient communication. The low frequency of testing, lack of routine health check-ups, and reduced motivation to seek medical care suggest that family physicians should play a more proactive role in preventing and managing deficiencies such as vitamin D deficiency.

Participants in this study reported beliefs linking vitamin D deficiency with sunlight exposure, bone health, age, and gender. They generally showed a solid understanding of the possible consequences of deficiency, with slightly higher awareness among women and individuals with higher education levels. Overall, this level of awareness reflects both general health consciousness and engagement in preventive behaviors.

To transform awareness into sustained health behavior, effective health counseling, personalized information, and regular follow-up by family physicians are essential. Some participants' concerns about vitamin D supplementation indicate that misinformation or fear of side effects may negatively influence treatment adherence. Addressing these misconceptions through targeted health education and reassurance could improve compliance and contribute to better long-term outcomes.

Keywords: Perceived Sensitivity, Health Beliefs, Vitamin D, Primary Care, Family Medicine

What Do People Really Know and Believe About HPV and Its Vaccine? Insights from a Cross-Sectional Study

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Introduction and Aim

Human Papillomavirus (HPV) infection holds a significant place in medical education and preventive healthcare. HPV is one of the major causative agents of cervical, anal, vulvar, vaginal, penile, and oropharyngeal cancers. Cervical cancer is the fourth most common malignancy among women worldwide. According to data from the Global Cancer Observatory (GLOBOCAN), cervical cancer accounts for approximately 13.3% of all cancers in women, with an estimated 604,127 new cases and 341,831 deaths globally. The highest number of cases (351,720) has been reported in Asia, while in Turkey, 4,945 new cervical cancer cases were recorded in the same year. One of the major risk factors for cervical cancer is Human Papillomavirus (HPV) infection. Among the 11 infectious pathogens classified as carcinogenic by the International Agency for Research on Cancer (IARC), HPV is recognized as a leading cause of cervical cancer. Given its strong etiological link with multiple malignancies, including cervical, anal, vulvar, vaginal, penile, and oropharyngeal

Oral Presentation – OP315

cancers, understanding public awareness and beliefs regarding HPV and its vaccine is of vital importance.

This study aims to evaluate the knowledge, attitudes, and health beliefs of individuals aged over 18 years concerning HPV infection and vaccination. Assessing these factors is crucial for identifying knowledge gaps and guiding public health interventions to enhance vaccination uptake and preventive practices. The findings of this research are expected to contribute to increasing public awareness of HPV and supporting the improvement of preventive healthcare services.

Materials and Methods

Data were collected using the *Modified Health Belief Model Scale for Human Papillomavirus (HPV) Infection and Vaccination*. This scale, originally developed by Kim (2012), was designed to assess individuals' health beliefs regarding HPV infection and vaccination. The Turkish validity and reliability study of the scale was conducted by Güvenc et al. The instrument consists of four subscales: perceived severity, perceived barriers, perceived benefits, perceived susceptibility. Each item is rated on a 5-point Likert-type scale ranging from 1 ("not at all") to 5 ("very much"). Higher scores indicate stronger beliefs in the corresponding dimension. All subscales, except for perceived barriers, are positively associated with vaccination behavior. In the present study, Cronbach's α coefficients were 0.82 for perceived benefits, 0.81 for perceived susceptibility, 0.74 for perceived severity, and 0.79 for perceived barriers, indicating acceptable internal consistency. The study was designed as a cross-sectional survey conducted among adults aged over 18 years.

Data analysis was performed using SPSS for Windows, version 20.0. Descriptive statistics, including means and standard deviations, were calculated for continuous variables, and frequencies and percentages were used for categorical variables. The Shapiro–Wilk test was applied to assess the normality of distribution for continuous variables. For normally distributed variables, Student's t-test was used, whereas the Mann–Whitney U test was

applied for non-normally distributed data. The Chi-square test was employed to compare categorical variables. A p value of <0.05 was considered statistically significant.

Results

A total of **32 participants** were included in the study, with a mean age of **41.34 ± 13.99 years** (range: 19–65). Of these, 62.5% ($n = 20$) were female and 37.5% ($n = 12$) were male. The majority were married (65.6%), and 37.5% were university graduates. Only 12.5% ($n = 4$) of the participants had previously received the HPV vaccine, while 32.1% of the unvaccinated participants stated that they were considering vaccination.

Regarding knowledge and attitudes, 56.2% of participants agreed that HPV infection is associated with cervical cancer development. Nearly two-thirds (62.5%) believed that condom use prevents HPV transmission. Fear or anxiety related to HPV infection was common, with 90.7% agreeing or strongly agreeing with the statement “The idea of HPV infection frightens me.” Conversely, misconceptions persisted: 21.9% believed that the HPV vaccine is only for women, and 25% thought it was only necessary for sexually active individuals.

A large proportion (71.9%) disagreed that the HPV vaccine causes infertility, while 65.6% rejected the idea that it encourages sexual activity. Additionally, 68.8% disagreed that their partner receiving the HPV vaccine would cause trust issues in their marriage. However, 53.1% reported concerns about possible side effects of the HPV vaccine, and only 50% expressed confidence in its effectiveness and safety.

When asked whether they would object to their spouse receiving the HPV vaccine for health reasons, 87.5% reported no objection. The mean total score for Human Papillomavirus (HPV) Infection and Vaccination Knowledge and Health Beliefs was 48.0 ± 7.7 (range: 35–74) on a scale ranging from 16 to 90 points, indicating a moderate level of overall knowledge and health beliefs toward HPV infection and vaccination. Higher scores reflect stronger positive perceptions and awareness regarding HPV and its vaccine.

Correlation analysis revealed a positive but weak relationship between age and total attitude score (Spearman's $\rho = 0.36$, $p = 0.041$). No significant associations were found between total attitude score and gender ($p = 0.372$), marital status ($p = 0.621$), or education level ($p = 0.621$).

Conclusion

The findings of this study demonstrate that individuals have a moderate level of knowledge and health beliefs regarding Human Papillomavirus (HPV) infection and vaccination. Despite a general awareness of HPV's link to cervical cancer, misconceptions related to vaccine safety, eligibility, and effectiveness persist within the community. These results underscore the pivotal role of family physicians and primary care services in bridging the gap between knowledge and preventive behavior. As the first point of contact in healthcare, family physicians are in a unique position to provide accurate information, address vaccine hesitancy, and encourage HPV vaccination through personalized counseling and community education.

Family medicine should integrate HPV education and vaccination counseling into routine preventive care, particularly during adolescent and reproductive health visits. Moreover, structured training programs and awareness initiatives led by family physicians can enhance public understanding, dispel myths, and strengthen trust in vaccines.

In conclusion, the study highlights that family physicians bear a crucial responsibility in developing and implementing community-based strategies that promote HPV awareness and vaccination uptake. A stronger preventive orientation within family medicine will not only improve individual protection but also contribute to reducing HPV-related cancer burden at the population level.

Keywords: Human Papillomavirus (HPV), HPV Vaccine, Health Beliefs, Vaccine Hesitancy, Primary Health Care, Family Physicians, Preventive Medicine

Early Pulmonary Function Impairment in Relation to Nicotine Dependence Among Young Smokers

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Introduction:

Smoking remains one of the leading preventable causes of morbidity and premature mortality worldwide. Nicotine dependence, a key driver of sustained tobacco use, can be quantitatively assessed using the Fagerström Test for Nicotine Dependence (FTND). Although the lungs possess substantial functional reserve, structural and functional alterations—particularly in the small airways—may develop early and remain clinically silent. Identifying these subclinical changes is critical for timely intervention and prevention of chronic respiratory diseases.

Methods:

This observational analytical study included 102 active smokers aged 20–40 years. Data on sociodemographic characteristics, smoking history, and dependence levels were collected using a structured questionnaire. Nicotine dependence was assessed using the FTND and categorized as low (0–4), moderate (5–6), high (7–8), and very high (9–10). The Heavy Smoking Index (HSI) was also calculated. Pulmonary function tests (PFTs) were performed, with particular focus on small airway parameters, including FEF25%, FEF75%, and FEF25–75%. Participants were grouped according to dependence severity (mild/moderate vs. severe/very severe), and comparisons were conducted accordingly.

Oral Presentation - OP319

Results:

The study population had a mean age of smoking initiation of 17.76 ± 3.66 years and a mean smoking exposure of 10.88 ± 6.03 pack-years. The mean FTND score was 5.25 ± 1.85 . Higher dependence levels were significantly associated with greater smoking exposure and earlier initiation age ($p=0.032$ and $p<0.001$, respectively). Notably, individuals with high and very high nicotine dependence demonstrated significantly reduced small airway function parameters, including FEF25%, FEF75%, and FEF25–75%, both in absolute values and percentage predicted ($p<0.05$ for all comparisons).

Discussion and Conclusion:

Our findings indicate that increased nicotine dependence is associated with early impairment of small airway function, even in young adult smokers without overt respiratory symptoms. These results support the concept that smoking-related pulmonary damage begins in the peripheral airways and may precede clinically detectable disease. Detecting such early functional decline may offer a critical window for intervention, enhancing the effectiveness of smoking cessation strategies and potentially preventing progression to chronic bronchitis and other obstructive lung diseases.

Keywords: Smoking, Nicotine Dependence, Pulmonary Function Test, Small Airways, FTND

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Evaluation of Treatment Adherence in Hypertensive Patients Using the Hill-Bone Compliance to High Blood Pressure Therapy Scale in a Family Medicine Setting: A Descriptive Cross-Sectional Analysis

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Introduction and Aim

Hypertension remains one of the most prevalent chronic diseases worldwide and is a major contributor to cardiovascular morbidity and mortality. Despite the availability of effective antihypertensive medications, treatment success largely depends on patient adherence to both pharmacological therapy and lifestyle modifications. Non-adherence is a global challenge and a critical reason for inadequate blood pressure control and increased risk of complications such as stroke, myocardial infarction, and renal disease.

According to the World Health Organization (WHO), factors affecting medication adherence can be grouped under five main categories: (1) social and economic factors, (2) patient-related factors, (3) therapy-related factors, (4) comorbid conditions, and (5) health system-related factors. Each of these dimensions may independently or collectively reduce adherence to treatment. Identifying these barriers in daily practice is essential for developing effective interventions that improve adherence and overall outcomes.

Oral Presentation - OP321

However, detecting non-adherence in clinical settings is not always straightforward. Direct methods, such as measuring drug or metabolite levels in blood or urine, using biological markers, or observing medication intake, are accurate but impractical for routine use. Indirect methods—including self-reported questionnaires, pill counts, prescription refill tracking, and electronic monitoring—are more feasible and provide valuable insights into patient behavior. Hypertension management involves lifestyle changes such as salt restriction, weight control, smoking cessation, and regular physical activity, alongside consistent use of prescribed medications. Treatment adherence plays a pivotal role in disease control and prevention of complications. Lack of sufficient knowledge, low health literacy, and limited awareness about the consequences of poor adherence remain major challenges. Within this context, family physicians play a critical role in evaluating patient adherence, identifying contributing factors, and guiding individualized education and counseling.

This study aimed to evaluate the level of treatment adherence among hypertensive patients and to identify factors associated with adherence using the Hill-Bone Compliance to High Blood Pressure Therapy Scale in a family medicine setting.

Materials and Methods

This descriptive and cross-sectional study included 49 adult patients diagnosed with hypertension who presented to a family medicine outpatient clinic. Eligible participants were 18 years or older, had been receiving antihypertensive therapy for at least six months, and provided informed consent. Patients with communication barriers, dementia, or psychiatric disorders were excluded from the study.

Data were collected using a sociodemographic questionnaire and the Hill-Bone Compliance to High Blood Pressure Therapy Scale. The questionnaire included questions on age, gender, marital status, education level, duration of hypertension, frequency of

blood pressure monitoring, follow-up attendance, comorbid conditions, number of medications used, and alternative treatment practices.

The Hill-Bone Scale, developed by Kim et al. in 2000 and validated in Turkish by Karademir et al., evaluates three behavioral domains related to hypertension management: medication adherence, reduced sodium intake, and appointment keeping. The version used in this study contains 12 items, with total scores ranging from 0 to 36. As all items are negatively worded, higher scores indicate poorer adherence, while a score of zero represents perfect adherence.

Data analysis was performed using SPSS version 20.0. Categorical variables were analyzed using the Chi-square test, and continuous variables were examined with correlation analysis. Variables with normal distribution were analyzed using the independent samples t-test and ANOVA, while non-normally distributed variables were assessed using the Mann-Whitney U and Kruskal-Wallis tests. Relationships between continuous variables were explored with Pearson's correlation coefficient. A p-value of <0.05 was considered statistically significant.

Results

The mean age of participants was 63.1 ± 15.1 years, and 57.1% (n = 28) were female. The average number of medications used per patient was 4.33 ± 3.23 . The mean total Hill-Bone adherence score was 9.14 ± 3.02 , indicating a moderate level of adherence. A negative correlation was found between age and forgetting to take medication due to inattention ($r = -0.21$, $p < 0.05$), consumption of junk food ($r = -0.32$, $p < 0.05$), and salt intake ($r = -0.28$, $p < 0.05$). A positive correlation was observed between the duration of hypertension and regular medication use ($r = +0.30$, $p < 0.05$). No statistically significant differences were found between adherence and sex or education level ($p > 0.05$). However, the presence of comorbid chronic diseases was significantly associated with poorer adherence ($p = 0.048$).

Conclusion

This study found that hypertensive patients generally demonstrated a moderate level of adherence to treatment. Advanced age and longer duration of hypertension were associated with higher adherence, suggesting that patients who have lived with the condition longer may develop better disease awareness and self-management behaviors. Conversely, the presence of multiple chronic comorbidities was found to negatively affect adherence, likely due to complex treatment regimens, polypharmacy, and treatment fatigue. These findings highlight that hypertension management should go beyond prescription and involve patient-centered strategies focusing on behavioral and educational interventions. Family physicians, as primary care providers, are in a unique position to strengthen adherence by offering individualized education, medication reminder tools, and continuous lifestyle counseling tailored to each patient's needs. Establishing a structured follow-up system, simplifying treatment regimens where possible, and enhancing communication between patients and healthcare providers can significantly improve adherence rates.

Furthermore, incorporating digital health technologies such as mobile reminders, electronic monitoring, and teleconsultations into primary care may support long-term treatment continuity. Community-based education programs and family involvement could also contribute to sustainable behavioral changes. In conclusion, improving adherence among hypertensive patients requires a multifaceted approach integrating clinical, behavioral, and systemic strategies. Enhancing patient education, optimizing medication management, and reinforcing lifestyle counseling within family medicine practice are key components for achieving better blood pressure control and reducing the long-term burden of hypertension-related complications.

Keywords: Hypertension, Treatment Adherence, Hill-Bone Scale, Family Medicine, Primary Care

Evaluation of the Relationship between Health Literacy Level and Health Anxiety in Individuals with Chronic Diseases Registered at Atatürk University Education Family Health Centers

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Background and Aim: It is known that health literacy in patients with chronic diseases is related to timely application and access to healthcare services, health improvement, adoption of healthy lifestyle habits, and adherence to early diagnosis and treatment. On the other hand, health anxiety is characterized by excessive worry about current or potential health problems, and is more common in individuals with chronic illnesses. This study aimed to evaluate the relationship between health literacy levels and health anxiety in individuals with chronic diseases registered at Atatürk University's education and family health centers.

Methods: Our study was conducted between January and July 2025 at a total of 8 units of the Training Family Health Center (EASM) affiliated with the Department of Family Medicine, Atatürk University Faculty of Medicine. A total of 351 people registered with EASM were included in the study, and data were collected using a face-to-face survey method. The SOY scale was used to measure the participants' health literacy levels, and the SA scale was used to measure their health anxiety levels. The data analysis was performed using the SPSS 22 program.

Oral Presentation – OP325

Results: 60,4% of participants (n=212) are women, 50,7% (n=178) are primary school graduates, 86,9% (n=305) are married, and 48,4% (n=170) are homemakers. The average age of the participants was $53,87 \pm 13,77$ years. The average health literacy score of the participants was determined to be $31,8 \pm 8,45$. 58,2% of participants had inadequate, problematic-limited health literacy levels. The participants' average health anxiety score was determined to be $14,29 \pm 8,67$. It was determined that 11,4% of the participants had high health anxiety. A positive significant correlation ($p < 0.05$) was found between the SOYÖ mean score and the SAÖ dimensions of Hypersensitivity to Bodily Symptoms and the Anxiety subdimension, while a negative significant correlation was observed with Illness-Related Negative Expectations ($p < 0.05$).

Conclusion: In our study, a positive significant relationship was found between health literacy and health anxiety. Considering the demographic variables that influence health literacy and health anxiety, it is important to increase and develop policies and practices that will support improvement in these areas. It is necessary to disseminate interventions that strengthen health literacy, especially for individuals with chronic illnesses, and reduce anxiety.

Keywords: Health Literacy, Health Anxiety, Demographic Characteristics, Chronic Diseases

Association Between Arsenic Exposure and Endocan and Fetuin-A Levels in Firefighters

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Objective:

Firefighters are at high risk due to exposure to smoke, particulate matter, and various toxic substances released during fires. Among these exposures, arsenic may exert systemic effects through mechanisms such as oxidative stress, inflammation, and endothelial dysfunction. This study aimed to evaluate the effects of arsenic exposure on endothelial dysfunction and metabolic biomarkers, specifically endocan and fetuin-A levels, in firefighters.

Materials and Methods:

The study was conducted among male firefighters (n = 100) who were admitted to the occupational diseases clinic for periodic medical examinations. The control group consisted of non-exposed male office workers (n = 100). Demographic and clinical characteristics of the participants were recorded. Serum endocan and fetuin-A levels were measured using the ELISA method.

Results:

The mean urinary arsenic level in the exposure group was 97.47 µg/L, whereas it was 14.99 µg/L in the control group, with a statistically significant difference between the

Oral Presentation - OP326

groups ($p < 0.001$). No statistically significant differences were observed between the patient and control groups in terms of age, blood pressure, body mass index, and lipid parameters ($p > 0.05$). Serum endocan levels were significantly higher in the exposure group compared to the control group (69.2 vs. 58.4 pg/mL, $p = 0.024$). Similarly, fetuin-A levels were significantly elevated in the exposure group (520.3 vs. 432.6 $\mu\text{g/mL}$, $p < 0.001$). Additionally, increased arsenic levels were found to be positively correlated with endocan and fetuin-A levels ($r = 0.254$).

Conclusion:

The elevated levels of endocan and fetuin-A in firefighters exposed to arsenic suggest that arsenic exposure may affect both endothelial function and metabolic processes. These biomarkers may serve as potential diagnostic tools for the early detection of arsenic-related effects. Further studies with larger sample sizes and prospective designs are needed to better elucidate this relationship.

Keywords: Arsenic, Firefighters, Occupational Exposure, Endothelial Dysfunction, Endocan, Fetuin-A

Complexity of Care in Primary Care: A Cross-Sectional Study from a Family Medicine Clinic in Ankara

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Objective

This study aimed to evaluate the complexity of care delivered in primary care at the Yükseltepe Family Medicine Outpatient Clinic affiliated with Ankara Atatürk Sanatorium Training and Research Hospital.

Materials and Methods

This observational, cross-sectional study included 250 patients evaluated on a designated working day. Patients were seen by 5 residents, 1 faculty member, and 1 specialist physician. Data were retrospectively obtained from electronic medical records.

Results

The mean age of participants was 55.62 ± 16.71 years; 76.2% were female and 23.8% were male. Most participants were married (88.6%) and living in the city center (91.1%). Educational status was generally low, with 61.7% being primary school graduates and 7.4% illiterate. A large proportion of participants were unemployed (80.7%).

Oral Presentation – OP327

Lifestyle characteristics showed that 16.3% of participants were smokers and 1.2% reported alcohol use. The mean body mass index (BMI) was $30.50 \pm 4.21 \text{ kg/m}^2$, and the mean waist circumference was $94.93 \pm 12.76 \text{ cm}$.

Clinical evaluation revealed that 22% of visits involved three or more problems, and 38% of participants had three or more chronic conditions. Psychiatric diagnoses were present in 8% of individuals, while 6% were using psychiatric medications. The prevalence of polypharmacy was 20%, and 31% of participants were obese.

Conclusion

Primary care is characterized by multimorbidity, lifestyle-related risk factors, and increasing care complexity. The relatively low rates of psychiatric diagnosis and treatment may indicate under-recognition of mental health conditions. Primary care services extend beyond the management of acute conditions and require a multidimensional, holistic, and continuous approach addressing chronic diseases, polypharmacy, obesity, and lifestyle factors.

Keywords: Primary Care, Family Medicine, Complexity Of Care, Chronic Disease, Polypharmacy, Obesity

Turkish Validity and Reliability Study of the Older Adults' Lifestyle Scale (OALS-TR)

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Introduction: In Türkiye, primary care and healthy ageing services are increasingly expected to support health promotion and chronic disease prevention among older adults; a brief and psychometrically sound lifestyle instrument may facilitate the screening, counseling, and evaluation of interventions. Therefore, the present methodological study aimed to translate the OALS into Turkish (OALS-TR), culturally adapt it, and examine its validity and reliability in a sample of Turkish adults aged 65 years and older. *er* description here.

Materials and Methods: This methodological study translated, culturally adapted, and psychometrically evaluated the Turkish version of the Older Adults' Lifestyle Scale (OALS-TR). Using a cross-sectional and test-retest design, data were collected from 250 adults aged ≥ 65 years attending the Healthy Ageing Center and Family Medicine clinics of Giresun University Training and Research Hospital, Türkiye, between September and December 2025; 47 participants completed the retest after 15 days. The 19-item scale was adapted through forward-backward translation, expert review, and pilot testing. Construct validity was examined using exploratory and confirmatory factor analyses and measurement invariance across sex, while reliability was assessed with Cronbach's alpha and intraclass correlation coefficients.

Results: A total of 250 older adults were included in the psychometric analyses; 54.0% were women and 91.2% reported having a chronic disease. Item mean scores ranged from

2.87 to 4.38, with the highest scores observed for relationship-related items and the lowest for physical activity items. Exploratory factor analysis supported a four-factor structure, explaining 63.86% of the total variance. Factor loadings were satisfactory across all items (0.606–0.905), and all 19 items were retained. Internal consistency was good, with an overall Cronbach's alpha of 0.850. Corrected item–total correlations ranged from 0.157 to 0.613, and item deletion did not meaningfully improve reliability.

Conclusion: The OALS-TR demonstrated satisfactory validity and good internal consistency in Turkish adults aged 65 years and older. Its four-factor structure and acceptable item performance support its use as a practical and psychometrically sound instrument for assessing lifestyle behaviors in later life. The scale may be useful in primary care and healthy ageing settings to support screening, counseling, and the evaluation of health-promotion interventions among older adults in Türkiye.

Keywords: Aged, Life Style, Cross-Cultural Comparison, Psychometrics, Questionnaires

Can Digital Health Interventions Improve Maternal and Infant Health?: A Comprehensive Review

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Objective:

This study aimed to provide a comprehensive literature analysis by evaluating systematic reviews and meta-analyses investigating the effects of digital health interventions (mHealth, SMS-based reminders, telemedicine, remote fetal monitoring, and eHealth) on maternal and infant health outcomes.

Materials and Methods:

In this study, systematic reviews and meta-analyses published between 2016 and 2026 that examined the impact of digital health interventions on maternal and infant health were included. A total of 21 studies meeting the inclusion criteria were identified through the literature search. The studies were systematically analyzed in terms of country/region distribution, sample size, technology platform used, effect sizes (OR, RR, SMD/MD), and methodological quality using the AMSTAR-2 tool. Twelve key domains of AMSTAR-2 were applied, and the studies were classified as high, moderate, low, or critically low quality.

Results:

Most of the included studies were published between 2018 and 2024, indicating a growing interest in this field in recent years. Of the studies, 38.1% (n=8) were conducted

Oral Presentation - OP330

in low- and middle-income countries (LMICs), 33.3% (n=7) in mixed regions, and 23.8% (n=5) in high-income countries.

In terms of technology platforms, mHealth applications (19%), telehealth (9.5%), remote fetal monitoring (9.5%), and SMS-based interventions (9.5%) were the most commonly used approaches. Regarding research focus, antenatal care (ANC) was addressed in 62% of the studies (n=13), while mHealth interventions were examined in 48% (n=10) and SMS-based interventions in 43% (n=9).

Evaluation of effect sizes revealed notable findings:

- SMS reminders increased ANC attendance (RR=1.34; 95% CI: 1.12–1.60),
- mHealth interventions improved skilled birth attendance rates (RR=2.14; 95% CI: 1.76–2.60),
- remote fetal monitoring significantly reduced the risk of neonatal asphyxia (RR=0.25),
- telemedicine support in gestational diabetes reduced HbA1c levels (MD = -0.70).

Additionally, eHealth interventions showed a significant effect on perinatal anxiety (SMD = -0.41; $I^2 = 0\%$).

According to the AMSTAR-2 assessment, 10 studies (47.6%) were of high quality, 3 (14.3%) moderate, 4 (19.0%) low, and 4 (19.0%) critically low quality.

Conclusion:

Digital health technologies represent an evidence-based, cost-effective, and scalable approach to strengthening maternal and infant health services. In particular, SMS-based reminders and mHealth platforms significantly improve access to antenatal care and increase skilled birth attendance rates, especially in LMICs. Moreover, telemedicine in the management of gestational diabetes, eHealth interventions for perinatal mental health, and remote fetal monitoring in high-risk pregnancies demonstrate clinically meaningful benefits. Future research should focus on standardized intervention protocols, long-term



follow-up outcomes, and cost-effectiveness analyses. The integration of digital health interventions into national maternal and child health strategies presents a critical opportunity to achieve global health targets.

Keywords: Digital Health, Mhealth, Maternal Health, Infant Health, SMS, Telemedicine, Systematic Review, Meta-Analysis

Awareness and Beliefs Regarding Third-Hand Smoke Among Medical Students: A Cross-Sectional Study

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Aim: Third-hand smoke (THS)—tobacco residues persisting on indoor surfaces, dust, and clothing—is a significant yet under-recognized exposure pathway that is often omitted from medical curricula. This study aimed to describe medical students' THS awareness, perceived knowledge, and beliefs, and to examine associated factors.

Methods: This descriptive, cross-sectional study was conducted between July 2024 and December 2024 among students studying at Gaziantep University Faculty of Medicine. Data were collected via online and face-to-face questionnaires, including study-developed items and two instruments: the Fagerström Test for Nicotine Dependence and the validated BATHS-T scale (score range: 1–5). BATHS-T scores were compared across demographic variables and smoking characteristics using a two-tailed alpha level of 0.05.

Results: A total of 336 students participated. Most students (81.3%) had never heard the term “third-hand smoke,” only 3.0% reported prior education on the topic, and 94.9% rated their knowledge about THS as insufficient. After being provided with a standardized definition of THS, participants demonstrated moderate-to-high belief scores regarding

THS overall (BATHS-T total: 3.91 ± 0.88), its health effects (3.90 ± 0.89), and its persistence in the environment (3.92 ± 0.93). Belief scores increased significantly with age and year of study (ANOVA, $p \leq .006$) and were higher among students reporting a chronic disease ($p \leq .040$). Non-smokers had higher health subscale scores than smokers ($p = .040$), while gender and nicotine dependence were not consistently associated with BATHS-T scores.

Conclusions: Medical students showed low awareness of THS terminology but were receptive to its harms once the concept was defined, indicating a clear recognition gap. These findings suggest that THS represents a high-yield, competency-linked topic that should be incorporated into existing tobacco and environmental health curricula.

Keywords: Third-Hand Smoke; Medical Students; Tobacco Control; Medical Education; Awareness; Beliefs

Analysis of Family Health Centers in Erzurum via Google Maps

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Objective: With the progression of digitalization, online mapping and navigation platforms have become essential guides for patients seeking physical access to primary healthcare services. This study aims to analyze the currentness of Family Health Centers (FHCs) in Erzurum on Google Maps, along with the feedback and ratings provided by users.

Methods: This cross-sectional study was conducted on March 25, 2026, by searching for 65 FHCs listed on the Erzurum Provincial Directorate of Health website via Google Maps. The centers were evaluated for their presence on the platform, accuracy of location and naming, and the availability of contact information and operating hours. In addition, user ratings, comments, and the number of comments were also recorded.

Results: Out of the 65 FHCs officially listed, 17% (n=11) had no record on Google Maps. Among the 54 registered FHCs, half (n=27) were found to be incorrectly named, and 48.1% (n=26) had incorrect locations. Although the family medicine system was implemented in Erzurum in 2008, the outdated term "Health Center" (Sağlık Ocağı) was still frequently used in naming. Some FHCs were found to be pinned in multiple locations

under different names. Furthermore, 68.5% (n=37) of the centers lacked operating hours, and half did not have a registered contact number. While 18 FHCs had no ratings, 36 centers received a total of 190 ratings (ranging from 1 to 5), with an average score of 3.88. Content analysis of comments revealed that users persistently use "Health Center" (Sağlık Ocağı) terminology, and the primary sources of dissatisfaction were unanswered calls and inaccurate map coordinates.

Conclusion: Our study demonstrates that while the visibility of FHCs in Erzurum on Google Maps is high, there are significant deficiencies regarding naming, communication, and location accuracy. Missing contact details and geographic inaccuracies pose a barrier to accessible primary care. It is recommended that Provincial Directorates of Health periodically update digital data to ensure effective health management.

Keywords: Family Health Center, Google Maps, Digital Accessibility, Health Management

Evaluation of the Implementation of the Quality Management System in Medical Laboratories for Service Quality in Kosovo

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Abstract

The importance of quality in the operation of healthcare laboratories is well recognized globally, particularly in developing countries. Poor quality of laboratory results can lead to inappropriate interventions, undermine the reliability of laboratories, and even trigger legal consequences. Therefore, it is essential to establish and implement a quality policy in medical laboratories.

The Quality Management System (QMS) has evolved from earlier concepts of quality control (QC), which applied statistical methods to monitor service outcomes, and quality assurance (QA), which provided a framework for setting standards.

This study evaluates the implementation of QMS in medical laboratories in Kosovo to ensure the highest quality of services. Primary data were collected from 237 respondents across Kosovo's laboratories, analyzed using descriptive and inferential statistics. Results indicate that organization and management positively influence QMS, while reporting practices, working conditions, and personnel development significantly contribute to its effective implementation.

Keywords: Medical Laboratories, Quality Management System, Personnel Development, Organization and Management

Oral Presentation - OP334

Introduction

Healthcare laboratories play a critical role in clinical decision-making and public health. Reliable laboratory results enhance diagnostic accuracy, while poor quality outcomes may lead to misdiagnosis, overtreatment, or inadequate interventions. International standards such as ISO/IEC 17025 and ISO 15189 provide comprehensive frameworks for laboratory quality, yet their implementation requires substantial resources. In Kosovo, strengthening laboratory quality systems is essential to improve patient care and align with global standards.

Research Objectives

- To assess the level of QMS implementation in medical laboratories in Kosovo.
- To examine the impact of organization and management on QMS.
- To evaluate the role of personnel development in enhancing QMS.
- To analyze the influence of reporting practices and working conditions on QMS.

Hypotheses

- H1: Organization and management have a positive effect on QMS.
- H2: Personnel development contributes to increased implementation of QMS.
- H3: Reporting practices and working conditions positively influence QMS.

Methods

A quantitative research design was employed using a structured questionnaire distributed to laboratory staff across Kosovo. A stratified random sampling technique was applied, yielding 246 participants, of whom 237 completed the survey. The questionnaire covered seven domains: organization and management, personnel, laboratory equipment, working conditions, quality assurance, and reporting. Data were analyzed using SPSS (v25), employing descriptive statistics, correlation, and regression analysis.

Results

- **Demographics:** Majority female respondents (60.8%), with most aged 36–45 years.
- **Education:** 7% held university degrees, 11.4% postgraduate.
- **Experience:** 4% had more than 10 years of laboratory work experience.
- **Findings:**
 - Organization and management strongly correlated with QMS effectiveness.
 - Personnel development showed significant positive impact on QMS adoption.
 - Reporting mechanisms and working conditions were critical in sustaining QMS.

Discussion

The findings confirm that QMS implementation in Kosovo's laboratories depends on managerial commitment, continuous staff training, and adequate working conditions. While laboratories are generally well-equipped, gaps remain in systematic documentation and regular quality audits. Compared to international studies, Kosovo demonstrates progress but requires further investment in human resources and infrastructure.

Conclusion

QMS implementation in Kosovo's medical laboratories is positively influenced by organizational structure, personnel development, and reporting practices. Strengthening these components will enhance service quality and patient safety.

Recommendations

- Establish dedicated quality managers in all laboratories.
- Develop comprehensive quality manuals and standardized procedures.
- Implement continuous professional development programs for laboratory staff.
- Conduct regular internal and external audits to ensure compliance with ISO standards.

- Improve working conditions to support staff performance and patient-centered care.

References

(Adapted into APA style from your thesis reference list — e.g., Begley et al., 2015; Belouafa et al., 2017; Giesen, 2015; WHO, 2005).

Introduction

The importance of quality in the functioning of healthcare laboratories is well recognized globally, particularly in developing countries. Poor quality of laboratory results can lead to inappropriate interventions, negatively affect the reliability of laboratories, and may even require legal action. Therefore, it is essential to develop and implement a quality policy in medical laboratories.

The International Organization for Standardization (ISO) has developed quality systems to evaluate specific aspects of healthcare services. Most laboratories rely on internationally recognized quality standards such as ISO/IEC 17025 for all types of testing and calibration laboratories, and more specifically ISO 15189 for medical laboratories. These standards are comprehensive and often require significant resources.

Quality implies compliance with standards. Standards are predefined requirements for a specific substance or service. Quality is of great importance in healthcare laboratories. Reliable results produced by a laboratory improve the decision-making ability of clinicians and public health physicians. The consequences of poor quality can be serious, leading to inappropriate actions or omissions, overtreatment, excessive investigation, mistreatment, lack of treatment, or inadequate examinations.

Delayed or suboptimal responses resulting from poor quality laboratory services can undermine the credibility of laboratories and may also require legal action. Quality is ensured through a well-defined quality system, which is part of overall quality

management aimed at guaranteeing consistency, reproducibility, traceability, and efficiency of products or services. A quality system is defined as the organizational structure and resources necessary to implement quality requirements.

A quality system has five key elements:

- Management and organizational structure
- Documentation
- Monitoring and evaluation
- Training

Quality standards

The overall responsibility for designing, implementing, maintaining, and improving quality systems lies with laboratory management. Quality is the responsibility of all staff members within the organization. Documentation includes any information or instruction, whether printed or electronic, such as policy statements, quality manuals, procedures, specifications, calibration tables, reports, job descriptions, external documents (regulations, standards, examination procedures, etc.). Laboratory management develops and implements quality indicators to systematically monitor and evaluate the laboratory's contribution to patient care.

When the program identifies opportunities for improvement within the system, laboratory management must take appropriate steps to address them. Error management must be strongly enforced. A quality system is only as effective as the staff working within it. No matter how well designed on paper, if it cannot be translated into practice, quality cannot be achieved. Training must also include an understanding of why quality is important. Training should be competency-based and followed by post-training courses to provide continuous support. Quality standards are integral to the quality system, aiming to ensure safety and consistency. They must be rigorously followed to meet regulatory requirements and monitor laboratory performance. Both managerial and

technical standards must be adhered to in order to ensure quality, and they must also comply with nation

Research Aim

The aim of this study is to evaluate the level of implementation of the Quality Management System (QMS) in medical laboratories in Kosovo, with a focus on the quality of medical services provided to patients, since the integrated quality system is centered on delivering high-quality patient care.

Research Questions

- RQ1: What effect does the organization and management of medical laboratories have on the Quality Management System (QMS)?
- RQ2: Has the development of laboratory personnel influenced the increased implementation of QMS?
- RQ3: Have reporting practices and working conditions influenced the increased implementation of QMS?

Hypotheses

- H1: Organization and management of medical laboratories have a positive effect on QMS.
- H2: Personnel development in medical laboratories has contributed to increased implementation of QMS.
- H3: Reporting practices and working conditions have influenced the increased implementation of QMS.

History of Quality Management

In recent years, several public sector research institutions have adopted quality processes to improve their organization. In France, the French Association for Standardization

(AFNOR) officially recommends the adoption of quality processes by researchers (Gardoni, 2004). However, implementing a quality process in a public organization may encounter specific challenges not typically faced in private organizations (Matei, 2014). Research requires both rigor and transparency in knowledge creation and involves objectives, resources, and organizational capacities that differ significantly from those in the industrial sector, where quality processes were traditionally developed.

Therefore, the implementation of a Quality Management System (QMS) within a public research organization cannot be carried out in the same way as in industry (Gruening, 2011). Specific challenges in research laboratories must be addressed through tailored solutions and actions to ensure the success of QMS.

Begley et al. (2010), Giesen et al. (2011), and Bareille et al. (2013) emphasize the importance of quality processes in science for improving management and reliability of research.

In this study, we identify the advantages of implementing QMS in public and private laboratories in Kosovo, whose mission is to generate and publish reliable knowledge, train researchers, provide expertise, and foster innovation. Practical examples are presented to demonstrate the benefits and improvements achieved through QMS implementation, as well as the challenges encountered and proposed solutions.

Laboratory Presentation and Quality Policy

The research laboratory under observation was established in January 2012 and is a relatively complex structure operating under the supervision of three institutions:

- INRA (French National Institute for Agronomic Research)
- Agrocampus Ouest (School of Engineering specialized in agronomy and horticulture)
- University of Angers

From INRA's perspective, the laboratory is attached to three different scientific divisions, each covering several disciplinary fields. The laboratory resulted from the merger of four Mixed Research Units (MRUs) and currently includes about 230 staff members organized into 16 teams. This makes it a very large-scale unit (VLSU) compared to the average INRA unit of 25 staff members.

The laboratory conducts research projects in seeds and horticulture, integrating expertise in genetics, epigenetics, genomics, pathology, physiology, eco-physiology, biochemistry, modeling, statistics, and bioinformatics. Before its creation in 2012, the four MRUs were geographically dispersed. Some had already begun implementing quality processes as early as 2000.

The merger of these MRUs created challenges, including administrative differences, multidisciplinary integration, and geographical dispersion. Solutions included delegating management to INRA, recruiting a full-time quality manager in 2013, and relocating teams to a single site in 2015.

Laboratory quality actions aim to:

- Ensure reliability of measurable results through controlled methods and equipment
- Guarantee traceability of research work
- Contribute to long-term data preservation
- Ensure quality of biological materials and services
- Manage samples effectively
- Address human and environmental risks
- Harmonize practices and procedures across teams
- Promote continuous improvement
- Selection of Quality Guidelines

INRA officially launched its quality process in 2000, issuing its first quality policy statement and establishing a quality working group. In 2005, INRA published its first guidelines (Version 1), including chapters on management responsibility, documentation, resource management, core activities, and measurement/analysis/improvement.

Research Methodology

This study employed a quantitative research design to evaluate the implementation of the Quality Management System (QMS) in medical laboratories in Kosovo. A structured questionnaire was developed, based on international standards and adapted to the local context. The questionnaire was divided into several sections, covering:

- Organization and management
- Personnel
- Laboratory equipment
- Working conditions
- Quality assurance
- Reporting practices

The survey was distributed to laboratory staff across Kosovo, ensuring representation from both public and private institutions.

Sample

The study population consisted of medical laboratory professionals working in Kosovo. A stratified random sampling technique was applied to ensure diversity in terms of age, gender, education, and years of experience. Out of 246 distributed questionnaires, 237 were completed and returned, yielding a high response rate.

Demographic variables included:

- Gender

- Age group
- Educational level
- Years of professional experience
- **Instrument**

The primary instrument used was a standardized questionnaire designed to measure perceptions and practices related to QMS implementation. The questionnaire included both closed-ended and Likert-scale questions, allowing for quantitative analysis. Reliability and validity were ensured through pilot testing and expert review.

Procedure

Data collection was conducted over a two-month period in 2024. Questionnaires were distributed electronically and in paper format, depending on the accessibility of participants. Respondents were assured of confidentiality and anonymity.

Data analysis was performed using SPSS (version 25). Descriptive statistics were used to summarize demographic data, while inferential statistics (correlation and regression analysis) were applied to test the hypotheses.

Introduction to Statistical Analysis

Statistical analysis was conducted to evaluate the implementation of the Quality Management System (QMS) in medical laboratories in Kosovo. The data collected from 237 respondents were analyzed using descriptive and inferential statistics. The analysis focused on demographic characteristics, descriptive evaluation of QMS domains, and hypothesis testing.

Demographic Analysis

The demographic profile of respondents included gender, age, education, and years of professional experience.

- **Gender:**The majority of respondents were female (60.8%), while males accounted for 39.2%.
- **Age:**Most respondents were between 36–45 years old, followed by those aged 26–35.
- **Education:**7% held a university degree, 11.4% had postgraduate qualifications, while the remainder had secondary education.
- **Experience:**4% had more than 10 years of laboratory work experience, indicating a highly experienced workforce.

Cross-tabulation analysis showed significant associations between gender and education, as well as between age and years of experience.

Descriptive Analysis of Research Domains

The questionnaire was divided into several domains, each analyzed descriptively:

- **Organization and Management:** Respondents reported that organizational structure and managerial practices positively influenced QMS implementation.
- **Personnel:** Continuous training and professional development were identified as critical factors in sustaining QMS.
- **Laboratory Equipment:** Laboratories were generally well-equipped, but maintenance and calibration practices required improvement.
- **Working Conditions:** Adequate infrastructure and safe working environments were essential for effective QMS.
- **Quality Assurance:** Respondents emphasized the importance of internal audits, documentation, and compliance with ISO standards.
- **Reporting:** Accurate and timely reporting was considered vital for laboratory credibility and patient safety.

Hypothesis Testing

Inferential statistics were applied to test the three hypotheses:

- **H1:** Organization and management have a positive effect on QMS.
- Regression analysis confirmed a significant positive relationship.
- **H2:** Personnel development contributes to increased implementation of QMS.
- Correlation analysis showed strong associations between training programs and QMS outcomes.
- **H3:** Reporting practices and working conditions positively influence QMS.
- Results indicated that reporting accuracy and adequate working conditions significantly enhance QMS effectiveness.

Discussion

The findings demonstrate that QMS implementation in Kosovo's medical laboratories is strongly influenced by organizational management, personnel development, and reporting practices. While laboratories are progressing toward international standards, challenges remain in documentation, equipment calibration, and systematic quality audits.

Conclusions and Recommendations

Conclusions

The study evaluated the implementation of the Quality Management System (QMS) in medical laboratories in Kosovo. Based on the data collected from 237 respondents, several conclusions can be drawn:

- **Organization and Management:** Effective organizational structures and managerial practices have a positive impact on QMS implementation. Strong leadership and clear responsibilities are essential for sustaining quality standards.
- **Personnel Development:** Continuous training and professional development of laboratory staff significantly contribute to the successful adoption of QMS. Skilled and competent personnel are a cornerstone of quality assurance.
- **Reporting and Working Conditions:** Accurate reporting practices and adequate working conditions enhance the credibility of laboratories and ensure patient safety. These factors are directly linked to the effectiveness of QMS.
- **Overall Impact:** The findings confirm that QMS implementation improves the reliability of laboratory results, strengthens decision-making in clinical practice, and aligns Kosovo's laboratories with international standards.

Recommendations

Based on the conclusions, the following recommendations are proposed:

- **Strengthen Management Commitment:** Establish dedicated quality managers in all laboratories to oversee QMS implementation.
- **Develop Standardized Documentation:** Create comprehensive quality manuals, standard operating procedures (SOPs), and ensure systematic documentation across laboratories.
- **Enhance Personnel Training:** Implement continuous professional development programs, including competency-based training and refresher courses, to maintain high standards of practice.
- **Improve Infrastructure and Working Conditions:** Invest in laboratory infrastructure, equipment maintenance, and safe working environments to support staff performance.
- **Conduct Regular Audits:** Organize internal and external audits to monitor compliance with ISO standards and identify areas for improvement.

- **Promote a Culture of Quality:** Encourage staff participation in quality initiatives, fostering accountability and ownership of QMS processes.

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From Short Stature to Amenorrhea: The Importance of Primary Care Awareness and Missed Clinical Clues in Family Medicine in Patients with Late-Diagnosed Turner Syndrome

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Introduction/Aim

Turner syndrome (TS) is one of the most common chromosomal disorders, affecting approximately 1 in 2,500 live female births. It is among the most frequent sex chromosome abnormalities in girls and typically presents with short stature, delayed puberty, primary amenorrhea, and various associated systemic findings. Nevertheless, diagnosis may be delayed, particularly in individuals with subtle phenotypic features. Late diagnosis may postpone timely interventions related to growth, pubertal induction, cardiovascular and renal evaluation, and psychosocial support. As family physicians are often the first and most frequent point of contact within the healthcare system, primary care plays a crucial role in the early recognition of these patients. This study aims to highlight the importance of family medicine awareness in the early diagnosis of TS through cases diagnosed at different ages.

Cases/Findings

We present three patients with Turner syndrome diagnosed at different ages. The first case was a 2-year-9-month-old girl referred for short stature. Her height SDS was -3.18. On physical examination, she had a short webbed neck and frontal bossing and was

Oral Presentation - OP335

prepubertal. The second case presented at 8 years and 11 months of age with short stature; her height SDS was -3.22. Physical examination revealed a short webbed neck, flattened facial appearance, broad forehead, low-set ears, and pes planus. The third case presented at 14 years and 10 months of age with short stature. Her height SDS was -2.62. On examination, she had a low posterior hairline, webbed neck, low-set ears, inverted nipples, absent breast development, and primary amenorrhea. Karyotype analysis in all three patients was consistent with 45,X. Notably, in the last case, short stature had been followed for years; however, further diagnostic evaluation and appropriate referral were delayed.

Conclusion

Delayed diagnosis remains an important clinical problem in Turner syndrome. Earlier recognition may be achieved when family physicians consider short stature, delayed puberty, and amenorrhea as components of a single clinical picture rather than isolated findings. In addition, patients should be evaluated for accompanying clues such as hearing difficulties, recurrent otitis, and possible cardiac anomalies. In family medicine practice, Turner syndrome should be considered in every girl presenting with short stature, delayed puberty, or primary amenorrhea, and prompt genetic evaluation with referral to Pediatric Endocrinology should be arranged.

Keywords: Turner Syndrome, Short Stature, Amenorrhea, Delayed Puberty

Evaluation of the Relationship Between Fear of Falling and Activities of Daily Living in Individuals Aged 65 Years and Older Presenting to a Training and Research Hospital

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Objective: This study aimed to evaluate the relationship between fear of falling and the level of dependence in activities of daily living among individuals aged 65 years and older. Additionally, factors affecting fear of falling were investigated.

Materials and Methods: The sample size of this descriptive study was calculated using the OpenEpi sample size calculator. The prevalence of fear of falling has been reported in the literature as 21-61%(1-5). Accordingly, using the unknown population formula, the frequency was accepted as 41%; with a 95% confidence interval and a 5% margin of error, the minimum sample size was determined as 372 people. A total of 372 individuals aged 65 years and older who presented to a training and research hospital were included in the study. Data were collected using a sociodemographic data form (20 items), the Barthel Activities of Daily Living Index (10 items), and the International Falls Efficacy Scale(IFES) (16 items). The study was conducted between February and June 2024 following ethical approval and institutional permissions. Statistical analyses were performed using SPSS (Statistical Packet for The Social Science) 26.0. Continuous variables were expressed as mean $\pm$ standard deviation or median (minimum-maximum), and categorical variables as frequency and percentages. The Kolmogorov-Smirnov test was used to assess whether continuous variables exhibited a normal

Oral Presentation – OP339

distribution; for intergroup comparisons of parameters that did not show a normal distribution according to the test results, the Mann-Whitney U test and the Kruskal-Wallis test were used. Spearman correlation test and linear regression analysis were used to evaluate the relationship between continuous variables. As a result of the analyses, $p < 0.05$ was considered statistically

Result: This study evaluated 372 individuals aged 65 and over, with an average age of 72.94 ± 6.08 (median: 72.00, min: 65.00, max: 99.00). 70.7% of the participants were women. According to the IFES, 82% of participants exhibited fear of falling, while 40.3% ($n=150$) had a history of falls within the past year. Falls most frequently occurred indoors (64.0%). Moderate dependence was the highest level (57.5%) according to the Barthel Activity Level for Daily Living. A strong, statistically significant negative correlation was found between fear of falling and the level of dependence on activities of daily living ($p < 0.001$). It was determined that fear of falling increased with age, and consequently, dependence on activities of daily living also increased. Female gender, advanced age, low education level, inability to exercise, and a history of falls were associated with a higher level of fear of falling.

Conclusion: This study found a statistically significant relationship between fear of falling and the level of dependence in daily living activities in individuals aged 65 and over. Fear of falling was found to be associated with age, gender, marital status, education level, exercise habits, history of falls, living alone, and use of assistive devices. These findings demonstrate that fear of falling is a multifaceted problem and highlight the importance of holistic geriatric assessment and preventive approaches in primary care.

Keywords: Activities of Daily Living, Elderly, Fall, Fear of Falling

Evaluation of the Relationship Between Motivation to Change Health, Self-Efficacy, and Treatment Adherence in Hypertensive Patients Registered at Atatürk University Education Family Health Centers

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Objective:

This study aimed to evaluate the relationship between motivation to change health, self-efficacy, and treatment adherence in patients with hypertension in primary care, and to examine the associations of these variables with sociodemographic and clinical characteristics.

Methods:

This descriptive cross-sectional study was conducted between March and May 2025 at Atatürk University Education Family Health Centers, including 318 patients with hypertension. Data were collected through face-to-face interviews using a sociodemographic questionnaire, the Turkish version of the Motivation and Attitude to Change Health Scale, the Hypertension Self-Efficacy Scale, and the Hill-Bone Compliance to High Blood Pressure Therapy Scale. Descriptive statistics, correlation analyses, and multivariate regression analyses were performed.

Results:

The mean age of the participants was 58.53 ± 10.86 years, and 55.8% were female. The overall motivation to change health was at a moderate-to-good level (total score: 3.70 ± 0.78). Subscale scores indicated that the highest level was observed in the “desire”

domain (3.95 ± 0.96), followed by “readiness” (3.57 ± 1.05) and “worthwhileness” (3.57 ± 1.12). The hypertension self-efficacy level was moderate-to-high (54.58 ± 10.32). According to the Hill-Bone scale, treatment adherence was not optimal (23.32 ± 7.38), indicating the presence of clinically relevant non-adherence among participants.

Correlation analyses demonstrated a significant positive association between motivation and self-efficacy, suggesting that individuals with higher motivation levels tend to have greater confidence in managing their disease. In contrast, treatment non-adherence scores showed significant negative correlations with both motivation and self-efficacy. A moderate negative correlation between self-efficacy and treatment non-adherence further emphasized the critical role of self-efficacy in adherence behaviors.

Multivariate regression analysis revealed that increases in both motivation and self-efficacy significantly improved treatment adherence ($p < 0.05$). Among these variables, self-efficacy emerged as the strongest independent predictor of adherence. Additionally, patients who reported regular medication use and those with controlled blood pressure exhibited significantly higher levels of motivation and self-efficacy compared to their counterparts, highlighting the clinical relevance of behavioral and psychological determinants in hypertension management.

Conclusion:

Treatment adherence in hypertension management is closely associated with patients’ motivation and self-efficacy, beyond routine clinical follow-up. Strengthening these factors through patient-centered and holistic interventions in primary care may play a key role in improving adherence and overall disease management outcomes.

Keywords: Hypertension, Motivation, Self-Efficacy, Treatment Adherence

Food Allergy Is Not a Barrier to MMR Vaccine: Safe Practice in Primary Care

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INTRODUCTION

Vaccination is the most effective public health intervention for controlling infectious diseases; therefore, it is essential that vaccines included in the Ministry of Health's National Immunization Schedule are administered completely and on time to all children, particularly in primary care settings. Although the measles, mumps, and rubella (MMR) vaccine is generally considered safe, uncertainties persist among clinicians and families regarding its use in children with a history of food allergy, which may lead to delays in vaccination. The aim of this study was to evaluate the clinical characteristics, reasons for referral, and vaccination processes of children referred to a pediatric allergy clinic for MMR vaccination and to assess the safety of vaccine administration.

MATERIALS AND METHODS

Between October 2025 and April 2026, 33 children referred from family health centers to our pediatric allergy clinic for MMR vaccination were retrospectively evaluated. Demographic characteristics, reasons for referral, and allergy histories were analyzed.

RESULTS

Twelve patients (36.4%) had a history of urticaria, angioedema, and/or anaphylaxis (egg: 18.1%, milk: 6.1%, egg and milk: 9.1%, multiple food allergies: 9.1%), 7 (21.2%) had proctocolitis, 7 (21.2%) had atopic dermatitis, 4 (12.1%) had non-specific rash, and 3 (9.1%) had abdominal pain and irritability. In our study, only 9.0% of patients had a history of anaphylaxis related to milk and/or egg.

Based on clinical evaluation, including history, physical examination, allergen-specific IgE levels, and skin prick test results, the MMR vaccine type and post-vaccination outcomes were recorded. According to the findings, 88% of patients (n=29) received an α -lactalbumin-containing vaccine (Serum Institute of India), and 12% (n=4) received the Priorix® vaccine.

Two patients with a history of anaphylaxis to egg and/or milk and elevated specific IgE levels were vaccinated using desensitization. A total of 8 patients (6 with urticaria and 2 with atopic dermatitis) received graded dosing (1/10–9/10). The remaining 23 patients received the α -lactalbumin-containing vaccine as a single dose without complications.

Patients who underwent desensitization or graded dosing were observed for 2 hours after vaccination, while those who received a single dose were observed for 1 hour. All patients were discharged without complications.

CONCLUSION

In our study, a history of food-related reactions or parental concern led to avoidance of MMR vaccination in primary care, with most cases referred despite clinically insignificant findings. This suggests that misconceptions and limited knowledge regarding food allergy may adversely affect vaccination practices.

However, egg allergy—even with a history of anaphylaxis—is not a contraindication to MMR vaccination, and routine skin testing is not recommended. Adequate preparedness is sufficient to manage potential anaphylaxis during vaccination.

The MMR vaccine can be administered in primary care under appropriate conditions. Nevertheless, persistent misconceptions may increase vaccine hesitancy and contribute to anti-vaccination attitudes.

Delayed vaccination leaves children vulnerable to preventable infections and weakens herd immunity. Therefore, supporting healthcare professionals with up-to-date knowledge is essential to improve vaccination practices.

Keywords: MMR Vaccine, Food Allergy, Anaphylaxis, Primary Care

Evaluation of Safety Measures Against Home Accidents and First Aid Self-Efficacy Among Mothers of Children Aged 0–6 Years

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Objective: It was aimed to evaluate the safety measures taken against home accidents and the first aid self-efficacy levels of mothers with children aged 0–6 years registered at a family health center.

Methods: This cross-sectional and descriptive study included mothers with children aged 0–6 years. To prevent multiple inclusions, each mother was included only once in the study. Data were collected using a questionnaire including sociodemographic characteristics (27 items), the “Scale for Identifying Mothers’ Safety Measures Against Home Accidents in Children Aged 0–6 Years” (40 items), and the “First Aid Self-Efficacy Scale in Home Accidents” (12 items). Data were analyzed using SPSS version 23.0, and a p value < 0.05 was considered as statistically significant.

Results: The mean age of the mothers was 32.5±5 years (range: 22–47), and 20.6% were employed. Of the participants, 91.6% lived in nuclear families, and 13.1% had a history of chronic disease. It was determined that 30.8% of the mothers had one child, 38.3% had two children, and 17.8% had three children. While 71% had one child aged 0–6 years, 2% had four children in this age group. Childcare was predominantly provided by mothers

(86%), and 77.6% reported receiving moderate or higher support from their spouses. Additionally, 72.9% of mothers described their children as active, and the most common play area was the living room (55.1%).

A history of home accidents was present in 21.5% of the children, with a mean age at the time of the accident of 2 ± 1 years (range: 6 months–5 years). Home accidents occurred more frequently in boys (60.9%), first-born children (56.5%), and at the age of two years (60.9%). The most common types of home accidents were falls from height ($n=18$), foreign body ingestion ($n=3$), burns ($n=3$), asphyxia ($n=3$), and poisoning ($n=1$). It was found that 52.2% of the accidents were managed at home, and 8.7% resulted in permanent damage.

The rate of home accidents was significantly higher among children of mothers with a history of chronic disease (42.9%) compared to those without ($p=0.037$). Only 12.1% of mothers reported having knowledge about home accidents. The mean score of the safety measures scale was 179 ± 18 (range: 107–200), and the mean first aid self-efficacy score was 30 ± 11 (range: 6–48). There was no significant difference in scale scores between children with and without a history of home accidents ($p=0.856$ and $p=0.189$, respectively).

Conclusion: The frequency of home accidents was found to be 21.5% based on real-world primary care data. The findings indicate that mothers' knowledge and first aid self-efficacy regarding home accidents need to be improved. The study is ongoing.

Keywords: Home Accidents, Children Aged, 0-6 Years, First Aid Self-Efficacy

Evaluation of the Effect of Participation Level in a Hybrid Smoking Cessation Clinic on Quit Rates: Real-World Data

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Aim: Regular follow-up and counseling are among the most critical determinants of successful smoking cessation. However, barriers to accessing face-to-face healthcare services may adversely affect patients' engagement with follow-up care. In this context, remote healthcare delivery and hybrid follow-up models have emerged as promising alternatives to improve access to cessation services. This study aimed to evaluate follow-up attendance and smoking cessation outcomes among patients monitored through remote patient assessment within a hybrid care model implemented in a smoking cessation outpatient clinic.

Methods: This descriptive cross-sectional study was conducted among individuals aged 18–65 years who presented to the smoking cessation outpatient clinic between June 2025 and February 2026 and were initiated on cytisine treatment. Within the hybrid care model, initial assessments were performed face-to-face, whereas follow-up visits were conducted via remote patient assessment. Data regarding participation in scheduled online follow-up visits, smoking cessation outcomes, and difficulties encountered during the follow-up process were recorded. Data were analyzed using SPSS version 23.0, and a p value < 0.05 was considered as statistically significant.

Oral Presentation - OP347

Results: Among 398 individuals interviewed, online follow-up appointments were scheduled for 68.0% (n=270), of whom 38.2% (n=103) attended the follow-up visit.

Of the participants, 65.0% were male, and the mean age was 39 ± 11 years (range, 19–64). While 83.5% presented on their own initiative, 12.6% had been referred by a physician. Household smoke exposure was present in 74.8% of participants.

The three most frequently reported reasons for smoking initiation were social imitation (43.7%), stress/sadness (27.2%), and curiosity (20.4%). The most commonly reported motivations for quitting were concern about developing future illness (58.3%) and the presence of an existing disease (27.2%).

The mean age at smoking initiation was 17 ± 4 years (range, 8–28). The mean smoking exposure was 27 ± 20 pack-years (range, 2–120), and the mean daily cigarette consumption was 25 ± 12 cigarettes/day (range, 5–60).

A history of previous quit attempts was reported by 83.5% of participants, with a mean of 3 attempts (maximum, 20). The rate of unassisted quit attempts was 68.2%, whereas 29.4% had previously received pharmacotherapy support. The three most commonly reported withdrawal symptoms were craving (77.6%), irritability (70.6%), and difficulty concentrating (28.2%).

The mean exhaled carbon monoxide level was 11 ± 5 ppm (range, 3–25). The mean Fagerström Test for Nicotine Dependence score was 6 ± 2.5 (range, 1–10), and 55.3% of participants had high/very high nicotine dependence. Among patients managed with the hybrid model, 71.8% achieved smoking cessation, while 31.1% experienced adverse effects. Dry mouth and gastrointestinal complaints were the most commonly observed adverse effects. During online follow-up visits, 38.8% of patients reported active complaints, with increased thirst and oral ulcers being among the most frequently reported.

Smoking cessation rates were significantly higher among married participants compared to singles ($p=0.017$). Participants who failed to quit had significantly higher Fagerström dependence scores and higher daily cigarette consumption ($p=0.025$ and $p=0.044$, respectively).

Conclusion: In addition to conventional approaches, hybrid care models may serve as an effective alternative in smoking cessation counseling by facilitating follow-up and improving access to care.

Keywords: Tobacco Dependence, Smoking Cessation, Online Assessment

The Effect of Cancer Information Overload on Attitudes Toward Cancer Screening

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Objective:

Cancer is a critical public health issue as it is preventable and treatable when detected early. Early diagnosis and screening programs enable the detection of cancer before clinical symptoms appear, thereby increasing treatment effectiveness. Cancer information overload is defined as a negative tendency in which individuals experience confusion and distress due to their inability to organize new information because of insufficient resources. This study aimed to examine the effect of cancer information overload on attitudes toward cancer screening among relatives of patients.

Materials and Methods:

This cross-sectional and descriptive study was conducted with 66 participants. The research was planned among relatives of cancer patients who applied to the Family Medicine Outpatient Clinic of Sivas Cumhuriyet University Health Services Application and Research Hospital over a 6-month period. Data were collected using a 12-item demographic form, the 8-item Cancer Information Overload Scale, and the 15-item Attitude Toward Cancer Screening Scale–Short Form. Data were analyzed using SPSS version 23.0, and $p < 0.05$ was considered statistically significant.

Results:

The mean age of the participants was 37 ± 13 years (range: 18–81), and 80.3% were female. Of the participants, 70% were married and 93.9% had health insurance. In terms

of relationship to the patient, 25.8% were children, 6.1% were spouses, and 68.2% were siblings. A total of 77.3% had received information about cancer, mostly from healthcare professionals (70%). Among those who received information, 71.4% found it useful. While 84.2% reported fear of cancer, only 36.4% had undergone cancer screening. The mean score of the Cancer Information Overload Scale was 18 ± 3.5 (range: 8–26), and the mean score of the Attitude Toward Cancer Screening Scale was 50 ± 8 (range: 23–75). No significant difference was found between genders.

Conclusion:

Although the level of knowledge among relatives of cancer patients was high, screening behaviors were low, and cancer was associated with a high level of fear. It is recommended to reduce cancer information overload, improve the quality of education, and promote participation in screening programs.

Keywords: Cancer, Cancer Screening, Cancer Information Overload, Attitude, Patient Relatives, Early Diagnosis

The Future of Family Medicine in Türkiye, 2050: Demographic and Epidemiological Projections for Patient Load, Chronic Disease, and Geriatric Care

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Objective

This study aims to project the demographic and epidemiological characteristics of the population registered to Family Medicine Units (FMUs) in 2050, based on Turkish Health Statistics and World Health Organization (WHO) population projection data, and to evaluate the future patient care burden in primary healthcare services accordingly.

Materials and Methods

The study utilized data on the number of FMUs and the average population per FMU from Turkish Health Statistics, along with Turkey-specific population projections from the WHO Global Health Observatory (GHO) database. According to WHO projections, the population of Türkiye is expected to reach 91,258,061 by 2050. Based on this total population estimate, the number of FMUs and the average population per unit were calculated. Artificial intelligence support from Claude Sonnet 4.6 (Anthropic) was used during the calculation and synthesis processes. All data were reviewed and verified by the researchers.

Results

In this study, the number of FMUs in Türkiye in 2050 is projected to be approximately 39,087, with an average of 2,335 registered individuals per unit. Based on age distribution, it is estimated that 14.8% of the registered population will be aged 0-14 years, while 63.1% will be aged 15-64 years. Within the adult population, the increasing proportion of individuals aged 45-64 is expected to lead to higher demand for chronic disease management, cardiovascular risk management, and cancer screening programs. The proportion of the geriatric population registered to FMUs is projected to rise to approximately 22.1% by 2050. Within this group, individuals aged 65-74 are expected to constitute 12.2%, while those aged 75 and over will account for 9.9%. In line with WHO GHO 2050 demographic pyramid projections, approximately 58% of individuals aged 75 and over are expected to be women, increasing to 67% among those aged 85 and above. With the growth of the geriatric population, the workload in primary healthcare services is expected to increase, particularly in terms of home visits, polypharmacy management, and monitoring of geriatric syndromes. Assuming that the prevalence of hypertension in the 30-79 age group remains stable, it is estimated that 21.1% of the registered population will consist of hypertensive individuals. Among individuals aged 15 years and older, tobacco use is projected to be 26.5%, adult obesity 33.9%, and childhood and adolescent obesity (ages 5-19) 2.5%.

Conclusion

The findings indicate that the workload of family medicine services will shift from a predominantly pediatric-focused structure toward a model centered on geriatric patients with a high likelihood of multimorbidity. Therefore, strengthening geriatric care in primary healthcare and developing structured follow-up protocols for multimorbidity management are essential. Given the higher proportion of women in older age groups and the greater prevalence of certain health conditions among women, targeted preventive follow-up strategies should be developed, particularly for conditions such as osteoporosis, depression, and social isolation. Additionally, preventive healthcare



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*The Conundrum of Disasters and Technological Change:
A Health Care System with Qualified Family Physicians to Unravel the Enigmatic Uncertainty*

practices and behavior change interventions targeting modifiable risk factors-such as obesity and tobacco use, which are expected to remain prevalent-should be reinforced in primary care in the coming years.

Keywords: Family Medicine, Population Projection, Aging, Geriatric Care

The Effect of Storage Temperature and Waiting Time on Hematological and Biochemical Parameters in Blood Samples: A Standardization Approach for Family Health Centers

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Objective: Family health centers in Türkiye do not provide services under equal conditions in terms of geographic location, transportation, climate, and access to laboratories. Therefore, blood samples may not always be delivered to the laboratory within a short time and may be stored under different temperature conditions. This study aimed to evaluate the effects of storage temperature and pre-analytical waiting time on hematological and biochemical parameters and to contribute to developing a standardized approach for blood sample management in family health centers.

Materials and Methods: This experimental and prospective laboratory study was conducted with 32 healthy volunteers aged 18-35 years who had no known chronic or active disease. Blood samples obtained from each volunteer were stored at room temperature and under +4°C refrigerator conditions. Samples were evaluated for hematological and biochemical parameters at 0, 4, 8, and 24 hours. Storage condition, time, and storage condition x time interaction were analyzed using two-way repeated-measures ANOVA. A p value of <0.05 was considered statistically significant.

Oral Presentation - OP352

Results: Time had a significant effect on many biochemical parameters. Significant time-dependent changes were detected in total iron-binding capacity, direct bilirubin, ALT, GGT, triglyceride, creatine kinase, uric acid, total cholesterol, amylase, creatinine, phosphorus, urea, ALP, calcium, glucose, albumin, chloride, potassium, and sodium levels. The storage condition-time interaction was significant, particularly for total cholesterol, amylase, phosphorus, ALP, calcium, and chloride. Among hematological parameters, WBC, RBC, HGB, and PLT generally remained stable; however, significant changes related to time and storage condition-time interaction were observed in erythrocyte indices such as HCT, MCV, MCHC, RDW-SD, and RDW-CV. These changes became more evident at 8 and 24 hours.

Conclusion: Pre-analytical waiting time is an important variable that may affect blood test results. Samples collected in family health centers should, whenever possible, be delivered to the laboratory and analyzed within the first 4 hours. If delay is unavoidable, biochemical samples should be centrifuged, serum or plasma should be separated, and samples should be transported under +4°C, that is, 2-8°C refrigerator conditions while maintaining the cold chain. Storage at room temperature should be limited to short periods. In delays of 8 hours or longer, deviations in electrolytes, enzymes, lipid parameters, and erythrocyte indices should be considered. If results from samples stored for 24 hours are inconsistent with clinical findings, obtaining a new sample should be considered. A written standard protocol is recommended for blood collection, centrifugation, storage, and transportation processes in family health centers.

Keywords: Family Medicine, Family Health Center, Blood Sample, Pre-Analytical Phase, Hematology, Biochemistry, Storage Conditions

Artificial Intelligence vs. Clinician Expertise in Temporomandibular Disorders Diagnosis and Management: A Comparative Analysis

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Objective:

The aim of this study was to comparatively evaluate the diagnostic and treatment responses to 20 clinical questions regarding temporomandibular disorders (TMD) in dentistry, provided by two large language models (ChatGPT and Gemini), a specialist dentist, and a general practitioner.

Materials and Methods:

Twenty standardized clinical scenarios related to the diagnosis and management of temporomandibular disorders (TMD) were presented to ChatGPT, Gemini, a specialist dentist, and a general practitioner. Each response was independently rated by evaluators using a 6-point Likert scale based on accuracy and clinical appropriateness. The normality of data distribution was confirmed, and one-way analysis of variance (ANOVA) was used to assess differences between groups. In the presence of statistically significant differences, Tukey's HSD post-hoc test was applied for pairwise comparisons. Descriptive statistics were summarized using mean, standard deviation, minimum, and maximum values.

Oral Presentation – OP355

Results:

When diagnostic and treatment scores were evaluated together, the general practitioner achieved a mean score of 4.35. Combined with the higher scores of the specialist dentist, the overall mean score for human clinicians was calculated as 5.46. Among the artificial intelligence models, Gemini achieved a mean score of 5.43, while ChatGPT scored 5.32. Accordingly, human clinicians demonstrated higher performance, particularly in complex and interpretive cases.

Conclusion:

AI-based language models generated satisfactory responses to clinical dentistry scenarios and show promise as clinical decision-support tools. However, the higher mean scores of human clinicians emphasize that clinical experience still makes a significant difference. Therefore, AI systems will yield the most effective results when used in conjunction with human expertise.

Keywords: ChatGPT, Gemini, Clinical Decision Support, Likert Scale

Assessment of Knowledge About Electronic Cigarettes and the Prevalence of Electronic Cigarette Use Among Final-Year Medical Students

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ABSTRACT

Introduction and Aim: Tobacco use remains a significant public health issue both globally and in Turkey. In recent years, electronic cigarettes have become increasingly popular, especially among young people, due to the perception that they are “less harmful.” As future healthcare providers, it is important to assess the knowledge levels and usage patterns of final-year medical students regarding electronic cigarettes. This study aims to evaluate the knowledge and usage frequency of electronic cigarettes among final-year students at Erciyes University Faculty of Medicine.

Materials and Methods: This cross-sectional study was conducted between March 10 and April 10, 2025, at Erciyes University Faculty of Medicine. A total of 152 volunteer final-year students participated in the study by completing a 50-item questionnaire that covered sociodemographic data, knowledge levels, and usage habits regarding electronic cigarettes. Data were analyzed using SPSS version 22.0, with frequency distributions, means, and chi-square tests.

Results: Of the participants, 42.1% reported having tried an electronic cigarette at least once, and 9.2% had used it at least once in the past 30 days. A majority (95.4%) believed that electronic cigarettes are harmful to health. The most commonly cited reason for use was the product’s attractive appearance and scent. Most students acknowledged that e-

Oral Presentation - OP356

cigarettes contain nicotine, are addictive, and may also pose risks through passive exposure.

Conclusion: The findings indicate that medical students generally have a high level of knowledge about electronic cigarettes. However, some misconceptions and gaps in knowledge still persist. These results suggest the need to enhance education on electronic cigarettes and similar products in the medical curriculum. Increasing awareness among students is critical, as they will soon assume roles as healthcare providers and public health advocates.

Keywords: Electronic Cigarette, Medical Students, Knowledge Level, Addiction, Smoking Cessation

Introduction

Tobacco use remains a major public health problem worldwide and in our country. According to the World Health Organization, more than 8 million people die each year due to tobacco, approximately 1.2 million of which are attributable to secondhand exposure. In Türkiye, about 16 million people use tobacco products, and tobacco-related diseases are reported to cause over 100,000 deaths annually. This picture underscores the need for strategies that go beyond classical tobacco control approaches (1).

In recent years, electronic cigarettes (e-cigarettes)—marketed with claims of being “less harmful”—have emerged as a rising product of the tobacco industry and a new domain of addiction that threatens public health (2). Containing nicotine, propylene glycol, flavoring agents, heavy metals, and various volatile organic compounds, these products can exert adverse effects on the respiratory and cardiovascular systems as well as the immune system, and their high addiction potential increases overall risk. The rapid uptake among young people signals a possible increase in the future burden of disease (3).

Young adults are among the groups where e-cigarette use is most frequently observed. University is a life stage in which habits are formed and long-lasting health behaviors

become consolidated. Therefore, assessing university students' knowledge, attitudes, and behaviors regarding tobacco and e-cigarette use is critical (4).

Although there is considerable public awareness about the harms of conventional cigarettes, perceptions concerning e-cigarettes are not at the same level. Messages such as "healthier," "harmless," or "helps with quitting" can lead to misunderstandings, not only in the general population but also among individuals receiving education in health fields. Hence, a systematic examination of medical students' knowledge, awareness, and use behaviors related to e-cigarettes is warranted (5).

Final-year medical students at Erciyes University, with knowledge reinforced by clinical experience, will soon join the healthcare system and play an active role in patient counseling. As these soon-to-graduate physicians will provide smoking-cessation counseling and interact directly with the public, their possession of up-to-date, evidence-based knowledge about new-generation tobacco products will directly influence both their professional practice and the awareness of those they serve.

Materials and Methods

This study employed a cross-sectional design and was conducted at Erciyes University School of Medicine.

Prior to data collection, approval was obtained from the Erciyes University School of Medicine Ethics Committee on January 23, 2025 (decision no. 2025/36). Permission to conduct the study was also obtained from the Dean's Office of Erciyes University School of Medicine on March 5, 2025 (decision no. E-14857630-900-818449). Data were collected between March 10, 2025 and April 10, 2025. The data were entered into and analyzed with SPSS version 22.0 between April 11, 2025 and April 20, 2025.

The study population comprised 240 final-year medical students at Erciyes University. The study was conducted with 152 students who agreed to participate. The sample size

was calculated using the OpenEpi sample size calculator. As it was not practical to reach the entire population, the minimum required sample size was estimated in OpenEpi assuming a 95% confidence level, 5% margin of error, and an expected prevalence of 50% (unknown). The calculated minimum sample size was 148 participants.

Results

4.1. Sociodemographic Characteristics of Participants

By sex, 53.9% of participants were female and 46.1% were male (Table 1). Regarding monthly income, 38.8% reported 0–22,500 TRY, 57.2% reported 22,500–45,000 TRY, and 3.9% reported ≥45,000 TRY (Table 1). In terms of residence, 54.6% lived in a shared apartment/student house; 30.9% lived with family; 4.6% in a private dormitory; and 9.9% in a state dormitory (Table 1). Concerning chronic illness, 17.1% reported at least one chronic condition while 82.9% reported none (Table 1).

Table 1. Sociodemographic characteristics of participants (N = 152)

Variable	Category	n	%
Sex	Female	82	53.9
	Male	70	46.1
Monthly income (TRY)	0–22,500	59	38.8
	22,500–45,000	87	57.2
	≥45,000	6	3.9
Residence	Shared apartment/student house	83	54.6
	Private dormitory	7	4.6
	State dormitory	15	9.9
	With family	47	30.9
	Other	0	0.0
Chronic illness	None	126	82.9
	Present	26	17.1

4.2. Knowledge About Electronic Cigarettes

Only 1.3% (n = 2) agreed that “e-cigarettes are not addictive,” 11.8% (n = 18) were unsure, and 86.8% (n = 132) disagreed (Table 2). The proportion considering e-cigarettes harmful to health was very high (95.4%; n = 145); 0.7% (n = 1) disagreed and 3.9% (n = 6) were unsure (Table 2). No participant agreed with the statement “e-cigarettes are only water vapor”; 89.5% (n = 136) disagreed and 10.5% (n = 16) were unsure (Table 2). Similarly, 86.8% (n = 132) disagreed that “e-cigarettes do not cause cancer,” 10.5% (n = 16) were unsure, and 2.6% (n = 4) agreed (Table 2).

Regarding content, 54.6% (n = 83) agreed that e-cigarettes contain heavy metals (nickel, tin, lead); 44.1% (n = 67) were unsure; and 1.3% (n = 2) disagreed (Table 2). Concerning tobacco content, 32.9% (n = 50) agreed they contain tobacco, 44.1% (n = 67) were unsure, and 23.0% (n = 35) disagreed (Table 2). Awareness of nicotine content was higher: 75.0% (n = 114) agreed that e-cigarettes contain nicotine; 24.3% (n = 37) were unsure; and 0.7% (n = 1) disagreed (Table 2).

For comparative health risks, 71.7% (n = 109) disagreed that “cancer risk is lower in e-cigarette users”; 26.3% (n = 40) were unsure; and 2.0% (n = 3) agreed (Table 2). Likewise, 82.9% (n = 126) disagreed that e-cigarettes “do not cause cardiovascular disease”; 15.8% (n = 24) were unsure; and 1.3% (n = 2) agreed (Table 2). The statement “there are no harmful effects on infants and children” was rejected by 92.1% (n = 140), while 7.9% (n = 12) were unsure (Table 2). The claim “they do not have an enticing effect on children” was rejected by 94.1% (n = 143), with 5.9% (n = 9) unsure (Table 2). Regarding pregnancy, 92.1% (n = 140) disagreed that “e-cigarettes can be used during pregnancy,” and 7.9% (n = 12) were unsure (Table 2).

With respect to regulation and use practices, 25.7% (n = 39) agreed that “e-cigarette sales are legal,” 41.4% (n = 63) were unsure, and 32.9% (n = 50) disagreed (Table 2). The notion that e-cigarettes “can aid smoking cessation” was rejected by 62.5% (n = 95), 28.3% (n = 43) were unsure, and 9.2% (n = 14) agreed (Table 2). A total of 62.5% (n = 95) agreed there is a “risk of explosion during use,” 34.9% (n = 53) were unsure, and 2.6% (n = 4)

disagreed (Table 2). The statement that e-cigarettes “can be used in smoke-free areas” was rejected by 69.1% (n = 105); 24.3% (n = 37) were unsure; and 6.6% (n = 10) agreed (Table 2). Finally, 94.1% (n = 143) rejected the claim “they can be used without limitation and are harmless,” 5.9% (n = 9) were unsure, and none agreed (Table 2).

Table 2. Knowledge about electronic cigarettes

Statement	Agree n (%)	Unsure n (%)	Disagree n (%)
E-cigarettes are not addictive	2 (1.3)	18 (11.8)	132 (86.8)
E-cigarettes are harmful to health	145 (95.4)	6 (3.9)	1 (0.7)
E-cigarettes are only water vapor	0 (0.0)	16 (10.5)	136 (89.5)
E-cigarettes do not cause cancer	4 (2.6)	16 (10.5)	132 (86.8)
E-cigarettes contain heavy metals (e.g., nickel, tin, lead)	83 (54.6)	67 (44.1)	2 (1.3)
E-cigarettes contain tobacco	50 (32.9)	67 (44.1)	35 (23.0)
E-cigarettes contain nicotine	114 (75.0)	37 (24.3)	1 (0.7)
Cancer risk is lower among e-cigarette users	3 (2.0)	40 (26.3)	109 (71.7)
E-cigarettes do not cause cardiovascular disease	2 (1.3)	24 (15.8)	126 (82.9)
No harmful effects on infants and children	0 (0.0)	12 (7.9)	140 (92.1)
No enticing effect on children	0 (0.0)	9 (5.9)	143 (94.1)
E-cigarettes can be used during pregnancy	0 (0.0)	12 (7.9)	140 (92.1)
E-cigarette sales are legal	39 (25.7)	63 (41.4)	50 (32.9)
They can be used to aid smoking cessation	14 (9.2)	43 (28.3)	95 (62.5)
Risk of explosion during use	95 (62.5)	53 (34.9)	4 (2.6)
They can be used in smoke-free areas	10 (6.6)	37 (24.3)	105 (69.1)
They can be used without limitation and are harmless	0 (0.0)	9 (5.9)	143 (94.1)

4.3. Experimentation/Use and Reasons for Use

In total, 42.1% (n = 64) reported having tried an e-cigarette at least once, while 57.9% (n = 88) had never tried one (Table 3). For the past 30 days, the vast majority (88.2%; n = 134) reported no use. Moreover, 9.2% (n = 14) reported use on ≤10 occasions; 0.7% (n = 1) on 11–20 occasions; and 2.0% (n = 3) on ≥31 occasions (Table 3).

The most frequent motivation for use among those who had tried e-cigarettes was the product’s appealing appearance and smell (32.9%; n = 50). A total of 57.9% (n = 88)

reported never having tried/used e-cigarettes. Other reasons included using them for smoking cessation (4.6%; n = 7) and perceiving them as less harmful than conventional cigarettes (1.3%; n = 2). A further 3.3% (n = 5) cited other reasons (Table 4).

Table 3. E-cigarette experimentation and use

Variable	Category	n	%
Ever tried an e-cigarette	Yes	64	42.1
	No	88	57.9
Past-30-day frequency	No use	134	88.2
	≤10 times	14	9.2
	11–20 times	1	0.7
	21–30 times	0	0.0
	≥31 times	3	2.0

Table 4. Reasons for e-cigarette use

Reason	n	%
Never tried/never used	88	57.9
Appealing appearance and smell	50	32.9
To quit smoking	7	4.6
Perceived as less harmful substitute for cigarettes	2	1.3
Other	5	3.3

4.4. Exposure to E-cigarette Advertising

A total of 24.3% (n = 37) reported having seen e-cigarette advertisements, while 75.7% (n = 115) had not. Among those exposed, 94.6% (n = 35) encountered such advertisements on social media, and 5.4% (n = 2) via television. No participant reported seeing ads in magazines or other media (Table 5).

Table 5. Exposure to e-cigarette advertising

Variable	Category	n	%
Saw an e-cigarette advertisement	Yes	37	24.3
	No	115	75.7
Where the ad was seen	Television	2	5.4
	Social media	35	94.6
	Magazine	0	0.0
	Other	0	0.0

4.5. Awareness and Experimentation by Sociodemographics

Women's awareness of e-cigarettes was slightly higher (52.4%) than men's (47.6%), but the difference was not statistically significant ($p = 0.179$). In contrast, experimentation was significantly more common among men (60.9%) than women (39.1%) ($p < 0.05$), suggesting that sex may be a determinant of e-cigarette experimentation. Monthly income was not associated with awareness or experimentation ($p = 0.511$ and $p = 0.422$, respectively). Residence type did not significantly affect awareness or experimentation ($p = 0.646$ and $p = 0.365$, respectively), though the highest proportions were observed among those living in shared apartments/student houses. Those without chronic illness showed higher awareness and experimentation proportions, but differences were not statistically significant ($p = 0.359$ and $p = 0.528$, respectively) (Table 6).

Table 6. Awareness and experimentation by sociodemographic characteristics

Characteristic	Awareness – Yes n (%)	Awareness – No n (%)	Experimentation – Yes n (%)	Experimentation – No n (%)	p (awareness)	p (experimentation)
Sex					0.179	0.003**
Female	75 (52.4)	7 (77.8)	25 (39.1)	57 (64.8)		
Male	68 (47.6)	2 (22.2)	39 (60.9)	31 (35.2)		
Monthly income (TRY)					0.511	0.422
0–22,500	54 (37.8)	5 (55.6)	23 (35.9)	36 (40.9)		
22,500–45,000	83 (58.0)	4 (44.4)	37 (57.8)	50 (56.8)		
≥45,000	6 (4.2)	0 (0.0)	4 (6.3)	2 (2.3)		
Residence					0.646	0.365
Shared apartment/student house	77 (53.8)	6 (66.7)	36 (56.3)	47 (53.4)		
Private dormitory	7 (4.9)	0 (0.0)	1 (1.6)	6 (6.8)		

State dormitory	15 (10.5)	0 (0.0)	5 (7.8)	10 (11.4)		
With family	44 (30.8)	3 (33.3)	22 (34.4)	25 (28.4)		
Other	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)		
Chronic illness					0.359	0.528
None	117 (81.8)	9 (100.0)	55 (85.9)	71 (80.7)		
Present	26 (18.2)	0 (0.0)	9 (14.1)	17 (19.3)		

Percentages in some "No" columns reflect the distribution within that subgroup, as provided by the dataset. **p < 0.05** indicates statistical significance.

Discussion

A total of 152 individuals were included. The mean age was 24.70 ± 3.21 years (median = 24; range: 22–45). Women constituted 53.9% of the sample. Regarding awareness, 94.1% reported having heard of e-cigarettes. In terms of use, 42.1% reported having tried an e-cigarette at least once, and 11.8% reported use within the past 30 days.

International data provide context for these findings. In a 2013 survey conducted in four countries (USA, UK, Canada, Australia), 46.6% were aware of e-cigarettes, 7.6% had tried them at least once, and 2.9% were current users (6). In Indonesia, for example, the 2011 Global Adult Tobacco Survey reported that 10.9% of adults were aware of e-cigarettes and only 0.3% used them (7). A comprehensive systematic review covering Europe and North America (49 studies) showed that awareness rose from 16% in 2009 to 58% in 2011, while ever-use increased from 1% to 6% over the same period (7).

The high awareness among medical students may be explained by their faster and more effective access to health-related information. The relatively high experimentation rate may reflect age-related curiosity. Overall, our study indicates very high awareness and higher experimentation/regular use rates among final-year medical students compared with many general-population reports. These findings serve as an important alert for institutions providing health education.

Among those who had used e-cigarettes at least once, the most common motivation was the product's appealing appearance and smell (78.1%; n = 50 of the 64 who had tried).

This was followed by use for smoking cessation (10.9%; $n = 7$) and the belief that e-cigarettes are less harmful than conventional cigarettes (3.1%; $n = 2$). In a study among medical students, 89.2% reported liking the aroma/smell of e-cigarettes (8). In adult samples, 87% reported choosing e-cigarettes because they believed them to be less harmful (9). Another adult study found that 85.1% used e-cigarettes for smoking cessation (6), while in a separate report 51.3% regarded e-cigarettes as an aid to quitting (10). Compared with adult populations, the relatively lower “use to quit” rate among students may reflect differences in age, experience, and motivational profiles in this health-educated young cohort.

When asked whether e-cigarette sales are legal, 25.7% believed sales are legal, 32.9% believed they are illegal, and 41.4% were unsure. Legal status varies across countries. Sales are generally legal in the USA, UK (including England), China, New Zealand, and many EU countries, whereas trade is banned in countries such as Australia, Norway, Singapore, Indonesia, Uruguay, Brazil, Canada, Denmark, and Switzerland (11). Even in jurisdictions where sales are legal, restrictive measures are increasingly implemented as evidence on potential harms accumulates. For instance, the Indonesian Food and Drug Authority has issued public advisories that e-cigarettes may pose higher risks compared with conventional tobacco. In Türkiye, there is no e-cigarette brand approved by the Turkish Medicines and Medical Devices Agency; accordingly, trade in e-cigarettes is not legal and products are largely obtained unlawfully or via the internet (12).

The substantial uncertainty among interns about legal status indicates gaps in knowledge and awareness. Despite the illegality of e-cigarette trade in Türkiye, such uncertainty among health professionals could create room for overlooking potential health risks.

In our study, the ever-use (experimentation) rate was significantly higher among male interns (60.9%) than female interns (39.1%) ($p < 0.05$). A study in İzmir reported no significant difference in dependence level by sex (13). Conversely, another university-based study found higher dependence scores among men than women (11), while yet

another reported no significant association between sex and dependence severity (14). Thus, while our finding aligns with some studies, other reports do not detect sex-based differences. The impact of sex on dependence behaviors may vary with sample characteristics and sociocultural factors.

Conclusion

This study examined knowledge, attitudes, and behaviors related to e-cigarettes among final-year medical students and yielded important insights. While awareness was very high, use was also notable. The product's appealing appearance and smell, ease of use in enclosed spaces, and enticing content on social media platforms emerged as key determinants of e-cigarette uptake among young adults.

A considerable proportion of interns reported having tried e-cigarettes, and some reported regular use. The persistence of interest even among individuals trained in health sciences suggests that prevalence in the general population could be higher. The higher use among men suggests that sex may act as a relevant variable.

Given the enticing portrayal of e-cigarettes across social and digital media, regulatory oversight in these domains should be strengthened. Tight control of social-media advertising, effective digital monitoring, and enforcement mechanisms against illegal promotion and sales are essential. In parallel, creative and engaging awareness campaigns targeting young people are needed to raise public consciousness about harms.

Despite regulations, continued online marketing and sales indicate enforcement gaps. Stronger deterrent measures should be applied to platforms and accounts engaging in illegal sales, and online access channels to these products should be restricted.

In summary, e-cigarette use is on the rise among young people and even among those training in the health professions, posing a significant public health risk at both individual and societal levels. Tobacco control policies should be broadened to include new-

generation nicotine products, adopting a multidimensional approach that integrates education, legislation, individual awareness, and public policy.

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Evaluation of the Relationship Between the Factors Affecting Cigarette Use, Smoking Cessation Behaviors and Perceived Stress Level of Research Assistants in a University Hospital

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Objective: In this study, we aimed to investigate the relationship between the factors affecting smoking, smoking cessation behaviors and perceived stress levels of research assistants in a university hospital.

Materials and Method: This cross-sectional study was conducted on 377 research assistants working at Erciyes University Faculty of Medicine in 2024. The aim of the study was to examine the relationship between the factors affecting smoking, smoking cessation behaviors and perceived stress level in physician assistants. The sample size was calculated as a minimum of 256 people in power analysis with a 5% margin of error at 95% confidence interval.

Results: A total of 377 research assistants working in basic, internal and surgical departments at Erciyes University Faculty of Medicine Hospital participated in our study. Of the participants, 216 (57.3%) were female and 161 (42.7%) were male, with a mean age of 29.86 years (SD: 4.63). While 211 (56.0%) of the participants were married/cohabiting, 166 (44.0%) were single/separated. Of the participants, 102 (27.1%) had at least one child. The proportion of participants with chronic diseases was 11.7% (n = 44).

Oral Presentation - OP359

Conclusion:

In our study, it was found that the smoking rate among physicians was high, similar to the general population. This suggests that physicians, like other individuals, need interventions and support to quit smoking in order to overcome smoking addiction.

It is important that all physicians who are seen as role models in the society, especially primary care physicians who provide preventive health care services, are more active and conscious about smoking and tobacco addiction, which is one of the most important public health problems of today and whose damages to health can be prevented with effective methods. There is a need to produce the necessary strategies, to give the necessary importance to smoking cessation, to increase the number and quality of trainings to increase the awareness of

Introduction and Objective: Tobacco use is a preventable cause of morbidity and mortality. In addition, tobacco addiction is a serious global public health threat that caused 100 million deaths in the twentieth century and will cause 1 billion deaths in the twenty-first century. Tobacco consumption is a risk factor for six of the eight diseases that cause the most deaths in the world. Tobacco use causes many fatal diseases due to both direct and passive smoke exposure (1).

Although physicians have an important role in the fight against smoking, some physicians still smoke. According to a systematic review and meta-analysis published in 2021 on the prevalence of smoking among physicians, the overall smoking rate was found to be 21% among 246 studies and 497,081 physicians, and the highest rate was found in medical school students with a frequency of 25% and in family physicians with a frequency of 24% (2). Healthcare workers are at risk in terms of mental symptoms and mood changes that occur due to the nature and burden of the work (3, 4). In addition to this, some studies have reported that stressors related to occupational factors cause physicians to smoke (5, 6).

Many studies have indicated that healthcare workers consume tobacco products due to increased stress (3). A study analyzing 217,561 individuals from forty-one African, American, Asian and European countries shows that perceived stress is significantly associated with higher smoking rates. This study showed that among those who smoked regularly every day, those with higher levels of perceived stress were at greater risk of smoking (7). It has been shown that there is a strong relationship between perceived stress level and self-reported nicotine withdrawal symptoms in smokers and that perceived stress level may exacerbate nicotine withdrawal symptoms (8).

Healthcare professionals have a much more important role than other individuals in preventing the occurrence of diseases and promoting a healthy life. Physicians and healthcare professionals should play an active role in patient education and in the formulation of effective tobacco control policies. It is considered as a simple and effective method in the fight against tobacco use that physicians question the smoking status of the patient who applies to them for examination with any complaint and advise him/her to quit smoking, and it is reported that 5-10% of patients quit smoking in one year with this recommendation alone (9). In the fight against tobacco and tobacco product use, physicians should both inform their patients about the harms of smoking and be good role models. The fact that physicians are smokers may lead to insufficient information in preventive health services and may decrease the patients' belief in the physician for smoking cessation (10). In this study, we aimed to investigate the relationship between the factors affecting smoking, smoking cessation behaviors and perceived stress levels of research assistants in a university hospital.

Materials and Method: This cross-sectional study was conducted on 377 research assistants working at Erciyes University Faculty of Medicine in 2024. The aim of the study was to examine the relationship between the factors affecting smoking, smoking cessation behaviors and perceived stress level in physician assistants. The sample size was calculated as a minimum of 256 people in power analysis with a 5% margin of error at 95% confidence interval. Statistical analysis was performed using SPSS (Statistical

Package for the Social Sciences) 28.0 package program and Graphpad Prism version 10.0.3. Visual inspection of values and histogram graphs were used to evaluate the normal distribution. The skewness value is used to measure the symmetry of a distribution. Positive skewness indicates that the distribution is skewed to the right, while negative skewness indicates that the distribution is skewed to the left. Kurtosis gives information about the shape of the tails and peak of a distribution. High kurtosis values mean a pointed and narrow peak, while low kurtosis values indicate a more spread out and rounded peak. For normally distributed parameters, Student's t-test was used in pairwise group analyses and One-way ANOVA test was used in multiple group analyses. For parameters that did not show normal distribution, Mann-Whitney U-test was used in paired group analyses and Kruskal-Wallis test was used in multiple group analyses. Correlations between variables were evaluated by Spearman correlation analysis. The results of the analysis were presented in tables and graphs. Statistical significance level was accepted as $p < 0.05$ in all tests.

Results: A total of 377 research assistants working in basic, internal and surgical departments at Erciyes University Faculty of Medicine Hospital participated in our study. Of the participants, 216 (57.3%) were female and 161 (42.7%) were male, with a mean age of 29.86 years (SD: 4.63). While 211 (56.0%) of the participants were married/cohabiting, 166 (44.0%) were single/separated. Of the participants, 102 (27.1%) had at least one child. The proportion of participants with chronic diseases was 11.7% ($n = 44$). Descriptive characteristics of the participants are summarized in Table 1.

Table 1. Descriptive characteristics of the participants (research assistants) ($n = 377$)		
	$\bar{x}$	ss
Age, (years)	29,86	4,63
	n	%
Gender		
Female	216	57,3
Male	161	42,7
Marital status		
Married / Together	211	56,0

Single/Separated	166	44,0
Child status		
There is	102	27,1
No	275	72,9
Chronic disease		
There is	44	11,7
No	333	88,3
Income status		
Income > Expense	131	34,7
Income < Expense	61	16,2
Income = Expense	185	49,1
n: Number of units, %: Percentage value, $\bar{x}$: Mean, ss: Standard deviation		

The professional characteristics of the participants are summarized in Table 2. While 265 (70.3%) of the participants were continuing their specialty training in an internal department, the proportion of participants continuing their specialty training in a surgical department was approximately 1/4 (24.7%) (93 people). Approximately 3/4 of the research assistants (70.6%) stated that they were on call at least once a month. Approximately half of the participants (47.7%) described their job as “moderately” difficult, while 44.0% of the participants described their job as “difficult”.

Table 2. Occupational characteristics of the participants (n = 377)

	n	%
Department		
Basic sciences	19	5,0
Internal sciences	265	70,3
Surgical sciences	93	24,7
Active patient care		
Yes	340	92,0
No	37	8,0
Shift status		
There is	266	70,6
No	111	29,4
Number of shifts per month		
No	111	29,4
1–4	86	22,8
5–8	180	47,7

How would you describe your job?		
Easy	31	8,2
Middle	180	47,7
Difficult	166	44,0
How would you describe your work environment?		
Good.	255	67,6
Bad	122	32,4

n: Number of units, %: Percentage value

The characteristics of the participants regarding smoking are summarized in Table 3. Approximately 3/4 (70.3%) of the participants (265 people) stated that they had never smoked before or had quit smoking. Therefore, some statistical analyses were only performed on participants who continued to smoke (regularly or rarely).

Table 3. Characteristics of the participants regarding smoking

	n	%
Smoking status		
Never drank / quit (does not drink)	265	70,3
I rarely drink / drink regularly (drinks)	112	29,7
Age at first cigarette smoking		
< 18	6	5,4
18–25	69	61,6
> 25	37	33,0
Non-cigarette tobacco product use		
No	352	93,4
There is	25	6,6
Cigarette type		
Filtered cigarette	102	91,1
Unfiltered cigarette	3	2,7
Filtered + Electronic	7	6,3
In which time period do you smoke more?		
Working hours	62	55,4
Out of hours	50	44,6
Smoking after starting to practice medicine		
Increased	74	66,1
Unchanged	34	30,4
Decreased	4	3,6
Busy working hours		
Increases	72	64,3
Does not change	30	26,8
Reduces	10	8,9
Furious incident during working hours		
Increases	98	87,5

Does not change	14	12,5
Feelings of inadequacy at work		
Increases	71	63,4
Does not change	38	33,9
Reduces	3	2,7
Shifts		
Increases	74	66,1
Does not change	32	28,6
Reduces	6	5,4
A cigarette is an opportunity for a break.		
I agree.	65	58,0
Undecided	14	12,5
Disagree	33	29,5
Cigarettes are relaxing.		
I agree.	70	62,5
Undecided	23	20,5
Disagree	19	17,0
Smoking status in the immediate environment		
My wife smokes	42	11,1
My mom smokes	32	8,5
My father smokes	95	25,2
My brother(s) smoke	91	24,1
My friends smoke	229	60,7
No one in my close circle smokes	67	17,8
Reasons for starting to smoke		
Having users in the family	7	6,3
Having friends among friends who use it	75	67,0
Stress and distress	55	49,1
Wannabe and fad	18	16,1
Work environment	37	33,0
Starting a career	13	11,6
Other	5	4,5
n: Number of units, %: Percentage value		

Participants' experiences with smoking cessation are summarized in Table 4. Approximately 2/3 of the participants (66.1%) (74 people) stated that they had thought about quitting smoking at least once. However, about half of the participants (49.1%) (55 people) had never attempted to quit smoking.

Table 4. Participants' experiences regarding smoking cessation

	n	%
Have you ever thought about quitting smoking?		

Yes	74	66,1
No/don't remember	38	33,9
Have you ever tried to quit smoking?		
Yes	57	50,9
No	55	49,1
Reasons for attempted smoking cessation		
Health problems	6	7,9
Family request	15	19,7
Professional responsibility	14	18,4
Public service announcements	3	3,9
The idea that it is harmful	66	86,8
Pregnancy and breastfeeding	3	3,9
Being a good role model	21	27,6
Other	2	2,6
The methods you use to quit smoking		
Pharmacological methods	11	14,5
Alternative medicine techniques	2	2,6
Motivational interviewing	—	—
Smoking cessation clinic	4	5,3
Individual effort	71	93,4

n: Number of units, %: Percentage value

Some questions were prepared by the researcher to evaluate the attitudes of research assistants towards smoking while practicing their profession. The answers of the participants to these questions are summarized in Table 5.

Table 5. Participants' attitudes towards smoking while practicing their profession

	n	%
I question the smoking status of patients hospitalized in outpatient clinic and ward.		
Always	123	32,6
Frequently	120	31,8
Sometimes	82	21,8
Nothing.	22	5,8
I question patients who smoke about their thoughts on quitting smoking.		
Always	52	13,8
Frequently	102	27,1
Sometimes	124	32,9
Nothing.	69	18,3
I advise my patients who smoke to quit smoking.		

Always	121	32,1
Frequently	132	35,0
Sometimes	73	19,4
Nothing.	21	5,6
I inform my patients about the harms of smoking and the diseases caused by smoking.		
Always	62	16,4
Frequently	147	39,0
Sometimes	103	27,3
Nothing.	35	9,3
I inform my smoking patients about smoking cessation methods.		
Always	32	8,5
Frequently	85	22,5
Sometimes	137	36,3
Nothing.	93	24,7

n: Number of units, %: Percentage value. Note: Since not all participants responded to all questions, there is missing data. Therefore, the sum of the percentages is not 100.

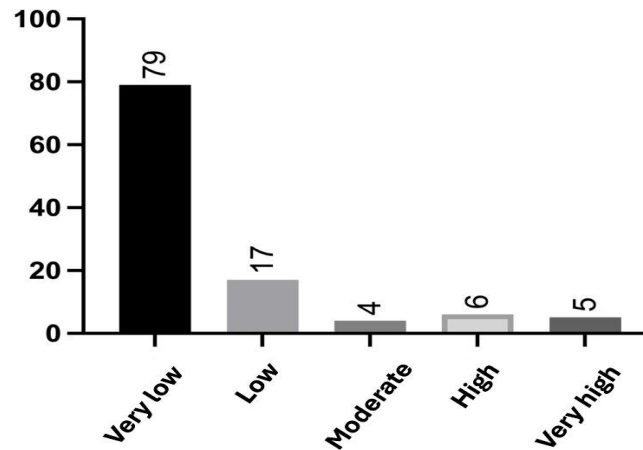
During the statistical analysis process, the psychometric properties of the scales used in the current study were examined. The mean Fagerstrom Nicotine Dependence Test (FNBT) score of the participants was 1.71 (standard deviation: 2.52). The minimum score was 0 and the maximum score was 10. The internal consistency coefficient (Cronbach's alpha) of the FNBT was calculated as 0.818 (Table 6).

Table 6: Statistics of Fagerstrom Nicotine Dependence Test

$\bar{x}$	ss	Minimum	Maksimum	Cronbach alfa
1,71	2,52	0	10	0,818

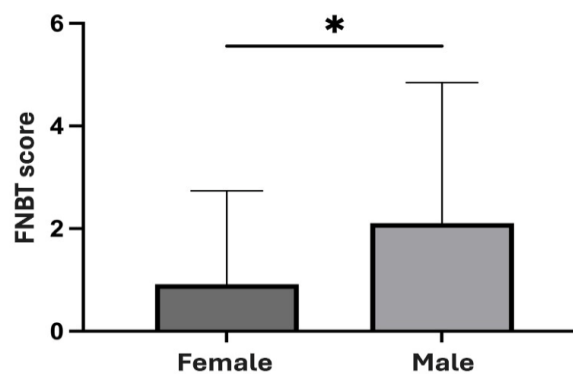
$\bar{x}$: Mean, ss: Standard deviation

The addiction levels of the participants according to their FNBT scores are shown in Graph 1.



Graph 1. Smoking dependence levels of the participants according to FNBT scores

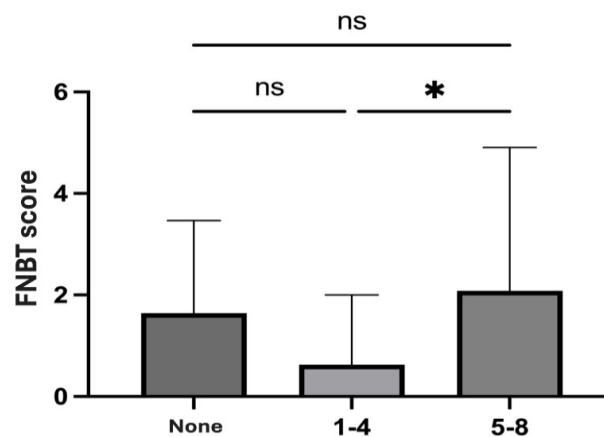
When the changes in FNBT scores according to the descriptive characteristics were analyzed, it was observed that the scale scores differed significantly according to gender. FNBT scores of men were significantly higher than those of women ($z = -2.527$, $p = 0.011$) (Graph 2).



Graph 2. Distribution of FNBT scores according to men and women

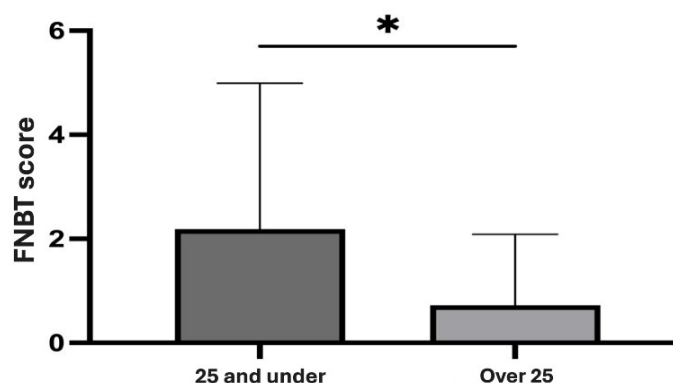
There was no statistically significant difference in FNBT scores according to age, marital status, child status, presence of chronic diseases and income status. Chi-square analysis revealed that the rate of smoking in participants who continued their specialty training in surgical departments was statistically significantly higher than the rate in participants who continued their specialty training in basic/internal branches ($\chi^2 = 29.08$, $p < 0.001$).

The relationship between the participants' occupational characteristics and FNBT scale scores was also evaluated. Research assistants who worked 5 to 8 shifts had statistically significantly higher FNBT scores than participants who worked 1 to 4 shifts ($p = 0.024$) (Graph 3).



Graph 3. Distribution of FNBT scores according to the number of seizures

When the relationship between participants' smoking characteristics and FNBT scores was evaluated, the FNBT scores of research assistants who started smoking before the age of 25 were significantly higher than those who started smoking after the age of 25 ($z = -2.524$, $p = 0.012$) (Graph 4).



Graph 4. Distribution of FNBT scores according to age at smoking initiation

A correlation analysis was performed to assess whether there was a relationship between the participants' medical experience and FNBT scores. The mean duration of medical experience was 4.84 years and there was no statistically significant correlation with FNBT scores ($r_s = -0.038$, $p = 0.691$). The mean duration of smoking was 6.68 years and there was a statistically significant and positive correlation with FNBT scores ($r_s = 0.389$, $p < 0.001$).

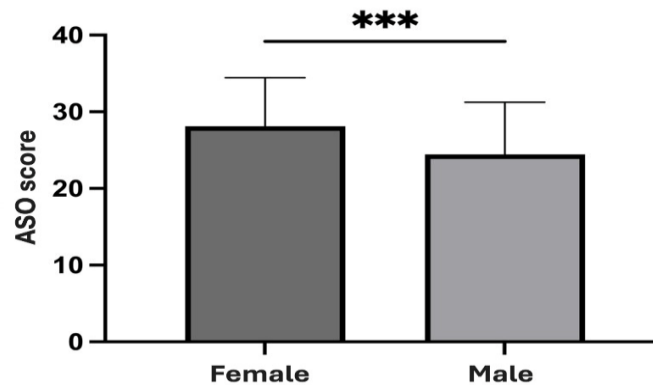
A Chi-square analysis was performed to evaluate the relationship between smokers in the immediate environment and smoking status of the participants. As a result of the analysis, the smoking rates of participants whose siblings ($\chi^2 = 4.401$, $p = 0.036$) and friends ($\chi^2 = 23.42$, $p < 0.001$) smoked were significantly higher than the others. On the contrary, the smoking rates of the participants who had no smokers around them were significantly lower than the other group ($\chi^2 = 16.805$, $p < 0.001$). The smoking status of the spouse, mother and father was not significantly related to the smoking status of the participants.

The mean score obtained from the Perceived Stress Scale (PSS), another scale used in the study, was 26.55 (SD: 6.78). The minimum score obtained from the scale is 3 and the maximum score is 51. The internal consistency coefficient (Cronbach's alpha) of the scale in the current sample was found to be 0.863 (Table 7).

Table 7: Statistics of Perceived Stress Scale

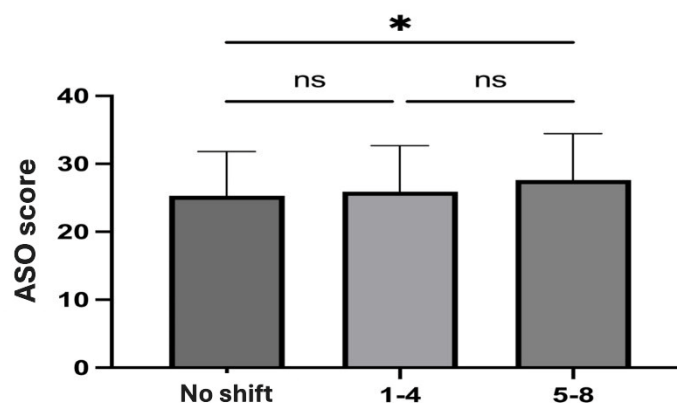
$\bar{x}$	ss	Minimum	Maksimum	Cronbach alfa
26,55	6,78	3	51	0,863
$\bar{x}$:Mean, ss: Standard deviation				

As a result of the statistical analysis, female research assistants had statistically significantly higher ASS scores than males ($t = 5.365$, $p < 0.001$) (Graph 6). On the other hand, other descriptive variables such as marital status, having or not having children, chronic disease status and income status did not statistically significantly differentiate ASQ scores.



Graph 6. ASQ scores according to gender

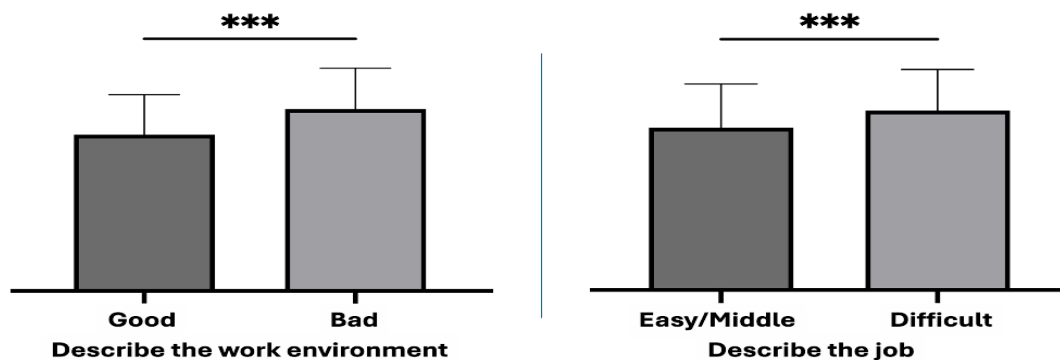
When the relationship between the occupational characteristics of the participants and their ASQ scores was analyzed, the scale scores of the participants who were on call were statistically significantly higher than those of the participants who were not on call ($t = 2.304$, $p = 0.022$). The one-way ANOVA test revealed that participants who had between 5 and 8 seizures per month had significantly higher ASS scores than participants who did not have seizures; however, they did not differ significantly from participants who had between 1 and 4 seizures per month ($F = 4.584$, $p = 0.011$) (Graph 7).



Graph 7. Participants' ASQ scores according to seizure status

As a result of the statistical analysis conducted to evaluate the ASQ scores of the participants according to their description of their jobs and working environment, the

ASQ scores of the research assistants who described their jobs as “difficult” and their working environment as “bad” were statistically significantly higher than the others ($p < 0.001$) (Graph 8).



Graph 8. ASQ scores according to job and working environment descriptions

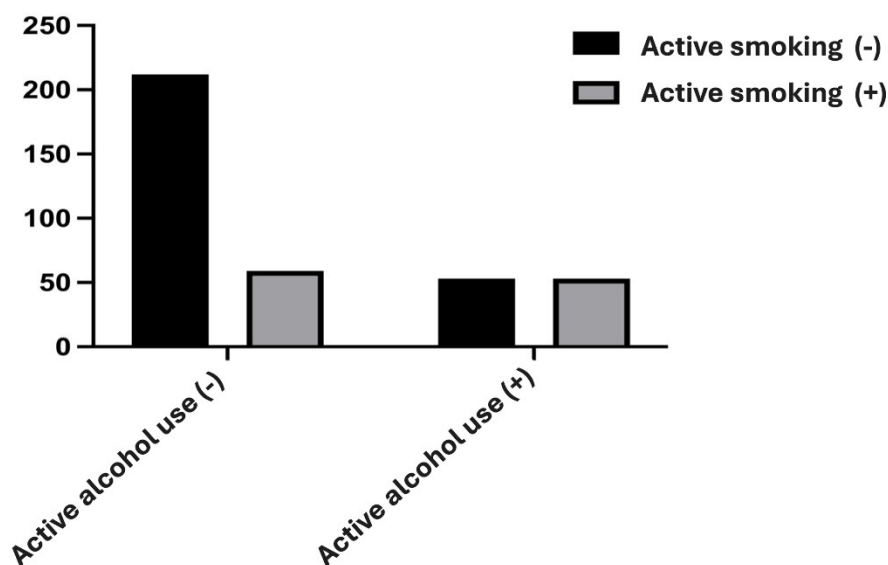
As a result of the statistical analyses performed to examine the relationship between the participants' smoking characteristics and ASQ scores, no statistically significant difference was found between the ASQ scores of the participants who actively smoked or who did not actively smoke. Similarly, statistical analyses evaluating the difference in ASQ scores according to characteristics such as the situations that change smoking, the time period in which cigarettes are consumed more, did not find a significant result.

As a result of the correlation analysis performed to evaluate the relationship between the two important outcomes of the current study, FNBT scores and ASQ scores, no statistically significant relationship was found between the two variables ($r_s = 0.001$, $p = 0.990$).

Chi-square analysis was performed to evaluate the relationship between the participants' attitudes towards smoking while practicing their profession and the department and active smoking. While 78.4% of the research assistants working in the surgical department answered “often/always” to the question of “questioning the smoking status of patients”, this rate was 67.8% among physicians working in internal branches ($\chi^2 = 3.95$, $p = 0.047$). On the other hand, the proportion of internal medicine residents (37.5%) who answered “often/always” to the question “informing patients about smoking

cessation techniques” was significantly higher than that of surgical medicine residents (22.7%) ($\chi^2 = 6.37$, $p = 0.012$). Moreover, among research assistants who were active smokers, the proportion of those who answered “often/always” to the question of “inquiring about patients’ smoking status” was 73.8% ($\chi^2 = 5.17$, $p = 0.023$), while this rate was 61.8% among those who were not active smokers ($\chi^2 = 5.17$, $p = 0.023$).

The relationship between participants’ alcohol use and smoking was evaluated. Chi-square analysis showed that the smoking rate of research assistants who actively used alcohol (rarely or regularly) was statistically significantly higher than that of participants who did not actively use alcohol ($\chi^2 = 29.08$, $p < 0.001$) (Graph 9). On the other hand, there was no statistically significant difference between the FNBT and ASQ scores of research assistants who actively drink alcohol (rarely or regularly) and those who do not actively drink alcohol.



Graph 9. Active smoking according to active alcohol use

Discussion: In this study, it was aimed to investigate the relationship between the factors affecting smoking, smoking cessation behaviors and perceived stress level among resident physicians working at Erciyes University Faculty of Medicine in 2024. The data obtained as a result of the study were compared and discussed with the existing literature.

In our study, the proportion of research assistant physicians who were active smokers was 29.7% (n=112), and the proportion of physicians who never smoked or quit smoking, that is, who did not actively smoke, was 70.3% (n=265). In the Turkish Health Statistics Yearbook 2021, it was reported that the prevalence of tobacco product use in our country was 28% (11). These findings show that the prevalence of smoking among physicians in our country is similar to the general population. According to a systematic review and meta-analysis published in 2021, the overall prevalence of smoking was reported as 21% among 246 studies and 497,081 physicians worldwide (2). When we look at the rates of smoking among physicians in some countries of the world; it was reported to be 3% in Australia, 6% in Sweden, 7% in England, 24.5% in Denmark, 34.5% in Spain, 36.5% in China, and 52.5% in Bosnia and Herzegovina. As a result of 22 studies conducted in Turkey, the prevalence of smoking among physicians was found to be between 32.6-66.2% (12). When the literature is examined, the results of previous studies and the results of our study show that the rate of smoking among physicians is high. These results may indicate that physicians, who are considered to be more conscious about the health hazards and dangers of smoking than other individuals in the society and who are accepted as role models, need to be supported to quit smoking.

In our study, when the changes of FNBT scores according to descriptive characteristics were analyzed, it was observed that the scale scores differed significantly according to gender and FNBT scores of males were found to be significantly higher than females. When we examined the literature, similar to our study, in the study of Alışkın et al. it was observed that the level of addiction was higher in males among health workers who smoked (13). In Yemenici's thesis study, similar to our study, the level of dependence was found to be higher in men than in women (14). The fact that men have higher nicotine dependence levels compared to women in studies may be due to the fact that men start smoking at a younger age, consume more cigarettes, and smoking is more common among men compared to women.

In our study, the relationship between the occupational characteristics of the participants and the FNBT scale scores was also evaluated, and the FNBT scores of the research assistants who worked between 5 and 8 shifts were found to be statistically significantly higher than the participants who worked between 1 and 4 shifts. In the study conducted by Koç et al. it was stated that hospital stress was a factor in smoking and it was thought that the hospital factor increased smoking, and in the study conducted by Sezgin et al. in 2020 evaluating the smoking status of nurses, it was found that nurses' being on duty in the hospital increased smoking (15, 16). Based on the studies in the literature and the results of our study, we can say that the working environment and being on call are factors affecting smoking.

In our study, it was determined that the rate of smoking in participants who continued their specialty education in surgical departments was statistically significantly higher than the rate in participants who continued their specialty education in basic/internal branches. Similar to our study, in Altundağ's thesis study examining smoking and quitting behaviors of research assistants in 2024, the smoking rate of research assistants working in surgical medical sciences was found to be higher than the smoking rate of research assistants working in internal and basic medical sciences (17). The more intense and faster pace of surgical departments may have caused stress and thus increased smoking frequency. In addition, the fact that the majority of research assistants working in surgical departments were male may have contributed to the high rate of smoking.

In our study, the relationship between participants' smoking characteristics and FNBT scores was evaluated and FNBT scores of research assistants who started smoking before the age of 25 were found to be significantly higher than those who started smoking after the age of 25. Similarly, in a study by Okutan et al. investigating the factors affecting nicotine dependence level in healthcare personnel, an inverse relationship was found between the age at which smoking was first tried and the age at which smoking started regularly and nicotine dependence level (18). Our study is generally compatible with the

literature and it can be said that age at initiation of smoking is a factor affecting nicotine dependence.

We examined the relationship between nicotine dependence level and some factors in smoking research assistants who participated in our study. The level of addiction was found to be higher in males. It was found that the nicotine dependence level increased in smoking research assistants as the number of shifts increased, the age of starting regular smoking decreased, and the duration of smoking increased. Research assistants who smoked more during working hours had significantly higher FNBT scores than research assistants who smoked more outside working hours. There was no significant difference between the department of residency and FNBT score, but the rate of smoking in participants who continued their residency training in surgical departments was statistically significantly higher than the rate in participants who continued their residency training in basic/internal branches. There was no statistically significant difference in FNBT scores according to marital status, child status, presence of chronic diseases, alcohol use, income status, age, length of time spent in the profession, type of the department in which they continued their specialty training, and their description of their work and working environment.

In the study of Okutan et al. no significant difference was found between FNBT score and age, marital status, number of children, gender, department of employment, and time spent in the profession (18). In Yemenici's thesis study, no correlation was found between FNBT score and marital status, number of children, income status, department of residency, alcohol use, age at first smoking, number of years in the profession and residency (14). According to the results of our study, gender, age at initiation of regular smoking, number of years of smoking, number of shifts, and smoking more during working hours stand out as factors affecting nicotine dependence level.

In our study, the mean score obtained from the Perceived Stress Scale (PSS) was found to be 26.55. When we compared the mean scores in our study with other studies in the literature, the mean total score of perceived stress was found to be 28.82, similar to our

study in a thesis study conducted by Başaran in 2023 investigating the effect of burnout level and perceived stress level on smoking behaviors in physicians (19). In 2013, in a study conducted in the USA with 168 participants to investigate the relationship between health behaviors of family medicine research assistants and stress, burnout and depression, the mean total mean score of ASQ was found to be 16.1, which is lower than our study (20). The diversity of the sociodemographic and cultural characteristics of the participants in the studies, the diversity of the healthcare professionals participating in the study, working environments, workload, environmental factors, and physical reasons may be effective in the difference in the ASQ scores in different studies in the literature.

In our study, female research assistants had statistically significantly higher ASQ scores than males. In Başaran's study, it was found that the perceived stress level was higher in women than in men (19). In Genç's thesis study, similar to our study, the mean total score of women on the ASS was found to be significantly higher than men (21). The higher stress levels of women compared to men may be due to the fact that women play a role in many areas such as housework, child care and working life in daily life and take more responsibility than men, women have variable moods due to hormonal effects (menstrual cycle, childbirth, menopause, etc.) unlike men and are more sensitive to the negative effects of stressful life events.

In our study, when the relationship between the occupational characteristics of the participants and the ASQ scores was examined, the scale scores of the participants who worked on shift were found to be statistically significantly higher than those of the participants who did not work on shift. In 2023, in a study examining the burnout level of physician mothers with children aged 0-6 years and the relationship between burnout and stress, it was found that emotional exhaustion and perceived stress levels of physicians who worked in shifts and kept night shifts were higher (22). There are different results related to the subject in the literature, and long working hours, being alone during the shift and managing critical events alone, inadequate rest, and mental fatigue may be effective in the high stress levels in those who keep watch.

In our study, as a result of the statistical analyses performed to examine the relationship between smoking characteristics and ASQ scores of the participants, no statistically significant difference was found between the ASQ scores of the participants who actively smoked or who did not actively smoke. Similar to our study, in Başaran's thesis study, no relationship was found between smoking, amount of cigarettes used, total duration of smoking, type of cigarettes smoked and perceived stress level (19). In a study conducted by Özdemir et al. in 2021 with 119 nurses to evaluate the perceived stress level and related factors in nurses, it was found that participants who smoked regularly had higher ASQ scores than non-smokers (23). These different results in various studies in the literature may be explained by the fact that perceived stress level alone is not effective in smoking behavior; various factors such as age, gender, employment status, social environment, family and work environment may also be effective.

In our study, no statistically significant relationship was found between the total scores of the Perceived Stress Scale and the scores obtained from the Fagerström Nicotine Dependence Test. When we reviewed the literature, unlike our study, in the study by Warner et al. in 2004, which examined the relationship between smoking behavior and perceived stress in smokers who underwent elective surgery, the mean total score of the PSS of smokers with high and above addiction level was found to be significantly higher than those with medium and below addiction level (24). Considering the studies in the literature, it may be effective that individuals with high perceived stress levels have higher nicotine dependence levels compared to other individuals; individuals see smoking as a tool to reduce their stressful situations and the feeling of happiness and relaxation that occurs with the effect of dopamine secreted as a result of nicotine activating the reward pathway in the brain may be associated with the stress-reducing effect.

Limitations of this study include the cross-sectional design, focusing problems due to the administration of the questionnaires to resident physicians during their working hours, and the fact that some variables that have the potential to affect perceived stress level

(depression, anxiety disorder and occupational burnout level) were not addressed. Future studies can make more comprehensive evaluations by taking these limitations into consideration and better understand the relationship between smoking and perceived stress level.

Conclusion: Since smoking is an important public health problem with its prevalence and passive smoking, it is very important to combat this issue at every stage of the health system. Especially the role of physicians and other healthcare professionals in the fight against smoking is very important. It has been found that even a short two-minute conversation between the physician and the patient who applied to the outpatient clinic for any reason about quitting smoking resulted in a statistically significant increase in smoking cessation rates compared to not recommending smoking at all. In this framework, physicians should be willing to encourage smoking cessation every time, knowing that even small suggestions are effective.

In our study, it was found that the smoking rate among physicians was high, similar to the general population. This suggests that physicians, like other individuals, need interventions and support to quit smoking in order to overcome smoking addiction.

The negative effect of stress-increasing situations on smoking behaviors during the day may be an indication that physicians need support in coping with stress. For this reason, doctors can be provided with trainings on combating stress.

Our study shows that the workload status of research assistants and their smoking status are related. In this context, supportive health policies should be made in order for physicians to manage their workload and combat stress. Healthy working environments may help physicians to reduce their smoking status.

It is important that all physicians who are seen as role models in the society, especially primary care physicians who provide preventive health care services, are more active and conscious about smoking and tobacco addiction, which is one of the most important public health problems of today and whose damages to health can be prevented with effective

methods. There is a need to produce the necessary strategies, to give the necessary importance to smoking cessation, to increase the number and quality of trainings to increase the awareness of physicians on this issue and to conduct more comprehensive studies on the subject.

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Knowledge, Attitudes, And Behaviors Regarding Cervical Cancer Screenings Among Women Aged 30-65 Years Attending Fevzi Çakmak Family Health Center

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ABSTRACT

Aim: Cervical cancer is the fourth most common cancer among women worldwide. It's largely a preventable disease, and its detection at an early stage significantly improves survival. Our study aimed to evaluate the knowledge and attitudes regarding cervical cancer screening among women aged 30-65 years who presented to Fevzi Çakmak Family Health Center.

Materials and Methods: Designed as a cross-sectional, descriptive, and analytical study, this research was conducted with 358 female participants who attended Kayseri Fevzi Çakmak Family Health Center. Data were collected using a structured questionnaire that covered socio-demographic characteristics, and knowledge and attitudes about cervical cancer and screening.

Statistical analysis of the obtained data was performed using IBM SPSS ver. 22.0. The normality of data distribution was examined using the Kolmogorov-Smirnov test. Continuous variables showing normal distribution were presented as mean $\pm$ standard deviation; variables showing abnormal distribution were presented as minimum - maximum. Categorical data were expressed as participant count and percentage. The chi-square test was used to evaluate categorical variables. A P-value below 0.05 was considered statistically significant.

Oral Presentation – OP360

Results: The mean age of the participants was 45.5 years, with the majority being housewives (71.5%) and married individuals (87.4%). While education levels varied, university graduates (29.9%) represented the largest group. A significant portion of participants (86.6%) had previously received information about cervical cancer screening, and most of those who received information obtained it from doctors and healthcare personnel. However, 28.2% stated they had not undergone a Pap Smear or HPV DNA test. Among the reasons for not getting screened, the highest proportion (28.2%) was "not deeming it necessary due to lack of symptoms." According to the logistic regression analysis results, increasing age (OR=1.111, $p<0.001$), having received information about cervical cancer (OR=17.858, $p=0.017$), and this information being provided by healthcare professionals (OR=3.310, $p=0.028$) statistically significantly increased the likelihood of participation in cervical cancer screening. Factors such as marital status, age at menarche, age at marriage, and awareness of national cancer screening programs did not have a significant effect on screening participation. Furthermore, it was observed that participants with a family history of cancer had higher screening rates.

Conclusion: This study emphasizes that to increase participation in cervical cancer screening programs among women attending Fevzi Çakmak Family Health Center, it is necessary to raise knowledge levels and promote the active role of healthcare professionals. For future studies, targeted education programs aimed at breaking the symptom-focused health perception, continuous information and guidance duties of healthcare professionals in primary care, proactive approaches to individuals with a family history of cancer, and increasing HPV vaccine awareness are recommended.

Keywords: Cervical Cancer, Screening, Knowledge Level, Attitude, Family Medicine.

Introduction

Cervical cancer is the most common gynecological cancer worldwide and the fourth most common cancer type in women among all cancers (1). In 2022 , **it resulted in approximately 660,000 new cases and approximately 350,000 deaths.** According to data from the International Agency for Research on Cancer (IARC), cervical cancer ranks 10th among female cancers with 2374 new cases in our country in 2022. (2). Despite the effectiveness of human papillomavirus (HPV) vaccines and screening programs, cervical cancer constitutes a significant public health problem worldwide. Inequalities in the implementation of HPV vaccination, inadequate preventive interventions, and socioeconomic factors can be cited as factors, especially in low- and middle-income countries (3). 5-year survival is 67% when all stages are combined; 91% in early-stage cancers; While it is seen in 60% of locally advanced patients, it is seen in 19% of metastatic patients.(6) Most cervical cancers (95%) are caused by persistent high-risk HPV infections. The most common histological types are squamous cell carcinoma (80%) and adenocarcinoma , while other histological types are rare (7.8%) (1).

Cervical cancers are generally treatable when diagnosed at an early stage. The recommended treatment for early-stage cancers is surgery after definitive pathology, and adjuvant therapy (radiotherapy and/or chemotherapy) or follow-up, depending on the histopathological type . Concurrent chemoradiotherapy may be administered to patients with locally advanced disease (3). In addition, treatments aimed at improving the quality of life of patients with locally advanced disease are also planned.

The World Health Organization's Global Initiative was launched to accelerate the elimination of cervical cancer as a public health problem. This initiative focuses on three key pillars: HPV vaccines, effective screening (Pap smear , HPV DNA testing, colposcopy) and early treatment of precancerous lesions. With today's developing technology, there have been continuous and important developments such as innovations in imaging

methods, new surgical approaches, pathological diagnosis, radiotherapy techniques, and targeted immunotherapy options (4).

the knowledge and attitudes of women aged 30-65 regarding cervical cancer screening , a significant public health issue, and the sociodemographic characteristics that influence this. We also aimed to raise awareness of this issue among the women who volunteered to participate in the survey.

Materials and Methods: This is a cross-sectional, analytical study. This study will use a questionnaire to determine the cervical cancer screening status of women aged 30-65 who presented to the Fevzi Çakmak Family Health Center. The sample size was initially calculated as 261 individuals using G Power 3.1, with a medium effect size, a 95% confidence interval, and a 5% margin of error. However, to ensure more precise results and to identify small effects, the sample size was 360 individuals.

Data collection process: Women aged 30–65 who presented to the Fevzi Çakmak Family Health Center for any reason between 8:30 AM and 5:00 PM between March 15, 2024 and March 15, 2025, were invited to participate in the study by the researcher's family physician and a family health worker affiliated with the physician. The family health worker was trained by the researcher before the study to ask and explain the questions in the same way. Those who accepted the invitation were asked to sign an informed consent form by the researcher and the family health worker. After the form was completed, it was either directly through a face-to-face interview or by informing those waiting in the waiting room. Women who agreed to participate and had no difficulties with verbal communication were included in the study .

During the implementation, surveys were sometimes forgotten to be administered, or due to patient density, not every woman who applied could be reached. Furthermore, patients from other family medicine units were contacted and surveys were administered in the waiting room. Therefore, participant selection was not fully controlled by the researcher.

Some individuals declined to participate in the study for various reasons. Because participation was voluntary, some individuals chose not to complete the survey, particularly for reasons such as lack of time or personal reluctance. This resulted in a certain degree of participation limitation during the data collection process. After informing participants about the purpose of the study, verbal consent was obtained, and a written informed consent form was subsequently signed. Completion of the surveys took approximately 10–15 minutes. Questions that participants did not understand were explained and answered by the researcher and a family health worker in a private room. Confidentiality, voluntariness, and privacy were maintained throughout the process.

performed using IBM SPSS ver. 22.0 (IBM Corp. Armonk, NY, USA) program. The Kolmogorov-Smirnov test was used to assess whether the data conformed to a normal distribution. Continuous variables with a normal distribution (e.g., age) were presented as mean $\pm$ standard deviation (Mean $\pm$ SD); variables with an abnormal distribution were presented as minimum- maximum (min-max). Categorical data (occupation, education, marital status, social security, income, smoking, number of children, etc.) were expressed as the number of participants (n) and percentage (%). The chi-square test was used to evaluate categorical variables. Logistic regression analysis was applied to the factors affecting cervical cancer screening test, **Statistical significance level** $p < 0.05$ was accepted.

Results: The study included 360 participants. Two surveys were excluded from the analysis due to incomplete completion, resulting in a total of 358 participants.

Table 4.1 lists the participants' descriptive characteristics: age, occupation, education, and marital status. The average age of the 358 participants was 45.5 years, with ages ranging from 30 to 65. When examined by occupation, the vast majority were housewives. Approximately one-third of the participants were university graduates. The majority of participants The majority are married, and the proportion of those who are single or divorced is very low.

Table 4. 1 characteristics of the participants

Features	Average (SD)	Median (Min - Max)
Age	45.5 (8.8)	30 - 65
Job	n	%
Housewife	256	71.5
Teacher	39	10.9
Healthcare personnel	26	7.3
Other	37	10.3
Educational Status		
Illiterate	4	1.1
Primary school and/or lower	98	27.4
Secondary school graduate	42	11.7
High school graduate	97	27.1
University graduate	107	29.9
Master's or PhD	10	2.8
Marital status		
Married	313	87.4
Single or divorced	45	12.6

n : number, %: percentage, mean (SD): standard deviation median (min-max)

Table 4.2 shows the participants' social security, income level, smoking, menstrual age, age at first marriage, and number of children.

Table 4. 2 characteristics of participants – continued

Features	n	%
Social security		
There is	326	91.1
None	32	8.9
Income level		
Insufficient	45	12.6
Middle	212	59.2
Sufficient	101	28.2
Smoking		
I've never used it	250	69.8
I left	27	7.5
Less than 1 pack per day	48	13.4

More than 1 pack per day	33	9.2
Menstrual age		
9-11	31	8.7
12-14	271	75.7
>15	56	15.6
Age at first marriage		
<18	52	14.5
18-25	244	68.2
>25	58	16.2
Number of children		
0	26	7.3
1	49	13.7
2-3	255	71.2
>4	28	7.8

n : number, %: percentage

Participants' sexual health status and family history are presented in Table 4.3. An examination of gynecological examination habits revealed that the vast majority of participants sought gynecological examinations when they had symptoms. The proportion of those who went for checkups every year was quite low.

Table 4. 3' gynecological examination, family planning behaviors, health status, cancer history and family history

Features	n	%
Gynecological examination		
I've never been	36	10.1
If I have a complaint, I will go.	257	71.8
I go every year for control purposes.	44	12.3
Other	21	5.9
Family planning / contraceptive method		
I don't use any methods	150	41.9
Condom	72	20.1
Pill	9	2.5
Intrauterine device	24	6.7
Injection	2	0.6
Retraction	57	15.9
Other	44	12.3
Chronic disease		
Yes	134	37.4
No	224	62.6
Cancer diagnosis		

Yes	13	3.6
No	345	96.4
Cancer in the family		
No	221	61.7
Yes	137	38.3
First degree relative	90	25.1
2nd degree relative	55	15.4
3rd degree relative	16	4.5
4th degree relative	2	0.6

n : number, %: percentage

participants' knowledge and attitudes toward cervical cancer screening are shown in Table 4.4. A significant portion of participants reported having heard of the national cancer screening program. The vast majority of individuals who reported hearing about this program reported obtaining it from family health centers. However, a relatively small number of participants obtained information from sources such as television, the internet, hospitals, or their immediate surroundings . Nearly all participants had heard of Cancer Early Diagnosis, Screening, and Education Centers (KETEM).

Table 4. 4' knowledge and attitudes about cervical cancer screening

Features	n	%
Have you heard of the national cancer screening program?		
Yes	251	70.1
No	107	29.9
From where did you hear about the national cancer screening program?		
Family health center	198	55.3
Hospital	15	4.2
The immediate surroundings	11	3.1
TV or internet	30	8.4
Other	5	1.4
Have you heard of Cancer Early Diagnosis, Screening and Education Centers (KETEM)?		
Yes	329	91.9
No	29	8.1
Do you think cancer screenings are important?		
Yes	346	96.6
No	0	0
I'm undecided	12	3.4
What do you think is the purpose of cancer screening?		n
Catching cancer early		323
Preventing cancer development		65
Detecting the spread of cancer to other organs		37

	Treating cancer patients	23
	I have no idea	9
With the knowledge you have and/or have learned about cancer screenings, would you recommend screening programs to other people?		
	Yes	98.6
	No	1.4

n : number, %: percentage

The vast majority of participants reported having previously received information about cervical cancer screening. Healthcare professionals were the most common source of information, with only a negligible number of participants obtaining information from the internet, social media, family, or mass media. The most commonly used screening method for cervical cancer is the Pap test. While Pap smear tests are available, fewer participants have heard of HPV DNA testing. Some participants stated that they have never heard of either test.

Table 4. 5' cervical cancer screening knowledge and attitudes - continued

Features	n	%
Have you received information about cervical cancer screening before?		
No	48	13.4
Yes	310	86.6
Doctor/medical personnel	296	
Family/friends	8	
Internet/social media	10	
TV/newspaper/radio	2	
Which of the tests used for cervical cancer screening have you heard of?		
Pap smear test	264	73.7
HPV DNA test	91	25.4
None	72	20.1
Who is screened for cervical cancer in our country?		
All sexually active women between the ages of 30-65	242	67.6
Postmenopausal women only	16	4.5
To all women over the age of 18	48	13.4
I don't know	52	14.5

Have you ever been screened for cervical cancer?		
Yes	277	77.4
No	81	22.6
How often do you have a Pap smear test and/or HPV test?		
I won't let it happen	101	28.2
I get it done irregularly	148	41.3
Every 2 years	34	9.5
Every 3 years	14	3.9
Every 5 years	61	17.0

n : number, %: percentage

Pap smear or had HPV DNA test done irregularly are presented in Table 4.6. The most common reason for not having these tests regularly was that they did not consider them necessary because they had no symptoms. However, those who generally neglected to have tests also accounted for a significant portion. Other reasons included not knowing that tests were necessary. Personal concerns such as embarrassment, fear of problems, and fear of pain were also cited at some levels.

Table 4. 6participants ' attitudes towards cervical cancer screening

Features	n	%
Pap-Smear Tests and HPV tests or have them done irregularly, what could be the reason?		
I don't know if it needs to be done.	32	8.9
I think my age is too early for screening. I am thinking .	15	4.2
It is necessary because I have no complaints. I don't see .	103	28.8
I am not sexually active.	5	1.4
Pap-Smear Testing is generally I neglect it .	54	15.1
I don't have time for a Pap smear test.	6	1.7
I am embarrassed to have a Pap smear test.	19	5.3
Is it necessary to have a Pap-Smear Test? I don't believe it is .	4	1.1
Experiencing pain during the procedure I am scared .	15	4.2

In case of any problems I am scared	25	7.0
Other	13	3.6

n : number, %: percentage

Table 4.7 examines the rates of cervical cancer screening among individuals in different age groups. Screening rates increase significantly with increasing age ($p < 0.001$).

Table 4. 7cancer screening rates of participants in different age groups

Cervical cancer screening status	Yes	No	p
Age	n (%)	n (%)	<0.001
30-39	58 (57.4)	43 (42.6)	
40-49	116 (82.9)	24 (17.1)	
50-59	74 (86)	12 (14)	
60-65	29 (93.5)	2 (6.5)	

n : number, %: percentage, p: statistical significance value, $p < 0.05$ is significant.

the participants' sociodemographic characteristics and their cervical cancer screening status is shown in Table 4.8. There is no statistically significant difference between occupation and screening status ($p = 0.690$). There is a statistically significant relationship between education level and screening status ($p < 0.001$).

Table 4. 8the sociodemographic characteristics of the participants and their cervical cancer screening status

Cervical cancer screening status	Yes	No	p
Job	n (%)	n (%)	0.690
Housewife	201 (72.6)	55 (67.9)	
Healthcare personnel	21 (7.6)	5 (6.2)	
Teacher	28 (10.1)	11 (13.6)	
Other	27 (9.7)	10 (12.3)	
Educational background			
Illiterate	2 (0.7)	2 (2.5)	
Primary school and/or lower	70 (25.3)	28 (34.6)	

Secondary school graduate	18 (6.5)	24 (29.6)	<0.001
High school graduate	80 (28.9)	17 (21)	
University graduate	98 (35.4)	9 (11.1)	
Master's degree or doctorate	9 (3.2)	1 (1.2)	
Marital status			0.755
Married	34 (12.3)	11 (13.6)	
Single or divorced	243 (87.7)	70 (86.4)	

n : number, %: percentage, *p*: statistical significance value, $p < 0.05$ is significant.

the participants' sociodemographic characteristics and their cervical cancer screening status is shown in Table 4.9. As the number of children increased, the rate of screening was found to be statistically significant ($p < 0.008$).

Table 4. 9sociodemographic characteristics of the participants and their cervical cancer screening status - continued

Cervical cancer screening status	Yes	No	p
Social security	n (%)	n (%)	0.825
There is	253 (91.3)	73 (90.1)	
None	24 (8.7)	8 (9.9)	
Income level			0.156
Insufficient	31 (11.2)	14 (17.3)	
Middle	171 (61.7)	41 (50.6)	
Sufficient	75 (27.1)	26 (32.1)	0.606
Smoking			
I've never used it	189 (68.2)	61 (75.3)	
I left	23 (8.3)	4 (4.9)	
Less than 1 pack per day	39 (14.1)	9 (11.1)	0.789
More than 1 pack per day	26 (9.4)	7 (8.6)	
Menstrual age			
9-11	23 (8.3)	8 (9.9)	0.789
12-14	209 (75.5)	62 (76.5)	
>15	45 (16.2)	11 (13.6)	
Age at first marriage			0.955
<18	40 (14.4)	12 (15.6)	
18-25	191 (69)	53 (68.8)	

>25	46 (16.6)	12 (15.6)	
Number of children			
0	15 (5.4)	11 (13.6)	0.008
1	34 (12.3)	15 (18.5)	
2-3	202 (72.9)	53 (65.4)	
>4	26 (9.4)	2 (2.5)	

n : number, %: percentage, *p*: statistical significance value, $p < 0.05$ is significant.

When Table 4.10 examines participants' gynecological examination habits based on cervical cancer screening status, the relationship between gynecological examination frequency and cervical cancer screening status is significant ($p < 0.001$). It is particularly noteworthy that nearly all women who undergo annual gynecological examinations are screened for cervical cancer. This finding suggests that regular gynecological examinations have a significant impact on cervical cancer screening participation.

Table 4. 10relationship between participants' gynecological examination status and screening behaviors

Cervical cancer screening status	Yes n (%)	No n (%)	p
Gynecological examination status			
I've never been	7 (19.4)	29 (80.6)	<0.001
If I have a complaint, I will go.	207 (80.5)	50 (19.5)	
Every year for control purposes I'll go	43 (97.7)	1 (2,3)	
Other	20 (95.2)	1 (4.8)	

n : number, %: Percentage, *p*: statistical significance value, $p < 0.05$ is significant.

The relationship between knowledge about cervical cancer screening and cervical cancer screening status is shown in Table 4.11. A statistically significant relationship was found between prior knowledge about cervical cancer and cervical cancer screening status ($p < 0.001$). The vast majority of participants who had previously received information about cervical cancer had undergone screening, while a significant portion of those who had not received information (28.4%) had not. This result suggests that knowledge positively influences screening behavior. A statistically significant relationship was found between

the source of information and screening status ($p = 0.027$). Participants who received information from doctors/healthcare personnel had a higher screening rate (95.3%) than those who received information from "other" sources (e.g., family/friends, the internet/social media, TV/newspaper/radio) .

Table 4. 11between knowledge about cervical cancer screening test and status of cervical cancer screening

Cervical cancer screening status	Yes n (%)	No n (%)	p
Have you received information about cervical cancer before?			<0.001
Yes	252 (91)	58 (71.6)	
No	25 (9)	23 (28.4)	
Information source about cervical cancer screening			0.027
Doctor/medical personnel	241 (95.3)	55 (87.3)	
Other	12 (4.7)	8 (12.7)	

n : number, %: percentage, p: statistical significance value, $p < 0.05$ is significant.

The relationship between family history of cervical cancer and cervical cancer screening status is shown in Table 4.12. There is no significant difference in screening rates between those with and without a family history of cancer ($p = 0.436$).

Table 4. 12relationship between family history of cervical cancer and cervical cancer screening status

Cervical cancer screening status	Yes n (%)	No n (%)	p
Presence of cancer history in the family			
Yes	109 (39.4)	28 (34.6)	0.436
No	168 (60.6)	53 (65.4)	

n : number, %: percentage, p: statistical significance value, $p < 0.05$ is significant.

Logistic regression analysis for factors affecting cervical cancer screening is presented in Table 4.13. As the age of the study participants increases, the likelihood of cervical cancer screening increases ($p < 0.001$, OR = 1.111). Having received information about cervical

cancer increases the likelihood of cervical cancer screening ($p = 0.017$, OR = 17.858). Furthermore, having this information provided by healthcare professionals increases participation in cancer screening ($p = 0.028$, OR = 3.310). Marital status, age at first menstrual period, age at marriage, and awareness of the national cancer screening program are ineffective factors in determining participants' cervical cancer screening.

Table 4. 13regression analysis of factors affecting cervical cancer screening test

Parameters	Odds ratio (Exp (B))	95% Confidence interval CI	
		Lower	Upper
Age	1,313	1,165	1,481
Marital status	0.573	0.053	6,230
Educational background	1,680	0.932	3,030
Social security	1,006	078	12,995
Income level	0.341	0.123	0.946
Smoking	1,305	0.726	2,345
Age of first menstruation	1,257	0.771	2,050
Age of marriage	1,089	0.929	1,276
Number of children	1,280	0.436	3,761
Chronic disease	0.118	0.029	0.477
Presence of cancer diagnosis	42,423	0.093	19265,176
Family history of cancer	5,789	1,544	21,698
National cancer screening program awareness	0.286	0.068	1,194
Cervical cancer information status	17,858	1,681	189,721
Cervical cancer information source	3,310	1,139	9,613
Having a gynecological examination	2,843	0.974	3,041

Discussion : In our study, the knowledge and attitudes of 358 women aged between 30 and 65 who applied to Fevzi Çakmak Family Health Center regarding cervical cancer screening were evaluated.

In Estonia, Kivistik et al.(7) In a survey conducted on cervical cancer awareness among 1054 women, the average age was found to be 43, while in our study the average age was 45.5. While 71% of the women participating in our study were housewives, 10.4% of the participants in the study conducted by Kivistik et al. were housewives. In a study

conducted by Tunç et al. (8) on the knowledge, awareness and attitudes of individuals aged 30-70 towards cancer screening, 96.6 % of the participants had social security, while this rate was similar in our study (91.1%). When the smoking habits of the participants in our study were examined, 69.8% stated that they had never smoked, 22.6% smoked, and 7.5% stated that they had quit smoking. In a study conducted by Yiğitbaş et al. (10) examining the knowledge and attitudes of adults applying to Bingöl State Hospital regarding cancer screening tests, 35.3% of the participants smoked, while 55.5% stated that they were not smokers.

by Öz et al. (11) examining the knowledge and attitudes of women applying to the Hitit University Family Medicine outpatient clinic regarding cervical cancer, similar to our study, the majority of participants were university graduates (39.2%), followed by primary school graduates (27.8%), high school graduates (25.9%), and secondary school graduates (5.7%). In the study conducted by Yiğitbaş et al. (10), the most frequent participant was high school graduate (32.9%), followed by university graduates (28.4%), primary school graduates (18.4%), secondary school graduates (12.1%), and postgraduate graduates (2.4%). In the study conducted by Tunç et al. (8) , when the participants were asked whether they had heard of KETEM before, 39.3% stated that they had knowledge, while 40.2% stated that they had heard of it but did not have detailed information . In our study, the proportion of those who had heard of KETEM before was found to be higher at 91.9%. In a study conducted by Tunç et al., participants were asked to fill out a survey via social media. In our study, participants were selected from those who applied to the Fevziçakmak Family Health Center.

Conducted by Kivistik et al. (7), 72.3% of the participants had previously heard of the cervical cancer screening program, and this rate was similarly seen as 70% in our study. In the study conducted by Kivistik et al., when asked why they did not participate in cervical cancer screening programs, 14.3% of the participants stated that they did not participate in pap smear tests. While 12.9% stated that they did not have a Pap test due to fear of the test, 12.9% stated that they did not have a Pap test due to long waiting times.

In our study, The proportion of those who avoided the test due to fear of having a Pap smear was relatively low at 4.2% . In our study, when gynecological examination habits were examined, the majority (71.8%) reported that they only had a gynecological examination when they had a complaint , while 12.3% reported annual checkups for control purposes and 10.1% reported no examinations at all. Similar to our study, Kesic et al. (19) conducted a cervical cancer awareness study, 9.4% reported never having had a gynecological examination, while 33.4% reported having had an examination this year.

In our study, 70.1% of the women who participated stated that they had previously heard of the cancer screening program. In a cervical cancer screening and awareness study conducted by Coronado et al. (21) with 225 women in Jamaica, 65% of the participants stated that they had previously heard of cervical cancer screening. When the participants in our study were asked how often they had a Pap smear, 28.2% said they did not have one. Of these, 8.9% stated that they did not have one because they were unaware of the need for one. In the study conducted by Coronado et al. (21), similar to our study, 10.8% of the participants did not have one because they were unfamiliar with the test. While 7% of the participants in our study did not have a Pap smear because they were afraid of negative results, in the study conducted by Coronado et al. (21), the proportion of women who did not have a Pap smear due to fear of negative results was 15.4%. In the study conducted by Jia et al. (22), 47.6% of the participants stated that they did not have a screening test because they were afraid of negative results. While 34.1% of the participants stated that they did not have a screening test because they did not have any symptoms or complaints, 13.4% stated that they did not have the test because they did not know the benefits of the screening test. Babaoğlu et al. (9) conducted a study in which participants were asked to have a Pap test. Reasons for not having a Pap smear were asked, and the most common reason (40.7%) was not knowing that they needed one. Similarly, in our study, 28.8% of participants stated that they hadn't had a screening test because they had no symptoms , while 8.9% stated that they hadn't had a screening test before because they didn't know they needed one.

In their study, Öz et al. (11) asked participants which tests were used for cervical cancer screening in Turkey. 67.1% of the participants had Pap smear test. While 13.9% of participants indicated that they were familiar with the Pap test, 32.9% of participants stated that they did not know which tests were used for cervical cancer screening in Turkey. Similarly, in our study, the majority of participants (73.4%) While 25.4% of participants reported having heard of Pap smear tests, 20.1% reported having heard of HPV DNA tests. 20.1% of participants reported not knowing about cervical cancer screening tests. In our study, a relatively higher proportion of participants had heard of cervical cancer screening programs.

In our study, when we examined the source of information about cervical cancer screening, the majority of participants (82%) received information from doctors/healthcare personnel, followed by the internet/social media (3%) and family/friends (2%). Similar to our study, in the study by Öz et al. (11), the majority of participants (70%) reported receiving information from family health centers, hospitals, and other healthcare institutions, followed by the internet/media (6.3%) and friends/acquaintances (2.5%).

Öz et al. (11), participants were asked who receives cervical cancer screening in Turkey, and the majority (60.1%) responded that it is "every sexually active woman between the ages of 30 and 65," followed by "I don't know" (23.4%), women between the ages of 15 and 49 (13.3%), and only postmenopausal women (3.2%). Similarly, in our study, the majority (67.6%) responded that it is "all sexually active women between the ages of 30 and 65," followed by "I don't know" (14.5%), all women over the age of 18 (13.4%), and only postmenopausal women (4.5%).

Oluwole et al. (23) conducted a survey on cervical cancer awareness among 400 women aged 25-65 in Nigeria, and found that 66.7% of the participants had previously heard of cervical cancer. The source of information was the media. In our study, 70.1% of the participants stated that they had previously heard of cervical cancer and screening programs. The majority of the information sources (70%) were family health centers and

hospitals. In our study, only 1.4% of the participants heard about it from the media and the internet. When asked about their frequency of having Pap smear or HPV DNA screening tests, 41.3% reported having them done irregularly. 17% reported having them done every five years. This suggests that primary healthcare services in our country are more widespread and accessible to the public, and that KETEM also provides patient information, resulting in higher awareness. In our study, the factors influencing cervical cancer screening were statistically significant as participants aged, prior knowledge of cervical cancer, and receipt of this information from healthcare professionals increased.

In our study, when gynecological examination habits were examined according to cervical cancer screening status, it was shown that patients who regularly attended gynecological examinations (97.7%) had a higher rate of screening tests than those who never attended gynecological examinations (19.4%). A statistically significant difference was found between gynecological examinations and cervical cancer screening status. In a study conducted by Davrishli et al. (12) evaluating the knowledge and attitudes of women aged 30-65 about cervical cancer, 86.7% of women who had regular gynecological examinations had cervical cancer screening, while 5.6% of those who did not have examinations had screening tests. These results, similar to our study, showed that patients who had regular gynecological examinations had a statistically significantly higher rate of screening tests. Furthermore, in our study, 91% of those who received information about cervical cancer had screening tests, while 71.6% of those who did not receive information had a relatively lower rate of screening tests. Those who received prior information about cervical cancer were shown to have a significantly higher rate of screening. When evaluated according to the source of information, 95.3% of those who received information from doctors/healthcare personnel had screening.

In our study, when participants were asked who was screened for cervical cancer, 14.5% stated they did not know, while the majority (67.6%) stated that it was offered to all sexually active women between the ages of 30 and 65. 4.5% said it was only offered to postmenopausal women, and 13.4% said it was offered to women over 18. In a study

conducted in Serbia by Kesic et al. (19), 53.5% of the participants stated that screening should be offered to older women, 39.6% to those with a family history of cancer, 28.1% to women who change sexual partners frequently, and 5.9% to young women, while 5.9% did not know. Ninety-six percent of the participants stated that cancer screening is important, and 98.6% also recommended cancer screening to others. Khudairi et al. (94) In his study, 58.6% of the participants had pap smear He never recommends the smear screening test to his family, relatives and friends.

When examining the educational background of those who took the screening test, 90% of those with a master's degree or doctorate, 91% of university graduates, 82% of high school graduates, 42% of secondary school graduates, and 71% of primary school graduates had taken the test, while 50% of illiterate individuals had taken the test. As literacy increased, the number of those taking the screening test was found to be statistically significantly higher.

In our study, 91% of participants who had previously received information about cervical cancer had a screening test, while 20% of those who had not received information had a screening test. Those who had previously received information about cervical cancer had a significantly higher rate of screening. Similar to our study, Mingo et al. (18) found that women who had previously heard of cervical cancer had a higher risk of having a Pap test compared to those who had not. A significantly higher rate of women had a Pap smear test. When evaluated according to the source of information, 95.3% of those who received information from a doctor/healthcare professional had a screening, while 87.3% of those who received information from other sources had a screening.

Conclusion: The vast majority of participants indicated that they were knowledgeable about cervical cancer screening. Doctors and healthcare professionals were the most common sources of information. The most frequently cited reason for not undergoing screening was "I have no complaints." This suggests that the reality of screening tests as a component of preventive healthcare has not been sufficiently internalized. Additionally,

factors such as lack of knowledge, fear, embarrassment, and lack of time negatively impact screening participation.

Public awareness about cervical cancer, HPV infection, screening tests, and HPV vaccines. These programs can be held in settings with a high concentration of women, such as neighborhoods, schools, mosques, and public education centers, and should be supported with simple and understandable materials. The role of family health centers in this area should be enhanced, and the information and guidance duties of healthcare professionals working there should be supported, and they should be equipped with up-to-date information through ongoing in-service training.

A systematic reminder and follow-up mechanism should be established to encourage women to undergo regular screening tests. Individuals should be notified via text message, phone call, or text message when their screening is due, thus encouraging active participation in the screening process.

The study found that some women cited psychological factors such as fear, embarrassment, and pain concerns as reasons for avoiding screening tests. To address these reasons, counseling services should be expanded, safe environments where privacy is respected should be created, and detailed information about the procedures should be provided.

Lack of knowledge about the HPV vaccine is widespread in society. Therefore, information about the vaccine's safety, effectiveness, and the appropriate age groups should be increased. School vaccination campaigns for young girls should be strengthened, and awareness meetings should be held for parents. Policies should be developed to include the HPV vaccine in the national vaccination schedule .

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Blood Pressure Variations in 24-Hour Ambulatory Blood Pressure Monitoring Among Pregnant Women in Primary Care

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ABSTRACT

Aim: This study aimed to evaluate blood pressure variations in pregnant women without a diagnosis of hypertension using 24-hour ambulatory blood pressure monitoring (ABPM) in primary care, compare the findings with office measurements, and determine the distribution of dipper/non-dipper patterns.

Materials and Methods: This cross-sectional study was conducted on 50 healthy pregnant women who presented to a family medicine outpatient clinic. Pregnant women without a diagnosis of hypertension, not using antihypertensive treatment, and with singleton and twins pregnancies were included. Sociodemographic characteristics were recorded, and three office blood pressure measurements were performed according to standard protocols to determine mean systolic and diastolic values. The same participants underwent 24-hour ABPM to record daytime, nighttime, and total measurements. Dipper/non-dipper classification was made based on the percentage decrease between daytime and nighttime averages.

Results: Of the participants, 80.6% were under 35 years of age, 83.8% were housewives, and all were married. The mean office systolic blood pressure (SBP) was 111.2 ± 8.0 mmHg

Oral Presentation – OP361

and diastolic blood pressure (DBP) was 72.4 ± 9.9 mmHg, whereas ambulatory measurements showed SBP 108.8 ± 6.5 mmHg and DBP 64.9 ± 5.9 mmHg. No significant difference was found in systolic values ($p=0.158$), whereas diastolic values measured in the office were significantly higher ($p<0.001$). Non-dipper rates were 51.6% for systolic and 35.4% for diastolic pressure. Passing-Bablok analyses revealed no systematic or proportional error for either parameter. Bland-Altman analyses demonstrated a low mean difference between office and ambulatory measurements, indicating overall agreement between the methods; however, the relatively wide limits of agreement suggested that notable discrepancies might occur in certain individuals.

Conclusion: ABPM demonstrated lower diastolic values compared to office measurements and provided additional diagnostic value. ABPM may contribute to diagnosis and follow-up processes, particularly in pregnant women with borderline blood pressure values or those with risk factors.

Keywords: Ambulatory Blood Pressure Monitoring, Blood Pressure, Physiological Changes, Pregnancy, Primary Care

Introduction

Pregnancy is a dynamic process that induces significant hemodynamic changes in the maternal cardiovascular system. Increased blood volume and cardiac output, along with decreased peripheral vascular resistance, lead to a characteristic pattern in blood pressure throughout pregnancy. While a physiological decline in blood pressure is observed during the first and second trimesters, these values tend to return toward pre-pregnancy levels in the third trimester. This complex variability makes it difficult to establish fixed threshold values for the diagnosis of hypertension in pregnancy and creates diagnostic challenges for clinicians (1,2). Hypertensive disorders of pregnancy (gestational hypertension, preeclampsia, and eclampsia) affect approximately 5–10% of all pregnancies and are among the leading causes of maternal and fetal morbidity and

mortality. Maternal mortality statistics indicate that hypertensive disorders of pregnancy rank among the foremost causes of death in both developed and developing countries (3,4).

Accurate blood pressure measurement during pregnancy is critically important for both the early diagnosis of hypertensive disorders of pregnancy and the prediction of maternal–fetal outcomes. Office blood pressure measurement (OBPM), traditionally used due to its accessibility and practicality, is widely preferred in primary healthcare settings. However, OBPM may not always reflect true blood pressure levels because of factors such as the patient's stress response, the measurement environment, and its reliance on a single-time assessment. This may lead to clinical phenotypes such as white-coat hypertension (elevated in the office, normal at home) and masked hypertension (normal in the office, elevated at home) (5). Masked hypertension has been shown to increase the risk of preeclampsia and adverse perinatal outcomes, whereas white-coat hypertension, although generally associated with a more favorable course, may progress to true hypertension later in pregnancy (6, 7).

In recent years, 24-hour ambulatory blood pressure monitoring (ABPM) has emerged as a method that more accurately reflects blood pressure patterns during pregnancy. ABPM provides repeated measurements throughout the day and during sleep, thereby capturing both average blood pressure levels and circadian rhythms. Through this method, dipper and non-dipper patterns can be identified, and conditions such as nocturnal hypertension—which cannot be detected through OBPM—can be recognized (8).

In the literature, studies conducted at the primary care level that directly compare OBPM and ABPM values are limited, and there appears to be a particular lack of data on low-risk pregnant women without hypertension (9).

The aim of this study is to compare office blood pressure measurements (OBPM), performed by healthcare professionals in a primary care setting, with 24-hour ABPM monitoring in pregnant women without a diagnosis of hypertension, and to identify the

differences between the two methods. In addition, the study aims to evaluate the distribution of dipper and non-dipper patterns determined by ambulatory measurements and to provide data on circadian blood pressure variations during pregnancy.

Materials and Methods

This study was designed as a cross-sectional, descriptive, and analytical study and was conducted between 2024 and 2025 in Family Health Centers (FHCs) located in the central district of Kayseri. The sample size was calculated using the G*Power 3.1.9.7 software with a 95% confidence level ($\alpha = 0.05$) and 80% statistical power ($1-\beta = 0.80$), resulting in a minimum required sample of 45 participants. Considering potential dropouts and missing data, the study was planned to include 50 pregnant women. Statistical analyses were performed using the SPSS for Windows 22.0 (Statistical Package for the Social Sciences, Chicago, IL, USA). For descriptive statistics, mean $\pm$ standard deviation and median values were reported for continuous variables such as blood pressure, height, and weight, while categorical variables such as occupation and educational level were presented as numbers and percentages. The Shapiro–Wilk test was used to assess normality of distribution. Systolic and diastolic blood pressure values obtained from OBPM and diastolic blood pressure values from ABPM were found to be normally distributed, whereas systolic blood pressure values obtained from ABPM did not meet the assumption of normality. For comparisons between the two methods, the paired samples t-test was used when parametric assumptions were met, and the Wilcoxon signed-rank test was applied when they were no.

Two different methods were used to assess the agreement between office blood pressure measurements and 24-hour ambulatory blood pressure measurements. First, Passing–Bablok regression analysis was performed to examine the linear relationship between the measurements; in this analysis, the confidence intervals of the intercept and slope were evaluated to investigate the presence of systematic and proportional bias. In the second step, the Bland–Altman method was applied to calculate the mean difference between the two measurements and to determine the 95% limits of agreement; the proportion of data

points within these limits was considered to interpret whether the methods demonstrated clinically acceptable agreement. Passing-Bablok regression and Bland-Altman analyses were conducted using R software (R Foundation for Statistical Computing, Vienna, Austria). A p-value of <0.05 was considered statistically significant in all analyses.

Results

A total of 50 pregnant women, regardless of gestational age, without a diagnosis of hypertension and not using antihypertensive medications, were initially evaluated in the study. However, 11 participants removed the device before completing the full 24-hour period, and adequate data could not be obtained from 8 participants due to technical reasons. Consequently, 19 participants were excluded from the study, and analyses were completed with 31 pregnant women.

The mean age of the 31 pregnant women included in the study was 29.13 ± 5.96 years, with a median age of 28 years. Among the participants, 19.35% were aged 35 years or older. The majority of the study group were housewives, while other occupational groups included engineers, nurses, and teachers. According to ABPM results, the distribution of systolic blood pressure patterns showed that 48.39% of participants were classified as dippers and 51.61% as non-dippers. For diastolic blood pressure, 64.52% exhibited a dipper pattern, while 35.48% were non-dippers. Descriptive characteristics of the participants are summarized in Table 1.

Table 1. Participant Characteristics and Dipper/Non-Dipper Distribution According to ABPM

Characteristic	n	%
Age (years)		
<35	25	80.6
≥35	6	19.4
Occupation		
Housewife	26	83.9
Engineer	1	3.2
Nurse	2	6.5

Teacher	2	6.5
Education Level		
Primary School	9	29.0
High School	14	45.2
Associate Degree	1	3.2
Bachelor's Degree	7	22.6
Marital Status		
Married	31	100.0
Smoking		
Non-smoker	25	80.6
Smoker	6	19.4
Systolic BP Pattern (ABPM)		
Dipper	15	48.4
Non-dipper	16	51.6
Diastolic BP Pattern (ABPM)		
Dipper	20	64.5
Non-dipper	11	35.5

ABPM: Ambulatory Blood Pressure Monitoring; BP: Blood Pressure; n: Number of participants; %: Percentage

Evaluation of participants' age distribution, gestational weeks, and biochemical parameters indicated that the study predominantly represents a young and healthy pregnant population, mainly in the second trimester. Blood pressure values measured in the office setting were within the normotensive range for all participants. However, 24-hour ambulatory blood pressure monitoring (ABPM) results showed that diastolic blood pressure tended to be lower compared to office measurements. Examination of maximum and minimum blood pressure values revealed that, although no participant exceeded the diagnostic threshold for hypertension, some measurements approached borderline levels. Descriptive characteristics and clinical measurements of the participants are summarized in Table 2.

Table 2. Descriptive Characteristics and Clinical Measurements of Participants

Variable	Mean $\pm$ SD	Median (min-max)
Age (years)	29.13 $\pm$ 5.96	28 (18-41)
Gestational week	23.71 $\pm$ 9.46	22 (6-38)
Gravida	2.55 $\pm$ 1.61	2 (1-7)
Fetus number	1.06 $\pm$ 0.25	1 (1-2)
Parity	1.16 $\pm$ 1.21	1 (0-5)

Body weight (kg)	71.23 ± 11.07	70 (51–103)
Height (cm)	161.48 ± 5.47	162 (150–173)
BMI (kg/m ²)	27.29 ± 4.19	26.7 (20–37.8)
Fasting blood glucose (mg/dL)	83.35 ± 11.8	82 (66–121)
Triglycerides (mg/dL)	171.29 ± 115.89	158 (52–662)
Total cholesterol (mg/dL)	176.77 ± 40.43	175 (105–273)
HDL (mg/dL)	49.87 ± 10.19	48 (29–80)
LDL (mg/dL)	98.9 ± 22.98	97.5 (60–180)
BUN (mg/dL)	8.49 ± 2.44	8 (5–15)
Creatinine (mg/dL)	0.56 ± 0.12	0.55 (0.32–0.9)
AST (U/L)	17.94 ± 9.06	16 (4–46)
ALT (U/L)	15.0 ± 5.9	15 (7–32)
Hemoglobin (g/dL)	12.63 ± 1.62	12.8 (9.7–15)
Platelet (×10 ³ /mm ³)	260.35 ± 69.58	240 (160–477)
TSH (μIU/mL)	1.93 ± 1.19	1.63 (0.37–5.07)
T4 (ng/dL)	2.4 ± 3.29	1.16 (0.56–13.3)
Office BP		
Systolic BP (mmHg)	111.19 ± 8.04	111 (92–129)
Diastolic BP (mmHg)	72.42 ± 9.92	75 (50–94)
Pulse (bpm)	90.39 ± 14.41	89 (66–122)
ABPM		
Daytime mean SBP (mmHg)	111.74 ± 6.07	113 (97–120)
Daytime mean DBP (mmHg)	67.26 ± 5.81	67 (56–78)
Nighttime mean SBP (mmHg)	101.94 ± 7.96	101 (88–117)
Nighttime mean DBP (mmHg)	58.9 ± 7.35	60 (48–75)
Mean SBP (mmHg)	108.87 ± 6.48	111 (95–118)
Mean DBP (mmHg)	64.94 ± 5.91	65 (55–77)
Mean arterial pressure (mmHg)	85.16 ± 5.63	87 (74–94)
Mean pulse (bpm)	85.94 ± 10.79	86 (66–114)
Mean pulse pressure (mmHg)	45.23 ± 7.32	43 (37–75)
Max SBP (mmHg)	143.13 ± 15.87	141 (117–211)
Max DBP (mmHg)	90.77 ± 13.53	88 (74–128)
Min SBP (mmHg)	82.61 ± 7.43	84 (69–98)
Min DBP (mmHg)	42.1 ± 7.55	40 (31–57)

ABPM: Ambulatory Blood Pressure Monitoring; BP: Blood Pressure; BMI: Body Mass Index; FBG: Fasting Blood Glucose; ALT: Alanine Aminotransferase; AST: Aspartate Aminotransferase; BUN: Blood Urea Nitrogen; SBP: Systolic Blood Pressure; DBP: Diastolic Blood Pressure; TSH: Thyroid Stimulating Hormone; T4: Thyroxine; SD: Standard Deviation

The mean systolic blood pressure (SBP) measured in the office setting was 111.19 ± 8.04 mmHg, while the 24-hour ambulatory measurement yielded a mean SBP of 108.87 ± 6.48 mmHg. The difference between the two measurement methods was not statistically significant ($p = 0.158$), suggesting that systolic blood pressure values are largely similar

in office and ambulatory settings. In contrast, for diastolic blood pressure (DBP), the mean office measurement was 72.42 ± 9.92 mmHg, whereas the ambulatory mean was significantly lower at 64.94 ± 5.91 mmHg. This difference was statistically significant ($p < 0.001$). These findings indicate that DBP is measured higher in the office compared to ambulatory monitoring, and this discrepancy is clinically relevant (Table 3).

Table 3. Comparison of Office and Ambulatory Blood Pressure Measurements

Variable	OBPM	ABPM	p
SBP (mmHg)	111.19 ± 8.04 (111)	108.87 ± 6.48 (111)	0.158*
DBP (mmHg)	72.42 ± 9.92 (75)	64.94 ± 5.91 (65)	<0.001**

*Data are presented as mean $\pm$ SD (median).

*Wilcoxon signed-rank test; **Paired samples t-test.

ABPM: Ambulatory Blood Pressure Monitoring; BP: Blood Pressure; DBP: Diastolic Blood Pressure; OBPM: Office Blood Pressure Measurement; SBP: Systolic Blood Pressure

The agreement between office and ambulatory systolic blood pressure (SBP) measurements was evaluated using the Bland–Altman method. The mean difference ($\bar{d}$) between the measurements was 2.32 mmHg, indicating that office measurements were slightly higher than ambulatory measurements. The ± 1.96 standard deviation (SD) limits of agreement were calculated as -14.7 mmHg for the lower limit and 19.4 mmHg for the upper limit. These results suggest that, at an individual level, there may be clinically significant differences between the two methods; however, the small mean difference indicates that the methods yield similar results at the group level. The proximity of the mean difference to zero and the symmetry of the limits support a clinically acceptable level of agreement between the two methods. Nevertheless, given the wide limits of agreement, potential discrepancies should be considered in individual patient assessments (Table 4; Figure 1).

Table 4. Bland–Altman Analysis of Agreement Between Office and Ambulatory Systolic Blood Pressure Measurements

Variable	n	$\bar{d}$	SD	Lower limit	Upper limit
Office SBP	31	2.32	8.70	-14.7	19.4

SBP: Systolic Blood Pressure; SD: Standard Deviation; n: Number of participants

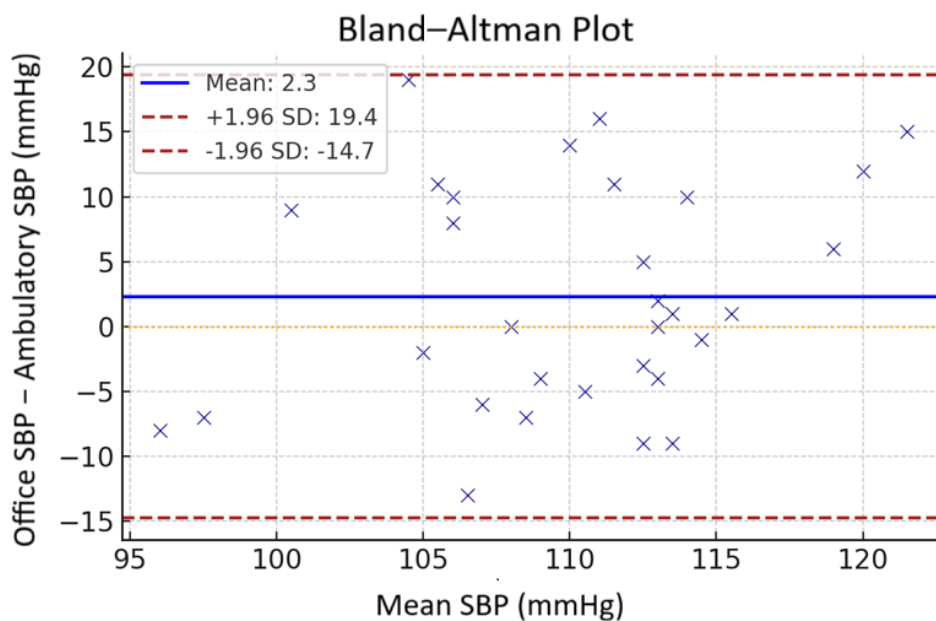


Figure 1. Bland–Altman Plot for the Comparison of Office SBP and Ambulatory (Holter) SBP Measurement Techniques

The agreement between office and ambulatory SBP measurements was also assessed using Passing–Bablok regression analysis. The resulting regression equation yielded an intercept of 77.68 and a slope of 0.32. The 95% confidence interval for the intercept was 0.00 to 129.00, and for the slope, it was -0.16 to 1.00. The inclusion of 0 within the intercept's confidence interval indicates that there is no systematic bias between the methods, meaning the measurements do not show a constant deviation. Similarly, the inclusion of 1 within the slope's confidence interval suggests the absence of proportional

bias, indicating that the measurements do not deviate relative to each other on different scales. Based on these findings, no statistically significant difference was observed between office and ambulatory SBP measurements, and a concordant relationship between the two measurement methods was demonstrated (Table 5; Figure 2).

Table 5. Comparison of Office and Ambulatory Systolic Blood Pressure Measurements Using Passing–Bablok Regression Analysis

Group	Intercept	Slope	95% CI (Intercept)	95% CI (Slope)
Total SBP	77.68	0.32	0.00 – 129.00	–0.16 – 1.00

CI: Confidence Interval; SBP: Systolic Blood Pressure

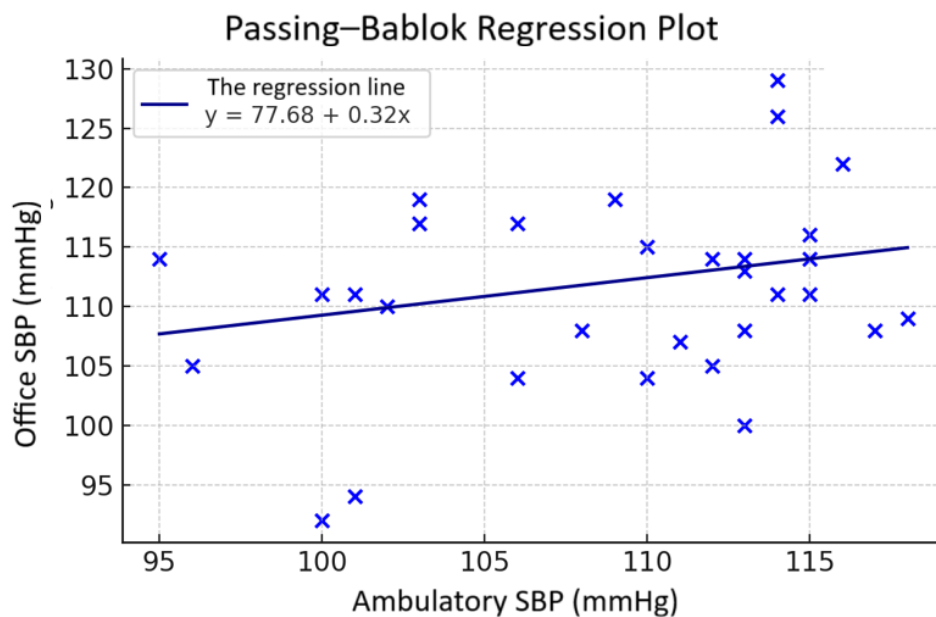


Figure 2. Passing–Bablok Regression Plot for the Comparison of Office SBP and Holter SBP Measurement Techniques

The agreement between office and ambulatory diastolic blood pressure (DBP) measurements was evaluated using Bland–Altman analysis. The mean difference ($\bar{d}$)

between the measurements was 7.48 mmHg, indicating that office-measured DBP values were higher than ambulatory measurements. The standard deviation of the differences was 8.33 mmHg, and the 95% limits of agreement were -8.8 mmHg for the lower limit and 23.8 mmHg for the upper limit. The mean difference being notably greater than zero indicates a systematic bias between the two methods. Moreover, the wide limits of agreement suggest that substantial discrepancies may occur at the individual measurement level. These findings demonstrate that diastolic blood pressure is measured higher in the office compared to ambulatory monitoring, and this difference should be clinically considered (Table 6; Figure 3).

Table 6. Bland–Altman Analysis of Agreement Between Office and Ambulatory Diastolic Blood Pressure Measurements

Variable	n	$\bar{d}$	SD	Lower limit	Upper limit
Office DBP	31	7.48	8.33	-8.8	23.8

DBP: Diastolic Blood Pressure; SD: Standard Deviation; n: Number of participants

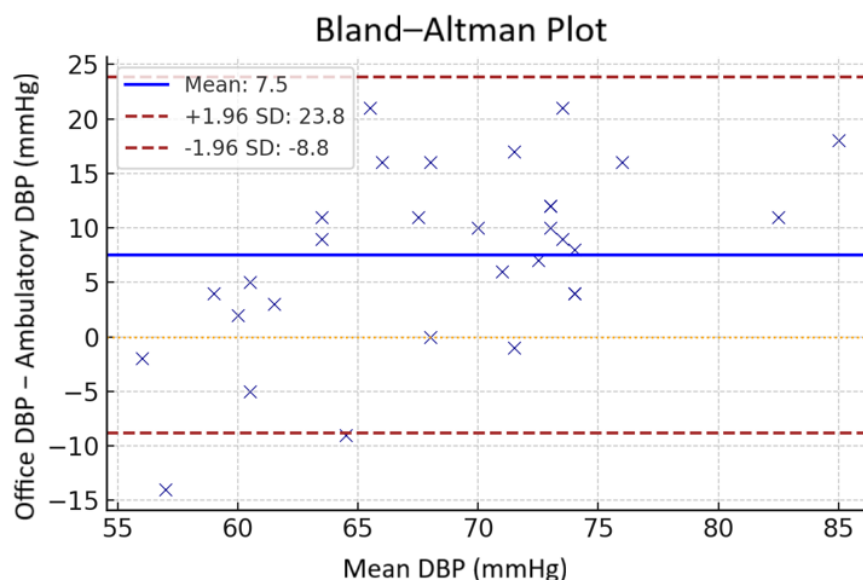


Figure 3. Bland–Altman Plot for the Comparison of Office DBP and Holter DBP Measurement Techniques

The linear relationship between office and ambulatory DBP measurements was assessed using Passing–Bablok regression analysis. The resulting regression equation yielded an intercept of 22.00 and a slope of 0.80. The 95% confidence interval for the intercept was –15.97 to 65.71, and for the slope, it was 0.14 to 1.35. The inclusion of 0 within the intercept’s confidence interval indicates that there is no systematic bias between the measurement methods. Similarly, the inclusion of 1 within the slope’s confidence interval suggests the absence of proportional bias. These findings demonstrate an overall concordant relationship between office and ambulatory DBP measurements, indicating that the two methods do not differ statistically in a significant manner (Table 7; Figure 4).

Table 7. Comparison of Office and Ambulatory Diastolic Blood Pressure Measurements Using Passing–Bablok Regression Analysis

Group	Intercept	Slope	95% CI (Intercept)	95% CI (Slope)
DBP	22.00	0.80	–15.97 – 65.71	0.14 – 1.35

DBP: Diastolic Blood Pressure; CI: Confidence Interval

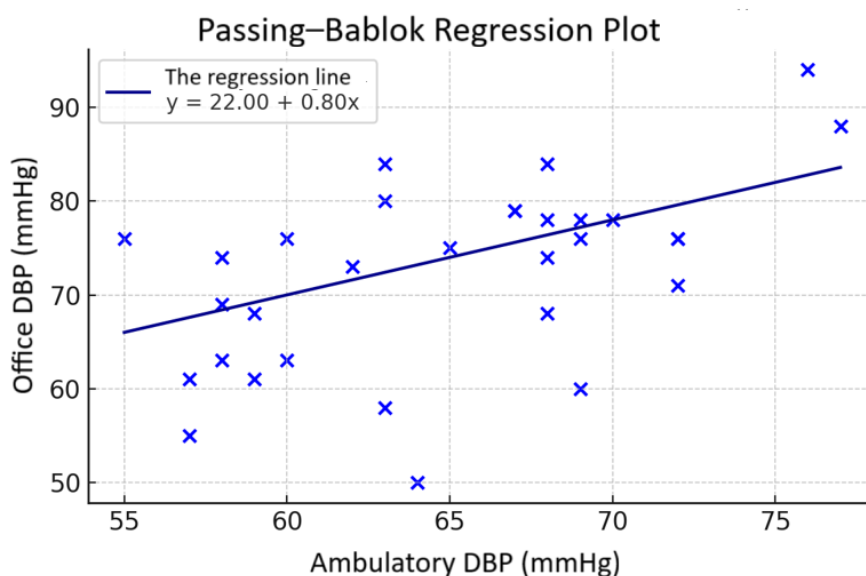


Figure 4. Passing–Bablok Regression Plot for the Comparison of Office DBP and Holter DBP Measurement Techniques

Discussion

This study aimed to evaluate 24-hour ambulatory blood pressure monitoring (ABPM) results in normotensive pregnant women at the primary care level, compare these values with office blood pressure measurements (OBPM), and determine dipper/non-dipper patterns. The findings demonstrated that systolic blood pressure (SBP) values were similar between the two methods, whereas diastolic blood pressure (DBP) values were significantly higher when measured in the office. Furthermore, approximately half of the participants exhibited a systolic non-dipper pattern, while the proportion of non-dippers for diastolic pressure was lower. These results suggest that blood pressure patterns during pregnancy are heterogeneous and that office measurements may overestimate diastolic values. Overall, the findings indicate that ambulatory monitoring could provide valuable insights for blood pressure assessment in pregnant women within primary care settings.

In a primary care study conducted by Mıstık and colleagues, office, home, and 24-hour ambulatory blood pressure measurements were compared in 47 normotensive individuals, and significant blood pressure variability was observed even within a normal population. The study reported a prevalence of white-coat hypertension of 13% and masked hypertension of 4%, with office-measured SBP and DBP values being higher than those obtained via ambulatory monitoring. Furthermore, the 24-hour measurements revealed an average SBP variation of 15.7 mmHg and a DBP variation of approximately 12 mmHg (10). These findings support the notion that single office measurements may not fully reflect an individual's true blood pressure profile, and that ambulatory monitoring serves as an important tool for detecting masked or white-coat hypertension. Similarly, in our study, office measurements yielded higher diastolic values compared to ambulatory monitoring, and certain patterns—particularly non-dipper prevalence—were more pronounced in specific cases. Consistent with the literature, these results suggest that even in low-risk pregnant women in primary care, ambulatory monitoring may offer valuable diagnostic insights.

Our findings indicate that office measurements during pregnancy may overestimate diastolic blood pressure (DBP). One important reason for this phenomenon could be ‘white-coat hypertension.’ In routine clinical practice, blood pressure assessment in pregnancy is generally performed using office measurements; however, this approach may overlook phenotypes such as white-coat or masked hypertension. White-coat hypertension refers to elevated blood pressure detected in the office setting while out-of-office measurements remain within normal ranges. In clinical practice, 24-hour ambulatory blood pressure monitoring (ABPM) or home blood pressure monitoring (HBPM) can be used to identify this condition (11). When office blood pressure values are $\geq 140/90$ mmHg, out-of-office measurements are recommended to rule out white-coat hypertension. In our study, no pregnant women were identified with elevated blood pressure outside the normal range in either office or ABPM measurements. Previous studies have reported that the prevalence of white-coat hypertension in pregnancy varies depending on study design and population characteristics, ranging from 4% to 30% (12–15). The prognosis of white-coat hypertension is generally considered better than that of persistent hypertension (16). Therefore, confirming the diagnosis via ABPM is important to avoid unnecessary treatment intensity and to prevent potential adverse effects on uteroplacental perfusion. Moreover, pregnant women already receiving antihypertensive therapy may also exhibit a ‘white-coat effect,’ which can lead to misinterpretation of office measurements as treatment-resistant hypertension or hypertensive emergency, potentially resulting in unnecessary dose escalation or preterm delivery interventions (16, 17). Consequently, ABPM or HBPM is recommended for all pregnant women with office measurements $\geq 140/90$ mmHg, regardless of gestational age. Although no cases of hypertension were detected in our study, the higher diastolic values observed in office measurements support the relevance of this phenomenon.

Another situation highlighting the importance of ambulatory blood pressure monitoring (ABPM) is masked hypertension. In our study, no evidence of masked hypertension was observed among the participants. Masked hypertension is known to be relatively common

in the general population, and the physiological blood pressure changes occurring during the first half of pregnancy may further increase its prevalence in pregnant women (18). Although the exact prevalence of masked hypertension in normal pregnancies is not well established, studies involving high-risk pregnant populations have reported rates of up to 30% (19). Moreover, masked hypertension has been shown to be an independent and strong predictor of preeclampsia and adverse neonatal outcomes (19–21). Therefore, identifying masked hypertension is particularly important in high-risk pregnancies.

Ambulatory monitoring provides not only average blood pressure values but also the opportunity to identify dipper and non-dipper patterns. Several studies have demonstrated that a non-dipper pattern may be associated with preeclampsia and other adverse pregnancy outcomes (19, 21, 22). Although a physiological nocturnal decline in blood pressure is expected throughout pregnancy, the magnitude of this decrease may vary between individuals and across trimesters (23–25). In our study, the prevalence of a systolic non-dipper pattern was relatively high at 51.6%, suggesting that this pattern may occur more frequently than expected during pregnancy. The lower prevalence of a diastolic non-dipper pattern (35.48%) indicates that systolic and diastolic regulation may be affected by different mechanisms during pregnancy. These findings suggest that detecting non-dipper patterns, even at the primary care level, could provide valuable information for risk prediction. However, larger prospective studies specifically targeting the pregnant population are needed to validate the use of this phenotype in screening and risk stratification.

Conclusion

The majority of the pregnant women included in this study were young and healthy, without comorbidities. This enhances the generalizability of the findings, particularly for routine antenatal monitoring. While no significant differences were observed in systolic blood pressure levels, diastolic blood pressure was higher in office measurements. This finding suggests that a ‘white-coat effect’ may also be present in pregnant women, and

that office-based diastolic measurements may be misleading. Approximately half of the participants exhibited a systolic non-dipper pattern. The relatively high prevalence of non-dipper patterns during pregnancy emphasizes the added value of ambulatory blood pressure monitoring (ABPM) for cardiovascular risk assessment in later life. Analyses indicated no systematic or proportional bias between measurement methods, although individual-level discrepancies were observed. Therefore, office measurements are sufficient for screening purposes, but ambulatory confirmation is recommended in women with borderline values. The use of ABPM in addition to office measurements can reduce the risk of falsely elevated readings during pregnancy. Recognizing white-coat and masked hypertension cases prevents unnecessary treatment initiation or delayed diagnosis. Increasing access to ABPM in primary care settings could facilitate more accurate classification and management of hypertension during pregnancy.

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The Evaluation of Patients' Thoughts and Attitudes Towards Polypharmacy in Family Medicine Polyclinic in the District Hospital

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Abstract

Objective: This study aimed to evaluate the perceptions and attitudes toward polypharmacy among patients attending a family medicine outpatient clinic in a district hospital and to determine the prevalence of polypharmacy and its associated factors.

Methods: This cross-sectional and descriptive study was conducted at the Family Medicine Unit No. 2 of Kayseri Özvatan District State Hospital. A total of 233 patients aged 18 years and older who had been using at least one medication for a minimum of one month and voluntarily agreed to participate were included. Data were collected through face-to-face interviews using a structured questionnaire consisting of 23 items addressing sociodemographic characteristics, medication use habits, and perceptions and attitudes toward polypharmacy. Data analysis was performed using SPSS version 22, and a p-value of <0.05 was considered statistically significant.

Results: The mean age of the participants was 64.3±11.3 years, and 40.8% were female. Of the participants, 80.7% reported regular medication use. While 31.8% believed that they were taking too many medications, 29.6% stated that they sometimes felt their treatment caused more harm than benefit. The majority of participants (96.6%) believed

Oral Presentation - OP362

that all of their medications were necessary, and 95.3% reported that they would be willing to reduce the number of medications if recommended by their physician. The prevalence of polypharmacy was found to be 30.0%. Polypharmacy was significantly more common among older patients, those with lower income levels, a higher number of chronic diseases, and longer duration of medication use ($p<0.05$).

Conclusion: Although most patients perceive their medications as necessary, a substantial proportion experience a high medication burden. These findings highlight the critical role of family physicians in reducing polypharmacy-related risks through regular medication reviews and patient-centered care.

Keywords: Polypharmacy, Family Medicine, Patient Attitudes, Medication Use, Primary Care.

INTRODUCTION

Polypharmacy has emerged as an increasingly prevalent health problem in contemporary medical practice, with significant clinical, economic, and social consequences. It is commonly defined as the concurrent use of five or more medications by a patient and has become more widespread worldwide due to population aging, the growing prevalence of multimorbidity, and the expansion of therapeutic options (1,2). Data from the World Health Organization and studies conducted in European countries indicate that the prevalence of polypharmacy among individuals aged 65 years and older ranges between 25% and 65% (1–3). Studies conducted in Türkiye report similar rates (4,5).

Polypharmacy is not limited to older adults and is also frequently observed in younger adults with chronic conditions such as diabetes mellitus, hypertension, cardiovascular diseases, and chronic kidney disease (6–8). Increased life expectancy and the simultaneous application of disease-specific clinical guidelines have led to a growing

medication burden, particularly in the geriatric population, making polypharmacy a major public health concern (9,10).

Family medicine plays a central role in the management of polypharmacy within primary care settings. Family physicians are well positioned to evaluate all medications used by patients from a holistic perspective, conduct regular medication reviews, and enhance patient safety (11,12). However, particularly in district hospitals and rural areas, limited resources, low health literacy, and inadequate coordination of care pose significant challenges to effective polypharmacy management (13,14).

The patient perspective is of critical importance in polypharmacy management. Patients' knowledge, beliefs, concerns, and expectations regarding medications directly influence treatment adherence (15,16). In Türkiye, studies examining the patient perspective on polypharmacy—especially in primary care and district hospital settings—remain limited (17,18). Education, awareness-raising interventions, regular medication reviews, and multidisciplinary collaboration have been highlighted as key strategies in the management of polypharmacy (19–21).

In this context, the aim of the present study was to evaluate the perceptions and attitudes toward polypharmacy among patients attending a family medicine outpatient clinic in a district hospital and to determine the prevalence of polypharmacy and its associated factors. The findings are expected to contribute to improving polypharmacy management in primary care and strengthening patient–physician communication.

MATERIALS AND METHODS

This cross-sectional and descriptive study aimed to evaluate the perceptions and attitudes toward polypharmacy among patients attending a family medicine outpatient clinic in a district hospital. The study population consisted of individuals aged 18 years and older who attended Family Medicine Unit No. 2 at Özvatan District State Hospital in Kayseri Province between November 4, 2024, and January 29, 2025. The sample size was

calculated using the OpenEpi program, assuming a prevalence of positive attitudes toward polypharmacy of 81% based on the literature (22), with a 5% margin of error and a 95% confidence level, resulting in a minimum required sample size of 233 participants.

Individuals aged 18 years and older who had been using at least one medication for a minimum of one month and who agreed to complete the questionnaire were included in the study. Individuals younger than 18 years, those who had been using medications for less than one month, those who declined participation, emergency cases, and special vulnerable groups were excluded.

Ethical Approval and Permissions

Ethical approval was obtained from the Erciyes University Faculty of Medicine Clinical Research Ethics Committee on September 4, 2024 (Decision No: 2024/159). Permission for field implementation was also obtained from the Kayseri Provincial Directorate of Health on June 10, 2024 (Decision No: 2024/10).

Data Collection

Data were collected using a structured questionnaire developed based on a review of the literature. The purpose of the study was explained to the participants, and verbal informed consent was obtained. The questionnaires were administered through face-to-face interviews, each lasting approximately 15–20 minutes.

The questionnaire consisted of two sections. The first section included questions on demographic and socioeconomic characteristics, disease history, and medication use. Patients who expressed a desire to reduce the number of medications were identified by comparing the number of medications used and daily intake patterns. The second section consisted of 12 items assessing perceptions and attitudes toward polypharmacy. The items were presented in a three-point Likert scale and Yes/No formats and evaluated medication awareness, treatment adherence, awareness of adverse effects, and attitudes

toward shared decision-making between patients and physicians. The content of the questionnaire was validated by one family medicine specialist and one pharmacology specialist. A pilot study conducted with 15 patients assessed comprehensibility, and no further revisions were deemed necessary.

Statistical Analysis

Data were summarized using descriptive statistics, including frequencies, percentages, means, and standard deviations. Normality of distribution was assessed using the Shapiro–Wilk test. Polypharmacy and its associated factors were evaluated within the framework of relationships between dependent and independent variables, with polypharmacy defined as the dependent variable and demographic characteristics and attitude items as independent variables. Associations between dependent and independent variables were analyzed using the chi-square test. All analyses were performed using SPSS version 22, and a p-value < 0.05 was considered statistically significant.

RESULTS

Sociodemographic Characteristics of Participants

A total of 233 patients who met the inclusion criteria and attended Family Medicine Unit No. 2 in Özvatan district of Kayseri participated in the study. The mean age of the participants was 64.36 ± 11.38 years (range: 21–92), with 40.8% female and 59.2% male participants. The majority of patients were married (84.5%), and educational attainment was predominantly primary school level or below. A total of 68.2% of participants reported a household income below the minimum wage. The mean number of medications used was 3.44 ± 2.16 (range: 1–10), and 30% of patients were using five or more medications. Detailed demographic and clinical characteristics are presented in Table 1.

Perceptions and Attitudes Toward Polypharmacy

Participants' perceptions and attitudes toward polypharmacy were evaluated using a 12-item scale (Table 2). While 80.7% of participants reported using their medications regularly, 31.8% stated that they believed they were required to take too many medications. Approximately one-third of patients reported that they did not take their medications on certain days because they felt the treatment caused more harm than benefit.

The vast majority of participants (96.6%) believed that all of their medications were necessary, and 95.3% reported that they would be willing to discontinue one or more medications if recommended by their physician.

Association Between Polypharmacy and Sociodemographic and Clinical Characteristics

According to the survey results, polypharmacy was identified in 30% of patients. The prevalence of polypharmacy was significantly higher among patients aged 80 years and older ($p < 0.001$). Polypharmacy was also more common among patients with an income below the minimum wage ($p = 0.039$). Patients with three or more chronic diseases (69.8%) and those who had been using medications for 10 years or longer had significantly higher rates of polypharmacy ($p < 0.001$). No significant associations were found between polypharmacy and sex, marital status, living arrangement, or educational level (Table 3).

Association Between Polypharmacy and Perceptions/Attitudes

Polypharmacy rates were significantly higher among patients who believed they were taking too many medications and among those who were dissatisfied with the number of medications they were using ($p < 0.001$) (Table 4). In contrast, no significant associations were found between polypharmacy and beliefs regarding medication necessity,

willingness to discontinue medications upon physician recommendation, perception of adverse effects, or regular medication use.

Willingness to Reduce the Number of Medications

As the number of medications increased, the proportion of patients who expressed a desire to reduce their medication burden increased markedly. Among patients using six or more medications, this proportion reached 57.5%. Sixty percent of patients who believed they were taking too many medications reported a desire to reduce the number of medications, and willingness to reduce medications was significantly higher among patients who had been using medications for 10 years or longer (Table 5).

DISCUSSION

This study aimed to evaluate perceptions and attitudes toward polypharmacy among patients attending a family medicine outpatient clinic in a district hospital. The findings indicate that perceptions of polypharmacy are associated with clinical and socioeconomic variables such as age, income level, number of chronic conditions, and duration of medication use.

The mean age of the participants was 64 years, indicating that the study sample predominantly consisted of older adults. However, the wide age range allowed for the evaluation of perceptions and attitudes toward polypharmacy across different age groups. The relatively low levels of education and income represent important risk factors in terms of health literacy and participation in treatment processes and may indirectly influence clinical outcomes related to polypharmacy.

The finding that 80.7% of patients reported regular medication use appears higher than rates reported in the literature (23). However, this result should be interpreted with caution due to the self-reported nature of the data. Previous studies have shown that patients tend to overreport medication adherence (24), suggesting that the high

adherence rates observed in this study may not fully reflect actual medication-taking behavior.

Approximately one-third of participants believed that they were required to take too many medications, indicating a notable perception of polypharmacy. This finding is consistent with results reported in studies conducted among older adults (25,26). Similarly, nearly 30% of patients reported that they did not take their medications on some days because they felt the treatment caused more harm than benefit, suggesting that concerns about adverse effects may negatively affect adherence. The literature likewise indicates that fear of adverse effects can influence medication use (27,28).

Although the majority of patients reported being satisfied with the number of medications they were using, nearly half stated that they believed they were taking many medications. This finding suggests that patients may accept the necessity of their medications while simultaneously being aware of their overall medication burden. Similar findings have been reported in studies showing that patients using multiple medications may view them as necessary for improving health, yet still express a desire to reduce the number of medications (29–31).

In this study, 96.6% of patients believed that all of their medications were necessary, and 95% reported willingness to reduce medications if recommended by their physician. These findings indicate a strong patient–physician relationship and suggest that patients trust treatment plans while remaining open to deprescribing under appropriate guidance. Consistent with this finding, previous studies have shown that older adults tend to respond positively to deprescribing initiatives when guided by their physicians (26).

The prevalence of polypharmacy in this study was 30%, which is consistent with rates reported in the literature (32). Higher rates of polypharmacy among older adults, individuals with lower income levels, those with three or more chronic diseases, and those with long-term medication use suggest that polypharmacy is primarily driven by

clinical and socioeconomic factors. The marked increase in polypharmacy among individuals aged 80 years and older is consistent with previous findings (33,34).

No significant associations were observed between polypharmacy and sex, marital status, living arrangement, or educational level. Although polypharmacy rates were higher among women, the difference did not reach statistical significance. The literature presents conflicting findings on the role of sex as a risk factor for polypharmacy, with some studies identifying female sex as a risk factor and others reporting no significant association (35–37). These inconsistencies suggest that polypharmacy cannot be explained solely by demographic variables.

When polypharmacy was evaluated together with patient perceptions and attitudes, significant associations were observed specifically for believing that one is taking too many medications and dissatisfaction with the number of medications used. In contrast, no significant associations were found between polypharmacy and beliefs about medication necessity, perceptions of adverse effects, regular medication use, or willingness to discontinue medications upon physician recommendation. These findings suggest that perceived medication burden, rather than general medication attitudes, may be more closely related to polypharmacy.

The higher willingness to reduce medications among patients using six or more medications and those with long-term medication use reflects the burden of polypharmacy on patient experience. Long-term medication use may lead to treatment fatigue, which in turn increases the desire to reduce medication burden (38–40). The findings of this study are consistent with previous reports in the literature.

Overall, the present study indicates that polypharmacy is not entirely independent of patient perceptions but is primarily associated with clinical characteristics and prescribing practices. Patient perceptions appear to overlap with polypharmacy mainly through perceived medication burden.

This study has several limitations. Due to its cross-sectional design, associations between variables could be identified, but causal relationships could not be established. The reliance on self-reported data may have led to overestimation of medication adherence and regular use. Additionally, the study was conducted in a single district with a specific socioeconomic profile, limiting the generalizability of the findings. Evaluating polypharmacy solely based on the number of medications used excluded qualitative aspects such as medication appropriateness and potential drug–drug interactions.

One of the strengths of this study is its focus on patient perceptions and attitudes toward polypharmacy, addressing a relatively underexplored dimension in the literature. The inclusion of a wide age range, with a predominance of older adults, enhances the representation of high-risk groups. Moreover, the simultaneous evaluation of multiple variables—including medication adherence, perceived necessity, and awareness of adverse effects—allowed for a more comprehensive assessment of medication management.

CONCLUSION

This study demonstrates that polypharmacy is common in family medicine practice and is closely associated with advanced age, multiple chronic conditions, long-term medication use, and lower socioeconomic status. Although most patients reported trust in their medications and openness to physician recommendations, perceptions related to medication burden were also prominent. Effective management of polypharmacy requires more than increasing patient awareness alone; regular medication reviews, rational prescribing practices, and strengthened patient–physician communication are essential. Future multicenter and longitudinal studies are needed to further examine both the clinical and experiential dimensions of polypharmacy and to support the development of feasible intervention strategies in primary care.

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Parental Awareness and Knowledge about Invasive Meningococcal Disease and Meningococcal Vaccines at a Private Hospital in Istanbul

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ABSTRACT

Background: This study aims to assess the knowledge and attitudes of parents towards Invasive Meningococcal Disease (IMD) and meningococcal vaccines, who presented to a pediatric clinic of a private hospital in Istanbul.

Materials and Methods: A cross-sectional survey study was conducted between May 2024 and August 2024 among 202 parents in Memorial Sisli Hospital, Affiliate of Halic University, Istanbul, Turkiye.

Results: Meningococcal vaccine uptake in index children was significantly higher among parents who had higher average monthly household incomes, who were aware of meningococcal vaccine(s), IMD & its long-term sequelae, who were willing to vaccinate their children with meningococcal vaccine(s) and among those who gather information from pediatricians ($p < 0.001$).

Additionally, meningococcal vaccine uptake in index children was statistically higher among parents who had educational levels of university degree and above and those who gather information from primary healthcare centres, newspapers, magazines, books, articles ($p < 0.05$).

Conclusion: A common view and/or practice among pediatricians and primary healthcare workers would be of substantial value to increase meningococcal vaccine uptake among children and adolescents.

Keywords: Invasive Meningococcal Disease, Meningococcal Vaccine, Parental Knowledge, Attitude

INTRODUCTION

Invasive meningococcal disease (IMD) is caused by a bacterium called *Neisseria meningitidis*, the nasal and oropharyngeal carriage of which is common. An infected individual may pass these bacteria via cough and sneezing on to healthy individuals during close contact and lead to a severe infection [1-3]. The age groups that are at higher risk of developing IMD are children below the age of five (especially infants below one year) together with adolescents and young adults [1,4]. The clinical presentation(s) of IMD may differ among individuals, however the most common clinical presentations are in the form of inflammation of the meninges (meningitis) and/or infection of the bloodstream (septicemia). Symptoms of meningitis caused by *Neisseria meningitidis* may include fever, mottled skin, altered mental status (stupor&coma) and/or signs of meningeal irritation such as headache, neck stiffness, nausea and vomiting; while non-blanching rash of septicemia may be preceded by nonspecific symptoms such as flu-like symptoms (fever, muscle&joint pain). Septicemia may show a fulminant course causing low blood pressure, cold extremities, shock, multiorgan failure and peripheral ischemia, which may lead to amputation of extremities, and/or death. Other possible clinical presentations of IMD may include pneumonia, arthritis, pericarditis, myocarditis, and endophthalmitis [2,5,6]. As well as being a lethal infection, the case fatality rate of which is around 10%; IMD may also cause long-term sequelae among survivors; such as amputation of extremities, deafness, mental retardation, epilepsy, etc [2,7,8]. Those who

are at high risk of getting IMD are immun deficient children, university students (especially those living in dormitories), military recruits and/or travelers to epidemic or hyperendemic areas [9].

There are 13 different serogroups of *Neisseria meningitidis*, six of which (A, B, C, W, X, and Y) are the most commonly seen serogroups in IMD. In order to prevent IMD, the best option is getting immunized against certain serogroups with the help of available meningococcal vaccines [10-12]. There are two types of meningococcal vaccines licensed and approved by the US Food and Drug Administration (FDA), which are recommended for use in children and young adults by the Centers for Disease Control and Prevention (CDC) Advisory Committee on Immunization Practices (ACIP). There are four products of MenACWY vaccines; namely Menactra (since 2012), Nimenrix (since 2016), Menveo (since 2016), MenQuadfi (since 2022) and there is only one product of serogroup B meningococcal (MenB) vaccine; namely Bexsero (since 2018) available in Türkiye [13-24]. The immunogenicity, effectiveness, and safety studies supporting the use in children and young adults can be found in the prescribing information for Menactra (MenACWY-D), Menveo (MenACWY-CRM), MenQuadfi or Nimenrix (MenACWY-TT), and Bexsero (MenB-4C) [15-24]. Meningococcal vaccines can be administered as early as 6 weeks of age, depending on the brand of the vaccine product, however vaccination can begin at any age. Apart from optional vaccines [rotavirus, meningococcal, human papillomavirus (HPV), and influenza virus], newer vaccines have been introduced to the ‘Turkish National Immunization Programme for Children’ and provided without any cost and obligation by the Turkish Ministry of Health over the last decades [25]. Meningococcal vaccines can be administered in accordance with the recommendations of the Social Pediatrics Association in all pediatric age groups via shared clinical decision making (SCDM), which requires a decision fit for the individual through exchange of information and opinions between the patient or their parent/caregiver and the health-care provider (HCP) [1,26,27]. However, it is a well known fact that fewer adolescents, compared to other pediatric age groups, access the health care services. When they do, it is most often to seek

medical help for their acute complaints and the probability of having a primary healthcare visit in a given year declines substantially with increasing age [27,28].

Therefore, in our study, we aimed to evaluate parents of children from any age regarding knowledge and attitudes towards invasive meningococcal disease and meningococcal vaccines during an out of routine follow-up visit for various acute medical complaints of their children. The data obtained from this study may help clinicians determine the dynamics of increasing meningococcal vaccination rates.

MATERIALS and METHODS

Data collection

A questionnaire-based cross-sectional study was conducted between May 1st and August 31st, 2024 in Memorial Sisli Hospital, Affiliate of Halic University, Istanbul. Data for the study were collected from 202 parents (either the mother or the father of the index child) who volunteered to fill out questionnaire sheets during an out of routine follow-up visit hour for various acute medical complaints of their children. The vaccination status of the index child was determined on the basis of parental declaration through multiple choice and/or open-ended questions. The parents were given leaflets containing information about invasive meningococcal disease and meningococcal vaccines after completing their questionnaires. The questionnaire was structured with the help of previous literature [30,31].

In addition to general demographic variables (gender of the parent, parental age, city of residence, marital status, level of education and occupation of both parents; average monthly household income, age and gender of index child and his/her sibling(s), source of information) and vaccination status&underlying disease of index child, the questionnaire also included questions about parental knowledge and behaviours regarding IMD and meningococcal vaccines.

Knowledge of IMD among parents was assessed via twelve multiple-choice questions; three of which also had open-ended domains. Eight of these questions were further used

to calculate the 'Total Parental Knowledge Score (TPKS)' of the parents about IMD. Correct answers regarding the route of transmission, the mortality rate, knowing at least one of the symptoms, knowing at least one of the complications, knowing that IMD may cause morbidity, and knowing that vaccination is the best option for protection against IMD corresponded to one point for each. Parents were scored with one point if they chose only one or two risk groups among travelers to epidemic/hyperendemic areas, military recruits or those living in university dormitories, whereas they were given two points if they knew all risk groups that are at higher risk for meningococcal infection correctly. Similarly, they were scored with one point if they picked only one risky age group, whereas they were given two points if they knew all risky age groups that are at higher risk for meningococcal infection correctly. That way, the total knowledge score ranged from zero to ten.

Parental awareness, attitudes and behaviours towards meningococcal vaccine(s) were assessed via eight multiple-choice questions, two of which also had open-ended domains.

Formation of Comparison Groups

Comparison groups were designed according to parental gender, parental age (those with a median age and below vs those over the median age), city of residence (those living in Istanbul vs those living outside Istanbul), marital status of the parent, highest educational level of the parent who filled out the survey form (below university degree vs university degree and above), presence of a healthcare worker among parents, monthly household income (50.000TRY and below, above 50.000TRY), the age group of the child who presented to the clinic (below 5 years of age, between 5 and 10 years, over 10 years of age), child's gender, presence of a chronic disease in the child, vaccination status according to the 'Turkish National Immunization Programme for Children (TNIPC)' (complete, partial, none), presence of vaccination outside the 'Turkish National Immunization Programme for Children', presence of vaccination with meningococcal vaccine, presence of vaccination with rotavirus vaccine, presence of vaccination with human papillomavirus (HPV) vaccine, presence of vaccination with influenza vaccine,

presence of a sibling, age groups of children within the household (all children below 5 years of age, all children of 5 years of age and above, mixed) awareness of IMD, awareness of IMD complications, awareness of meningococcal vaccine(s), source of information (pediatrician, primary healthcare centre/family physician, TV/Radio, Newspapers/Magazines/Books/Articles, Social media/Internet, Close contacts/Friends/Relatives), parental willingness to vaccinate the child with meningococcal vaccine.

Data Analysis

Data analysis was performed using the “R” based Jamovi 1.6 program [29]. Data were presented as n (%), mean $\pm$ standard deviation or median (25th-75th centile) according to their distribution characteristics. Data normality was evaluated using the Shapiro-Wilk test. Comparisons of quantitative variables between two groups were performed using Student’s t-test for normally distributed data and Mann-Whitney U test was used for non-normally distributed data. Chi-square test or Fisher’s exact test was used for the comparison of categorical variables. A p-value of less than 0.05 ($p < 0.05$) was considered statistically significant.

Ethical Approval

This study was approved by the Ethics Committee of Memorial Sisli Hospital (date: 12.12.2023, meeting number:006) and was conducted in full compliance with national and institutional ethical guidelines. Participation in the survey was voluntary, and informed consent was obtained from all participants at the beginning of the survey.

RESULTS

Sociodemographic characteristics

400 parents were invited to participate in the study during the study period while their children were kept under observation for various reasons (temperature control, rehydration, etc.), of whom 202 (M/F = 1:1.02) agreed to participate in the research (the

response rate was 50.5%). The median age of the 202 participants was 37 years (33-37). So, we decided to pick the median age of 37 years as the cut off point to be used in comparison tables. The city of residence of the majority (85.6%) of 202 parents was Istanbul, while the rest of the participants were residing in 19 different cities from all geographical regions of Türkiye. 97.5% of 202 parents were married (2.5% were widows). The highest educational level of 80.7% of 202 parents who filled out the survey questionnaire was university degree and above, whereas 76.7% spouses had a highest educational level of university degree and above. Majority (84.1%) of the parents who filled out the questionnaire were employed during the time of the study, only 15.9% were either housewives, unemployed or retired. Majority (80.7%) of the spouses did also had a job during the time of the study. Taking the parents who filled out the survey questionnaire and his/her spouse into account together; 9.9% of 404 parents were healthcare workers (n:40); and 14.9% of index children (n:30) had either a mother or a father working in healthcare. The average monthly household income was over 50.000TRY in 87.6% of the study population, while 12.4% had average monthly income of 50.000TRY and below. 57.9% of our study population (n:117) was the parent of a single child, whereas 31.7% had two children, 6.4% had three children and 4% had four and more children within the household. Taking all children within the household into account; all of the children were below 5 years of age in 40.6% of families, 33.2% of families were consisting of children between ages 5 and 10, and in 26.2% all children were over 10 years of age. The sociodemographic characteristics of parents are presented in Table 1.

Characteristics of Index Children

The median decimal age of the 202 index children (M/F = 1.19:1) was 5.92 years (3-10). Only 5.9% of 202 index children (n:12) had a diagnosis of a chronic disease (allergies&asthma 83.3%, epilepsy 8.3%, mastocytosis 8.3%). All 202 index children were up-to-date with their vaccinations according to the TNIPC, while 60.9% of 202 index children were vaccinated with any optional vaccines outside the TNIPC coverage with

regard to parental declaration. 2% of 202 parents who filled out the survey forms were unsure whether their index children had had any optional vaccines outside the TNIPC. Among these 202 index children; vaccination against rotavirus was 51.5%, meningococci was 39.6%, influenza was 15.3%, and HPV was 3.5% respectively according to parental declaration. The characteristics of index children are presented in Table 2.

Invasive Meningococcal Disease Knowledge

54% of parents were aware of invasive meningococcal disease, while 36.6% of them were completely unaware of IMD in our study population. Only about one third of the parents (34.2%) knew the mode of transmission correctly, and 51% of parents did not have any idea about how meningococci are transmitted. Majority of parents (86.1%) had no idea about the meningococcal carriage rate, and only 3.5% of the parents knew the approximate meningococcal carriage rate correctly in our study population. 54% of parents had no idea about the age groups that are at high risk for IMD, while 39.1% knew that the age group below 5 years is a high risk group. Majority of parents (90.6%) were unaware of the fact that the age group over 15 years is at risk. Just over one quarter of the parents (25.2%) had no idea about the symptoms of IMD, while the rest established a relationship with symptoms such as fever (51%), joint&muscle pain (36.6%), flu-like symptoms (35.6%), headache (32.7%), nausea&vomiting (32.2%), neck stiffness (29.7%), stupor&coma (16.8%), cold extremities (12.9%), non-blanching rash (9.4%) and mottled skin (7.9%), respectively. 46.5% of the parents had no idea about the clinical presentations of IMD, however meningitis was the most well-known clinical presentation among parents (47.5%) in our study population, which was followed by septicemia (23.3%), arthritis (14.4%), myocarditis (11.4%), pericarditis (8.9%) and endophtalmitis (7.9%) respectively. With regards to the morbidity of IMD, 59.4% of parents were definitely sure that IMD leaves long-term sequela among survivors, while only 1% of parents had a claim that IMD is not responsible from long-term sequela. When unsure parents about long-term sequela are also taken into account, mental retardation was the most well-recognized sequela among parents with 35.1%, which was followed by seizures

(27.7%), deafness (19.3%), and amputation (9.4%) respectively. 79.2% of parents had no idea about the mortality rate of IMD, while 7.4% of parents knew the mortality rate correctly. Risk groups among travelers to epidemic/hyperendemic areas, military recruits or those living in university dormitories were recognized by 39.1% of parents, 47% of parents had no idea about these risk groups. Regarding the best way to protect oneself from IMD, vaccines were the best option for 60.4% of parents in our study population, which was followed by hand-washing (2.5%), wearing a mask (1.5%) and antibiotics (0.5%) respectively, while 35.1% of parents had no idea about how to be protected against IMD in the best way. The median TPKS was 4 (1-6) out of ten points in our study population.

Meningococcal Vaccine(s) Knowledge

60.4% of 202 parents who filled out the survey form declared that they had had heard meningococcal vaccines, while 20.3% declared that they had not and 19.3% were unsure whether they had had heard at the time of the study. The most common source of vaccine information among these 202 parents was paediatricians (49.5%), followed by primary healthcare centre/family physician (22.8%), close contacts/friends/relatives (22.3%), social media/internet (20.3%), TV/radio (10.4%), newspapers/magazines/books/articles (7.4%) respectively. Only one fifth (n:3) of 15 parents who gather information about meningococcal vaccine(s) from newspapers/magazines/books/articles was healthcare personel but 93.3% (n:14) of 15 parents had educational levels of university degree and above. 36.6% of 202 parents knew that meningococcal vaccine(s) are administered via intramuscular injection, which was followed by subcutaneous injection (8.9%), oral route (3%) and intradermal (1%) respectively; however majority of these parents (50.5%) did not have any idea about how meningococcal vaccines are administered. Only just over one fifth of 202 parents (20.8%) knew the age that meningococcal vaccine(s) can be administered at the earliest to children, 57.9% of 202 parents had no idea about when. 22.3% of 202 parents knew that meningitis can be seen in a child who has been covered with meningococcal vaccine(s),

while 13.4% of these 202 parents declared that it is impossible for a child to get caught to meningitis after being covered with meningococcal vaccine(s). However, around two-third (64.4%) of parents had no idea whether meningococcal vaccines are completely protective against meningitis.

Parental Attitudes Towards Meningococcal Vaccine(s)

58.9% of parents who filled out the survey questionnaire declared that they would think of getting their children vaccinated with meningococcal vaccine(s), whereas 7.9% were not in favor of these vaccines completely. Additionally, 33.2% of these 202 parents were unsure about getting their children vaccinated with meningococcal vaccine(s). The reasons why 16 parents did not want their children get meningococcal vaccine(s) were lack of information about meningococcal vaccine(s) (n:9), distrust to meningococcal vaccine(s) (n:5), high costs (n:1) and strict adherence to the TNIPC, respectively. 58.4% of 202 parents wanted to get information about the safety, efficacy&effectiveness, side effect profile and duration of protection by meningococcal vaccine(s) altogether, while the rest of the parents wanted to be specifically informed about safety (12.4%), efficacy&effectiveness (11.4%), side effect profile (%7.9) and duration of protection (7.9%) respectively. 21.3% of parents had no idea about which type of information they wanted to get.

Characteristics of Parents who were not in Favor of Meningococcal Vaccine(s) and their Children

The median age of 16 parents (M/F = 1:1) who were not in favor of getting their children vaccinated with meningococcal vaccine(s) was 41.5 years. 68.8% of 16 parents who were not in favor of getting their children vaccinated with meningococcal vaccine(s) were above the median age of our study population. The highest level of education of 56.3% of 16 parents who filled out the survey questionnaire was university degree and above, whereas 50% of the spouses had an educational level of university degree and above. None of the respondents among 16 parents who filled out the survey questionnaire was a

healthcare personel, 68.8% of them were employed at the time of the study and 31.2% of them were either unemployed or retired. 62.6% of spouses were also employed at the time of the study. There was only one child who had a healthcare worker among his/her parents. The average montly household income was above 50.000TRY in 50% of parents who were not in favor of getting their children vaccinated with meningococcal vaccine(s). The median TPKS among 16 parents who were not in favor of getting their children vaccinated with meningococcal vaccine(s) was 1.5 (0-2.5) out of ten points, which was lower than the median TPKS of our study population. Moreover, 56.3% of these parents were unaware of invasive meningococcal disease, while 12.5% of them were unsure whether they had had heard about IMD. Only 37.5% of 16 parents were aware of meningococcal vaccine(s), and again only 37.5% of 16 parents knew that vaccines are the best way to get protected against IMD. The main sources of information about these parents were close contacts/friends/relatives (37.5%), social media/internet (18.8%), pediatrician (18.8%), primary healthcare centre/family physician (12.5%), TV/Radio (12.5%) respectively.

Index children of these 16 parents were mostly above 5 years of age (75%), and 37.5% of them were single children. Only 3 of them had diagnoses of chronic diseases (allergies&asthma). All of these 16 index children were up-to-date with their vaccinations according to the TNIPC, however 31.3% of them were vaccinated with optional vaccines; rotavirus (n:3), influenza (n:2), and meningococcal vaccine(s) (n:1) respectively. The parent of the child who had been vaccinated with meningococcal vaccine(s) was not in favor of getting his/her child vaccinated with meningococcal vaccine(s) due to lack of information about the vaccine.

Factors Affecting 'Total Parental Knowledge Score'

The distribution of the TPKS among comparison groups was found to be abnormal (Shapiro-Wilk $p < 0.05$) in our study population. There was no statistical significance between TPKS and parental gender, parental age (those with a median age and below vs

those over the median age), marital status of the parent, city of residence (those living in Istanbul vs those living outside Istanbul), index child's gender, presence of a chronic disease in the index child, presence of a sibling, age groups of children within household (all children <5 years of age, all children ≥ 5 years of age vs mixed), parental use of close contacts, friends or relatives as a source of vaccine information, age groups of index children (below 5 years of age, between 5 and 10 years, over 10 years of age) groups. However, the median TPKS of parents with highest educational levels of university degree and above was statistically found to be higher than those with highest educational levels below university degree ($p: 0.002$). The median TPKS of healthcare worker parents who filled out the survey form were statistically higher than others ($p: 0.029$). The median TPKS of parents who had their children vaccinated against meningococci and/or rotavirus were significantly higher than those who hadn't ($p < 0.001$), while the median TPKS of parents who had their children vaccinated against influenza and/or HPV were statistically higher than those who hadn't ($p < 0.05$). The median TPKS of parents who were aware of IMD and/or meningococcal vaccine(s) were significantly higher than others ($p < 0.001$). The median TPKS of parents who use pediatricians and/or primary healthcare centres as source of meningococcal vaccine information were significantly higher than those who don't use those as source of information ($p < 0.001$), while the median TPKS of parents who use TV, radio, newspapers, magazines, books, articles, social media and/or internet were statistically higher than those of non-users of these sources of information ($p < 0.05$). The median TPKS of parents who were willing to vaccinate their children against meningococci were significantly higher than others ($p < 0.001$). The median TPKS of parents who had their children vaccinated with any of the optional vaccines were significantly higher than those who hadn't ($p < 0.001$). The median TPKS of parents who were aware of long-term sequelae of IMD were significantly higher than those who were unsure about such sequelae ($p < 0.001$). Additionally, the median TPKS of parents who had an average monthly household income over 50.000TRY were significantly higher than those of 50.000TRY and below ($p < 0.001$). Median TPKS comparisons among designated study groups are presented in Table 3 and Table 4.

Factors Affecting ‘Meningococcal Vaccine Uptake’ in Index Children

There was no statistical significance in meningococcal vaccine uptake in index children according to parental gender, parental age ($p>0.05$). With regards to source of information, there was no statistical significance between meningococcal vaccine uptake and parents who gather information from TV, radio, social media, internet, close contacts, friends and relatives ($p>0.05$). However, meningococcal vaccine uptake in index children was significantly higher among parents who had average monthly household incomes above 50.000TRY, who were aware of meningococcal vaccine(s), IMD & its long-term sequelae, who were willing to vaccinate their children with meningococcal vaccine(s) and among those who gather information from pediatricians ($p<0.001$). Additionally, meningococcal vaccine uptake in index children was statistically higher among parents who had educational levels of university degree and above and those who gather information from primary healthcare centres, newspapers, magazines, books, articles ($p<0.05$). Comparisons with regards to meningococcal vaccine uptake are presented in Table 5.

DISCUSSION

This study represents an evaluation of knowledge, attitude, and behaviours of Turkish parents towards invasive meningococcal disease (IMD) and meningococcal vaccine(s) in a private hospital setting. All of the index children in this study were up-to-date for their vaccinations according to the ‘Turkish National Immunization Programme for Children (TNIPC)’, which might be related to the city where our study was conducted. Istanbul is the most crowded city in Türkiye, which is well-endowed not only with primary healthcare service but also with secondary and tertiary healthcare services, including private hospitals. Additionally, educational levels of parents/caregivers’ are higher than the national average in Istanbul. Both mothers and fathers in our study population were mostly consisting of young adults who mostly had university degrees and above. On top of that, most of the parents in our study population were employed and had monthly

household incomes relatively higher than the general population during the time of the study.

In addition to the ‘Turkish National Immunization Programme for Children (TNIPC)’, about 60% of index children were also vaccinated with any of the optional vaccines outside the TNIPC coverage with regard to parental declaration, meningococcal vaccines being the second most common following rotavirus vaccines in our study population. These rates might be due to the median age of index children within our study population and also due to the fact that these index children can be directly assessed by pediatricians, who have direct access to optional vaccines within the hospital settings. Moreover, meningococcal vaccines and rotavirus vaccines can be administered as early as 6 weeks of postnatal age, during when these infants are being followed-up regularly by pediatricians for ultrasound scans of the hips, anthropometric measurements, hyperbilirubinemia and etc. Only just over one fifth of our study population was aware about the age that meningococcal vaccine(s) can be administered at the earliest to children. Although around 60% of our participants declared that they had heard meningococcal vaccines, it should also be kept in mind that, these parents might be mixing meningococcal vaccines with other vaccines that are also protective against microorganisms responsible from causing meningitis; such as *Bacillus Calmette-Guérin* (BCG) vaccine, *Haemophilus influenzae* type b (Hib), and/or pneumococcal 13-valent conjugate vaccine. In a study by Kara et al., the uptake of optional vaccines was found to be 33.4%; influenza (32.1%) and rotavirus (31.1%) were the most commonly administered vaccines. Nevertheless, it should be noted that the vaccination status of the index children was determined by checking written vaccination records or on the basis of parental declarations if no such a card was available, and this was later compared with the digital records of the hospital in that study [30]. The relatively lower vaccine uptake with HPV vaccine in our study population might also be related to the median age of index children within our study population, while lower rates with influenza vaccines and/or HPV vaccine might also be linked to the decline in having a primary healthcare or pediatric follow-up visit with increasing age as a consistent finding with the literature [27,28].

The median IMD knowledge score of our study population was low. The scores were statistically found to be higher among survey responders who have vaccinated their children with any of the optional vaccines (meningococcal, rotavirus, HPV, influenza), work in healthcare, have educational levels of university degree and above, use sources of information except from close contacts, friends and/or relatives and have relatively higher household income. The scores were also statistically higher among parents who were aware of IMD, IMD's long-term sequelae and meningococcal vaccine(s) and who were willing to vaccinate their children with meningococcal vaccine(s). In a study by Wang et al., participants with high educational attainment, household income or socio-economic status were found to have higher overall knowledge of IMD similar to our study [31].

Although the IMD knowledge of our survey responders was found to be directly correlated with high parental educational attainment, use of sources except from close contacts, friends and/or relatives, higher household income, awareness of IMD and its long-term sequelae; meningococcal uptake of index children was mostly higher in parents with high educational attainments & higher monthly household incomes, who were willing to vaccinate their children with meningococcal vaccine(s), who were aware of meningococcal vaccine(s), IMD & its long-term sequelae and avail themselves of sources from pediatricians, primary healthcare centres, newspapers, magazines, books and articles in our study population. Only around 8% of our study population was not in favor of getting their children vaccinated with meningococcal vaccine(s), and most of their reasons were all manageable with piece of information about IMD and meningococcal vaccines.

CONCLUSION

A common view and/or practice among pediatricians and primary healthcare workers would be of substantial value to increase meningococcal vaccine uptake among children

and adolescents. The earlier the parents are exposed to both disease and vaccine information, the better the vaccine uptake of optional vaccines might be achieved. Further studies are needed to assess parental knowledge of IMD and the dynamics of increasing meningococcal vaccination rates.

Table 1. The sociodemographic characteristics of parents (n = 202).

Variable	n	%
Age		
≤ 37 years	104	51.5
> 37years	98	48.5
Gender		
Female	102	50.5
Male	100	49.5
City of Residence		
Istanbul	173	85.6
Others	29	14.4
Marital Status		
Married	197	97.5
Widowed	5	2.5
Educational Level		
≥ University degree	163	80.7
< University degree	39	19.3
Employment Status		
Employed	170	84.1
Unemployed/Housewife/Retired	32	15.9
Educational Level of Spouse		
≥ University degree	155	76.7
< University degree	47	23.3
Employment Status of Spouse		
Employed	163	80.7
Unemployed/Housewife/Retired	39	19.3
Presence of Healthcare-worker within Household		
Yes	172	85.1
No	30	14.9
Average Monthly Household Income		
≤ 50.000TRY	25	12.4
> 50.000TRY	177	87.6
Number of Children within Household		
Single	117	57.9
Two	64	31.7
Three	13	6.4
≥ Four	8	4
Age Groups of Children within Household		

All children < 5 years of age	82	40.6
All children 5 – 10 years	67	33.2
All children > 10 years of age	53	26.2

Table 2. Characteristics of index children (n = 202)

Variable	n	%
Gender		
Female	92	45.5
Male	110	54.5
Presence of Chronic Disease		
Yes	12	5.9
No	190	94.1
Presence of Optional Vaccine		
Yes	123	60.9
No	75	37.1
Unsure	4	2
Presence of Rotavirus Vaccine		
Yes	104	51.5
No	98	48.5
Presence of Meningococcal Vaccine		
Yes	80	39.6
No	122	60.4
Presence of Influenza Vaccine		
Yes	31	15.3
No	171	84.7
Presence of HPV Vaccine		
Yes	7	3.5
No	195	96.5

Table 3. Median ‘Total Parental Knowledge Score’ comparisons among designated study groups

	n	Median TPKS	P
Parental Gender			
Mother	102	5	0.150
Father	100	4	
Parental Age			
≤ 37 years	104	4	0.284
> 37years	98	5	
Marital Status of the Parent			
Married	197	5	0.126

Widowed	5	2	
City of Residence			
Istanbul	173	5	0.540
Others	29	4	
Parental Education			
<University degree	39	2	0.002
≥ University degree	163	5	
Average Monthly Household Income			
≤ 50.000TRY	25	1	<0.001
>50.000TRY	177	5	
Survey Responder Parent in Healthcare			
Yes	30	6	0.029
No	172	4	
Gender of Index Child			
Female	92	4.5	0.573
Male	110	4	
Presence of Siblings of Index Child			
Yes	85	4	0.341
No	117	5	
Presence of Chronic Disease in Index Child			
Yes	12	4	0.863
No	190	4.5	
Presence of Meningococcal Vaccine in Index Child			
Yes	80	6	<0.001
No	122	2	
Presence of Rotavirus Vaccine in Index Child			
Yes	104	6	<0.001
No	98	3	
Presence of Influenza Vaccine in Index Child			
Yes	31	6	0.003
No	171	4	
Presence of HPV Vaccine in Index Child			
Yes	7	8	0.003
No	195	4	
Parental Awareness of IMD*			
Yes	109	6	<0.001
No	93	1	
Paediatrician as Source of Vaccine Information			
Yes	100	6	<0.001
No	102	1	
Primary Healthcare Centre/Family Physician as Source of Vaccine Information			
Yes	46	6	<0.001
No	156	4	
TV/Radio as Source of Vaccine Information			
Yes	21	6	0.032

No	181	4	
Newspapers/Magazines/Books/Articles as Source of Vaccine Information			
Yes	15	7	0.004
No	187	4	
Social Media/Internet as Source of Vaccine Information			
Yes	41	5	0.014
No	161	4	
Close Contacts/Friend/Relatives as Source of Vaccine Information			
Yes	45	5	0.064
No	157	4	
Parental Willingness for Meningococcal Vaccines			
In favor	119	6	<0.001
Others	83	1	

*Invasive Meningococcal Disease

Table 4. Median ‘Total Parental Knowledge Score’ comparisons among designated study groups (n:202)

	P	df
Presence of any Vaccine Outside TNIPC*		
A: Yes		
B: No	<0.001	A>B
C: Unsure		
Age Groups of Index Children		
A: <5 years of age	0.190	
B: 5-10 years		
C: >10 years of age		
Age Groups of Children within Household		
A: All children <5 years of age	0.190	
B: All children ≥ 5 years of age		
C: Mixed		
Parental Awareness of IMD**		
A: Yes		A>B
B: No	<0.001	A>C
C: Unsure		

Parental Awareness of Meningococcal Vaccine(s) A: Yes B: No C: Unsure	<0.001	A>B A>C
Parental Willingness for Meningococcal Vaccine(s) A: In Favor B: Not in Favor C: Unsure	<0.001	A>B A>C
Awareness of Long-term Sequela A: Yes B: No C: Unsure	<0.001	A>C

*Turkish National Immunization Programme for Children, ** Invasive Meningococcal Disease

Table 5. Comparisons with regards to Meningococcal vaccine uptake

Variable	Meningococcal Vaccine Uptake in Index Child Yes		Meningococcal Vaccine Uptake in Index Child No		P
	n	%	n	%	
Parental Age ≤ 37 years > 37years	43 37	41.3 37.8	61 61	58.7 62.2	0.602
Parental Gender Mother Father	45 35	56.3 43.8	57 65	46.7 53.3	0.185
Parental Education <University degree ≥ University degree	7 73	8.9 91.3	32 90	26.2 73.8	0.002
Average Monthly Household Income ≤ 50.000TRY >50.000TRY	2 78	8 44.1	23 99	92 55.9	<0.001
Parental Awareness of IMD** Yes No	67 13	61.5 14	42 80	38.5 86	<0.001
Parental Awareness of Long-term Sequela Yes No Unsure	72 0 8	60 0 10	48 2 72	40 100 90	<0.001*
Parental Awareness of Meningococcal Vaccine(s) Yes	73	59.8	49	40.2	

No	0	0	41	100	<0.001
Unsure	7	17.9	32	82.1	
Parental Willingness for Meningococcal Vaccine(s)					
In favor	76	95	43	35.2	<0.001
Others	4	5	79	64.8	
Source of Information (Pediatrician)					
Yes	66	66	34	34	<0.001
No	14	13.7	88	86.3	
Source of Information (Primary Healthcare Centre/Family Physician)					
Yes	24	52.2	22	47.8	0.047
No	56	35.9	100	64.1	
Source of Information (TV/Radio)					
Yes	11	13.8	10	8.2	0.206
No	69	86.3	112	91.8	
Source of Information (Newspapers/Magazines/Books/Articles)					
Yes	11	73.3	4	26.7	0.006
No	69	36.9	118	63.1	
Source of Information (Social Media/Internet)					
Yes	19	46.3	22	53.7	0.323
No	61	37.9	100	62.1	
Source of Information (Close contacts/Friends/Relatives)					
Yes	17	37.8	28	62.2	0.776
No	63	40.1	94	59.9	

*Fisher's exact test, ** Invasive meningococcal disease

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Use of Musculoskeletal Ultrasonography by Physical Medicine and Rehabilitation Physicians

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ABSTRACT

Objective This study aimed to evaluate the prevalence of musculoskeletal ultrasonography (US) use, training status, and its integration into clinical practice among Physical Medicine and Rehabilitation (PM&R) specialists in Turkey. **Materials and Methods** Following approval from the Üsküdar University Ethics Committee, this study was conducted online via Google Forms among 110 PM&R specialists and residents. The questionnaire consisted of 22 items addressing demographic characteristics, duration of specialization and residency, musculoskeletal US usage, training and competency status, and the use of US in injections and interventional procedures. Data were analyzed using the chi-square test and Spearman correlation analysis. **Results** A total of 110 physicians were evaluated regarding musculoskeletal US training, device accessibility, and clinical use characteristics. The mean age of participants was 43.9 years, with a mean professional experience of 13.4 years. The majority were female (78%). Seventy-seven percent of participants reported receiving US training; however, only 50.9% had access to a US device in their clinic. Among trained participants, 25% were unable to use US due to a lack of equipment. A significant association was found between receiving US training and device availability ($p < 0.001$). Overall, 95.5% of participants performed interventional

Oral Presentation – OP364

injections. No statistically significant difference was found between trained and untrained physicians regarding injection practice ($p = 0.72$). The most frequently injected regions were the knee and shoulder. US-guided injections were most frequently performed in the shoulder and knee, and a significant association was found between injection site and US use ($p < 0.05$). Most physicians performing US-guided injections reported greater confidence, and US use significantly increased perceived procedural safety ($p < 0.05$). The majority believed that US would increase both the frequency and diversity of injections. Furthermore, a substantial proportion of trained participants considered their education insufficient and requested additional training. These findings suggest that musculoskeletal US training programs should be strengthened in both theoretical and practical aspects. Conclusion The findings indicate that most PM&R specialists in Turkey have received musculoskeletal US training and that US use is increasingly integrated into clinical practice. However, improvements are still needed in terms of training quality and device accessibility. The study highlights the importance of policies supporting practical MSKUS use and structured physician training programs.

Keywords: Sculoskeletal Ultrasonography, Physical Medicine and Rehabilitation, Medical Education, Clinical Practice

INTRODUCTION

Ultrasonography (US) is an imaging modality that uses high-frequency sound waves to generate images and is widely used in the diagnosis, follow-up, and treatment of musculoskeletal disorders (1). Sound waves beyond the range of human hearing are transmitted into the body through transducers, and the reflected waves from tissues generate real-time images (2). US was first introduced into medical practice by Dussik in 1942 (3,4). The first musculoskeletal application of US was reported in 1972 in the differential diagnosis of Baker's cyst and thrombophlebitis (5). Subsequently, US was used

to demonstrate synovitis and to evaluate treatment response in patients with rheumatoid arthritis (6). With the development of higher-resolution transducers and increased use in small joints, US has gained popularity in musculoskeletal pathology and has become widely used in PM&R, orthopedics, and rheumatology clinics (1). The advantages of ultrasonography include rapid applicability, absence of ionizing radiation, portability, patient comfort, dynamic imaging capability, and relatively low cost (1–2). However, its limitations include operator dependency, challenges in optimal probe positioning, limited visualization of deep structures, and the inability of sound waves to penetrate cortical bone (1–7). The diagnostic value of US is also highly dependent on equipment quality and transducer characteristics (3). Since the 1940s, US technology has demonstrated remarkable growth (8). The invention of the transistor and digital computers played a crucial role in its development (9). Although US was not widely adopted in medicine until the early 1970s, the introduction of duplex scanners in the late 1970s and early 1980s significantly increased its clinical use (9). During the 1980s, new imaging systems expanded musculoskeletal applications, including the evaluation of articular cartilage, joint effusion, synovitis, tendon and muscle abnormalities, and peripheral nerves (10). Today, musculoskeletal ultrasonography (MSKUS or MSUS) is widely integrated into clinical practice, allowing assessment of soft tissue vascularity, detailed anatomical visualization, and improved tissue characterization (10). Beyond diagnostic purposes, MSKUS offers significant advantages in treatment and follow-up, particularly as guidance for injections. Visualization of the needle and target structures increases procedural accuracy and safety (11). Procedures performed under US guidance reduce the risk of complications near critical structures such as nerves and arteries. Doppler ultrasonography further assists in evaluating vascular flow, inflammation, tumors, and infections, particularly in acute rheumatic conditions (2). Indications for MSKUS include soft tissue conditions (edema, abscess, necrotizing fasciitis, foreign bodies), muscle and tendon disorders (tendinosis, tendinitis, tendon rupture), joint pathologies (synovitis), nerve entrapments (carpal tunnel syndrome, cubital tunnel syndrome), and space-

occupying lesions (tumors) (12–13). This study aims to evaluate the practical impact of widespread MSKUS use and technological advancements on PM&R specialists in Turkey.

MATERIALS AND METHODS

After receiving ethical approval from Üsküdar University, a nationwide online survey was distributed to PM&R specialists in Turkey. The study included 110 participants aged between 29 and 70 years. Data were collected via the Google Forms platform. The questionnaire included 22 items covering demographic characteristics, duration of specialization and residency, MSKUS use, competency and training status, and the use of US in injections and interventional procedures. Participation was voluntary.

STATISTICAL ANALYSIS

Data were reviewed in electronic spreadsheets and exported in Excel/CSV format. Statistical analyses were performed using the chi-square test for associations between categorical variables and Spearman correlation analysis to assess relationships between variables. Results were compared between groups and interpreted in light of the existing literature.

RESULTS

The mean age of participants was 43.88 years, and the mean professional experience was 13.42 years. Eighty-six participants (78%) were female, and 24 (22%) were male. Seventy-seven percent reported receiving MSKUS training. However, only 50.9% had a US device available in their clinic. Among those without access to a device, 25% had received training but were unable to use US due to equipment limitations. A statistically significant association was found between training and device availability ($\chi^2 = 65.2$; $p < 0.001$). A total of 95.5% performed interventional injections. No significant difference was found between trained and untrained physicians regarding injection practice ($p = 0.72$). The most common injection sites were the knee (38%) and shoulder (34.6%). US-guided

injections were most frequently performed in the shoulder (48.5%) and knee (38.6%). A significant association was observed between injection site distribution and US use ($p < 0.05$). US-guided injections significantly increased perceived procedural safety ($p < 0.05$). Only 35.24% of participants reported feeling confident during blind injections, whereas 89.29% reported feeling confident with US guidance. Eighty percent planned to receive further US training. Among those desiring additional training, 53% had already received prior education ($p < 0.00049$), indicating perceived inadequacy of current training programs. Overall, 77% considered existing MSKUS training insufficient.

DISCUSSION

Approximately three-quarters of participants had received MSKUS training, indicating increasing integration into clinical practice. However, substantial gaps remain in training adequacy and equipment availability. Consistent with previous literature (15), US is commonly used for both diagnostic and interventional purposes, particularly in knee and shoulder pathologies. The American Medical Society for Sports Medicine (AMSSM) has emphasized the importance of US competency in sports medicine training programs (16). Similarly, our findings suggest that structured, standardized, and competency-based MSKUS training programs are needed in Turkey.

CONCLUSION

MSKUS is increasingly integrated into PM&R practice in Turkey. US-guided injections enhance procedural confidence and expand injection diversity. However, current training programs are widely perceived as insufficient. Strengthening education programs and improving equipment accessibility will enhance safe and effective MSKUS use and ultimately improve the quality of patient care.

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Psychiatric Comorbidities in Children and Adolescents with Autism Spectrum Disorder and Their Relationship with Maternal Psychological Symptoms

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Abstract

Objective: To describe psychiatric comorbidities in children and adolescents with autism spectrum disorder (ASD) and to explore their association with maternal psychological symptoms.

Methods: A total of 117 children and adolescents aged 5–18 years with ASD (DSM-5) who attended the Child and Adolescent Psychiatry outpatient clinic of a tertiary university hospital between January 2014 and January 2017 were included. Comorbid psychiatric diagnoses were evaluated using the Schedule for Affective Disorders and Schizophrenia for School-Age Children—Present and Lifetime Version (K-SADS-PL). Sociodemographic characteristics, developmental history (pregnancy, birth, language and motor milestones), and additional medical conditions were recorded using a standardized form based on parental report and chart review. For analyses, participants were grouped as children (<12 years) and adolescents (≥12 years). Measures used were the Sociodemographic Data Form, Childhood Autism Rating Scale (CARS), K-SADS-PL, Symptom Checklist-90-Revised (SCL-90-R), Parent–Young Mania Rating Scale (P-YMRS), and the Wechsler Intelligence Scale for Children (revised form).

Oral Presentation – OP365

Results: Mean age was 11.38 ± 2.51 years. The sample consisted of 100 boys (85.47%) and 17 girls (14.53%). Sixty-six participants (56.41%) were <12 years and 51 (43.59%) were ≥ 12 years. At least one psychiatric comorbidity was present in 62.4% of cases. The most common comorbid diagnoses were ADHD (43.6%), oppositional defiant disorder (9.4%), separation anxiety disorder (6.8%), and tic disorders (6.0%). Less frequent comorbidities included specific phobias (3.4%), obsessive-compulsive disorder (2.6%), generalized anxiety disorder (1.7%), social phobia (1.7%), and mood disorders (2.6%; all depressive disorders). Enuresis (4.3%) and encopresis (0.9%) were also noted.

Mothers' mean SCL-90-R Global Severity Index was 1.19 ± 0.94 , and the highest mean subscale score was observed for depression (1.10 ± 0.75). Higher maternal symptom levels were significantly associated with the presence of additional psychiatric diagnoses in children with ASD.

Conclusion: Psychiatric comorbidities were common in this ASD sample, underscoring the need for a thorough clinical assessment that includes structured diagnostic interviewing. Awareness of ASD is also important when evaluating young patients who present with heterogeneous psychiatric complaints and social interaction difficulties. Recognition and treatment of comorbid conditions may improve functioning, quality of life, and responsiveness to educational interventions. In parallel, screening caregivers—particularly mothers—for psychological symptoms and offering appropriate support may benefit both the child and the family.

Keywords: Autism Spectrum Disorder; Psychiatric Comorbidity; Child And Adolescent Mental Health; Maternal Psychological Symptoms.

Introduction

Autism spectrum disorder (ASD) is a neurodevelopmental disorder characterized by persistent difficulties in social communication and social interaction, together with restricted and repetitive patterns of behavior, interests, or activities [1]. In clinical practice, the assessment of ASD is rarely limited to core autistic symptoms. Children and

adolescents with ASD may also present with attention problems, anxiety, oppositional behaviors, tic symptoms, mood symptoms, elimination problems, and functional regression, all of which may influence educational participation, daily functioning, and treatment planning.

Psychiatric comorbidities are clinically important because they may increase impairment, complicate behavioral management, and heighten caregiver burden [2-5]. Diagnostic assessment may be challenging because psychiatric symptoms can overlap with ASD-related features or may be expressed atypically in children with limited verbal ability. Caregiver well-being is also an essential component of comprehensive ASD care, as mothers frequently have a central caregiving role and may experience psychological distress related to long-term developmental and educational needs. This study aimed to describe psychiatric comorbidities in children and adolescents with ASD and to examine their relationship with maternal psychological symptom levels.

Materials and Methods

This cross-sectional study included 117 children and adolescents aged 5–18 years with ASD who were evaluated at the Child and Adolescent Psychiatry outpatient clinic of Eskişehir Osmangazi University Faculty of Medicine between January 2014 and January 2017. Children followed at the university clinic and children attending special education centers in Eskişehir were invited for clinical assessment. Families who agreed to participate were interviewed at the outpatient clinic, and the diagnosis of ASD was confirmed according to DSM-5 criteria. Psychiatric comorbidities were assessed using K-SADS-PL [6]. Sociodemographic characteristics, pregnancy and birth history, developmental milestones, prior psychiatric history, medication use, and additional medical conditions were recorded using a standardized data form based on parental report and chart review. Autism severity was assessed with CARS [7]. Cognitive level was evaluated using the Wechsler Intelligence Scale for Children-Revised form and clinical assessment [10]. Maternal psychological symptoms were assessed using SCL-90-R [8]. The Parent-Young Mania Rating Scale was also included among the assessment tools [9].

For age-related analyses, participants were grouped as children (<12 years) and adolescents (≥12 years).

Categorical variables were summarized as number and percentage, and continuous variables as mean ± standard deviation. Categorical comparisons were performed using chi-square or Fisher exact tests where appropriate. Correlation analyses were performed using Spearman's rho test. SPSS 22.0 was used, and $p < 0.05$ was considered statistically significant.

Results

The mean age of the participants was 11.38 ± 2.51 years. The sample included 100 boys (85.47%) and 17 girls (14.53%); 66 participants (56.41%) were younger than 12 years and 51 (43.59%) were 12 years or older. All children were receiving special education, with a mean duration of 6.00 ± 2.17 years. Cognitive evaluation showed normal intelligence in 7 participants (6.0%), mild intellectual disability in 48 (41.0%), and moderate-to-severe intellectual disability in 62 (53.0%). According to CARS, 51 participants (43.6%) had mild-to-moderate autism severity and 66 (56.4%) had severe autism severity.

At least one psychiatric comorbidity was identified in 73 participants (62.4%). ADHD was the most frequent comorbidity, diagnosed in 51 participants (43.6%). ADHD subtypes were predominantly inattentive type in 23 participants (19.7%), combined type in 21 (17.9%), and predominantly hyperactive/impulsive type in 7 (6.0%). The next most frequent comorbidities were oppositional defiant disorder, separation anxiety disorder, tic disorder, enuresis, conduct disorder, specific phobia, depressive disorders, obsessive-compulsive disorder, social phobia, generalized anxiety disorder, and encopresis (Table 1).

Table 1. Distribution of psychiatric comorbidities in children and adolescents with ASD.

Psychiatric diagnosis	n	%
Any psychiatric comorbidity	73	62.4
ADHD	51	43.6
Oppositional defiant disorder	11	9.4

Separation anxiety disorder	8	6.8
Tic disorder	7	6.0
Enuresis	5	4.3
Conduct disorder	4	3.4
Specific phobia	4	3.4
Depressive disorder	3	2.6
Obsessive-compulsive disorder	3	2.6
Social phobia	2	1.7
Generalized anxiety disorder	2	1.7
Encopresis	1	0.9

ADHD: attention-deficit/hyperactivity disorder; ASD: autism spectrum disorder.

The presence of psychiatric comorbidity did not differ significantly between the child and adolescent age groups. However, children who had developed simple sentences before 36 months were less likely to have an additional psychiatric diagnosis than those without simple sentences before 36 months (chi-square=5.657, $p=0.021$, OR=2.6).

Maternal SCL-90-R assessment showed that 74 mothers (63.2%) had Global Severity Index (GSI) values within the normal range, whereas 43 (36.8%) had elevated symptom levels; no mother had a very high GSI level. Mean maternal GSI was 1.19 ± 0.94 . The highest mean subscale score was observed for depression (1.10 ± 0.75), followed by interpersonal sensitivity (1.05 ± 0.70) and obsessive-compulsive symptoms (1.03 ± 0.66). Elevated maternal symptom levels were significantly associated with the presence of psychiatric comorbidity in children with ASD (chi-square=8.058, $p=0.006$; Table 2).

Table 2. Maternal SCL-90-R Global Severity Index level according to psychiatric comorbidity status in children with ASD.

Maternal SCL-90-R GSI level	No comorbidity n (%)	Comorbidity present n (%)	Chi-square	p
Normal	35 (79.5)	39 (53.4)	8.058	0.006
Elevated	9 (20.5)	34 (46.6)		
Total	44 (100.0)	73 (100.0)		

GSI: Global Severity Index; SCL-90-R: Symptom Checklist-90-Revised.

Discussion

This study showed that psychiatric comorbidities were frequent among children and adolescents with ASD. Nearly two-thirds of the sample received at least one additional psychiatric diagnosis, supporting previous reports of high comorbidity rates in ASD samples assessed with structured or semi-structured diagnostic interviews [2-5]. These findings indicate that emotional or behavioral symptoms in a child with ASD should not automatically be attributed to ASD itself, particularly when they are new, impairing, or clinically prominent.

ADHD was the most common comorbidity, consistent with previous studies reporting attention-deficit/hyperactivity symptoms as one of the most frequent psychiatric comorbidities in children and adolescents with ASD [2-5]. This finding is clinically relevant because inattention, hyperactivity, impulsivity, emotional dysregulation, and executive function problems may worsen educational participation and daily functioning. Although ADHD symptoms may overlap with ASD-related behaviors, identifying ADHD as a comorbid condition is important because it may represent a treatable contributor to impairment. Anxiety disorders, tic disorders, oppositional defiant disorder, depressive disorders, and elimination disorders were also identified, emphasizing the need for broad psychiatric screening in ASD populations [2-5].

A second important finding was the significant association between elevated maternal psychological symptom levels and psychiatric comorbidity in the child. This relationship should be interpreted cautiously because the cross-sectional design does not establish causality. Child psychiatric comorbidity may increase caregiving stress, whereas maternal psychological distress may also influence family functioning, help-seeking, and the child's emotional environment. The association is most likely bidirectional and supports a family-centered approach to ASD care.

This study has limitations. The sample was drawn from a university outpatient clinic and special education settings, which may limit generalizability. K-SADS-PL is not specifically

designed for ASD populations, and symptom overlap may influence classification [6]. Maternal symptoms were measured using a self-report screening instrument rather than a diagnostic interview [8], and fathers were not evaluated with the same instrument. Despite these limitations, the study is strengthened by DSM-5 confirmation of ASD diagnosis, use of K-SADS-PL for comorbidity assessment, and parallel evaluation of maternal psychological symptoms.

Conclusion

Psychiatric comorbidities were common in children and adolescents with ASD, with ADHD being the most frequent additional diagnosis. Elevated maternal psychological symptom levels were significantly associated with the presence of psychiatric comorbidity in the child. Comprehensive assessment of ASD should therefore include structured evaluation of psychiatric comorbidities and attention to caregiver psychological well-being. Recognition and treatment of comorbid conditions may improve functioning, quality of life, and responsiveness to educational and psychosocial interventions, while caregiver screening may support a more family-centered management approach.

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A Systematic Review of Nomophobia-Related Medical Residency Theses

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Abstract

Introduction: Nomophobia, defined as the fear or anxiety associated with being without access to a mobile phone, has emerged as an increasingly prevalent behavioral health problem in the digital era. Excessive smartphone use has been associated with psychological distress, sleep disturbances, and reduced academic performance. Medical specialty theses represent an important source of academic knowledge in Türkiye and provide insight into emerging public health topics within residency education. This study aims to evaluate the disciplinary distribution, institutional characteristics, and temporal trends of medical residency theses addressing nomophobia in Türkiye.

Materials and Methods: This retrospective descriptive study evaluated medical residency theses addressing nomophobia in Türkiye. The National Thesis Center database of the Council of Higher Education was searched using the keyword “nomophobia.” Theses published between 2010 and 2026 were included. Titles, abstracts, and methodological sections were examined to confirm relevance.

Oral Presentation – OP369

Results: A total of 19 medical specialty theses addressing nomophobia were identified. The majority of these theses were conducted in the field of Family Medicine and Psychiatry. The highest number of theses originated from Health Sciences University. A notable increase in thesis production was observed after 2019.

Conclusion: Research on nomophobia within medical residency theses in Türkiye has increased in recent years but remains limited in scope. Greater interdisciplinary research is needed to better understand the behavioral and public health implications of digital dependency.

Keywords: Nomophobia, Smartphone Addiction, Behavioral Health, Digital Dependency, Medical Residency Theses

Introduction

The rapid expansion of digital technologies has significantly transformed communication patterns, social interactions, and daily life. Smartphones have become essential tools for communication, education, and professional activities. While these technologies provide numerous benefits, excessive smartphone use has also led to emerging behavioral health concerns. One such phenomenon is nomophobia, which refers to the fear or anxiety experienced when individuals are unable to access their mobile phones or digital communication platforms.

Recent research suggests that nomophobia may be associated with increased levels of anxiety, sleep disturbances, and problematic smartphone use (1). Several studies have demonstrated significant correlations between nomophobia and psychological distress, particularly among university students and young adults who frequently rely on smartphones for both academic and social purposes (2). In addition, digital dependency has been associated with behavioral patterns similar to technology-related addictions.

The increasing prevalence of smartphone use worldwide has intensified interest in digital health research. Behavioral patterns related to smartphone dependency have been examined in various populations, including healthcare students, adolescents, and university populations. These studies suggest that excessive smartphone use may negatively affect mental well-being, sleep quality, and daily functioning (3).

In Türkiye, medical residency theses represent an important component of academic production in the healthcare system. These theses often reflect emerging public health concerns and research priorities within different medical specialties. However, despite the growing international literature on nomophobia and digital dependency, the characteristics and distribution of nomophobia-related research in medical residency theses in Türkiye have not been systematically examined.

Therefore, this study aims to evaluate the disciplinary distribution, institutional characteristics, and temporal trends of medical residency theses addressing nomophobia in Türkiye.

Materials and Methods

This retrospective descriptive study was conducted on February 23, 2026, using the National Thesis Center database of the Council of Higher Education (YÖKTEZ). Medical residency theses focusing on nomophobia were identified by searching the keyword “nomophobia” within the title field of the database. All retrieved theses were screened to determine their relevance to the research topic. Theses published between 2010 and 2026 that addressed nomophobia or smartphone-related dependency were included in the study. The titles, abstracts, and methodological sections of the identified theses were reviewed to confirm their eligibility. For each thesis, information regarding scientific discipline, institutional affiliation, and year of publication was recorded. The findings were summarized using descriptive statistics.

Results

A total of 19 medical specialty theses focusing on nomophobia were identified. The majority of the theses were conducted in Family Medicine (63.2%), followed by Psychiatry (21.1%). A small number of theses were interdisciplinary collaborations involving psychiatry or sociology. The temporal distribution showed a noticeable increase in thesis production after 2019, with the highest number of theses completed in 2023 (Table 1). Regarding institutional distribution, the highest number of theses was conducted at Health Sciences University (31.6%) (Table 2).

Table 1. Distribution of Theses by Scientific Discipline and Year

Discipline	n	%
Family Medicine	12	63.2
Family Medicine + Psychiatry	1	5.3
Family Medicine + Psychiatry + Sociology	1	5.3
Public Health	1	5.3
Psychiatry	4	21.1
Total	19	100
Year	n	%
2019	1	5.3
2020	4	21.1
2021	2	10.5
2022	1	5.3
2023	6	31.6
2024	3	15.8
2025	2	10.5
Total	19	100

Table 2. Distribution by University

University	n	%
Health Sciences University	6	31.6
Atatürk University	2	10.5
Hacettepe University	2	10.5
Düzce University	1	5.3
Hatay Mustafa Kemal University	1	5.3

Hitit University	1	5.3
İnönü University	1	5.3
Kütahya Health Sciences University	1	5.3
Necmettin Erbakan University	1	5.3
Ondokuz Mayıs University	1	5.3
Trakya University	1	5.3
Zonguldak Bülent Ecevit University	1	5.3
Total	19	100

Discussion

The findings of this review indicate that research addressing nomophobia in medical residency theses in Türkiye has increased in recent years. This trend parallels the growing global interest in digital dependency and smartphone-related behavioral problems.

Previous studies have demonstrated that nomophobia is associated with anxiety symptoms, sleep disturbances, and problematic smartphone use (1). In addition, studies conducted among healthcare students and university populations have reported high levels of smartphone dependency and digital anxiety (2). These findings suggest that digital dependency may represent an emerging behavioral health concern, particularly among young adults and university students (3).

The predominance of Family Medicine in nomophobia-related theses may reflect the central role of primary care in addressing behavioral health issues and lifestyle-related health conditions. Family physicians often serve as the first point of contact for individuals experiencing psychological distress or behavioral health concerns. Therefore, primary care settings may provide valuable opportunities for identifying and addressing problems related to excessive smartphone use.

Psychiatry represents the second most common discipline examining nomophobia. Several researchers have suggested that nomophobia may share certain characteristics with behavioral addictions, including compulsive usage patterns, withdrawal symptoms, and impaired daily functioning. However, the classification of nomophobia as a distinct psychiatric disorder remains controversial, and further research is needed to clarify its conceptual framework.

Another notable finding of this review is the relatively limited level of interdisciplinary collaboration among the identified theses. Considering that digital dependency involves psychological, social, and technological dimensions, multidisciplinary research may provide more comprehensive insights into the mechanisms underlying nomophobia.

Despite the increasing interest in this topic, the number of theses addressing nomophobia remains relatively limited. This finding suggests that digital dependency has not yet been comprehensively explored within medical residency training in Türkiye. Expanding research in this field may contribute to a better understanding of the psychological and behavioral consequences of excessive smartphone use.

Conclusion

Nomophobia represents an emerging behavioral health concern in the digital age. This review demonstrates that research addressing nomophobia in medical residency theses in Türkiye has increased in recent years but remains limited in scope.

Most theses have been conducted in Family Medicine and Psychiatry, while interdisciplinary research remains relatively scarce. Considering the increasing prevalence of smartphone use and its potential impact on mental well-being, further research is needed to better understand the behavioral and public health implications of digital dependency.

Strengthening academic attention to nomophobia may contribute to the development of preventive strategies and evidence-based interventions within healthcare systems.

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A Systematic Review of Sleep Hygiene–Related Medical Residency Theses

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Abstract

Introduction: Sleep hygiene refers to a group of behavioral and environmental practices that promote healthy sleep and optimal sleep quality. Increasing evidence indicates that poor sleep hygiene is associated with insomnia, mental health disorders, reduced daytime functioning, and increased cardiometabolic risk. This study aims to analyze the presence, disciplinary distribution, institutional characteristics, and temporal trends of medical residency theses addressing sleep hygiene in Türkiye.

Materials and Methods: This retrospective descriptive study evaluated medical residency theses addressing sleep hygiene in Türkiye. The National Thesis Center database of the Council of Higher Education was searched using the keyword “sleep hygiene.” Theses published between 2010 and 2026 were included.

Results: A total of 13 medical specialty theses addressing sleep hygiene were identified. The majority were conducted in Family Medicine. Health Sciences University produced the highest number of theses. The temporal distribution demonstrated an increase in research activity after 2020.

Conclusion: Although research on sleep hygiene in medical residency theses has increased in recent years, the overall number of studies remains limited. Broader

Oral Presentation – OP371

interdisciplinary research may contribute to improved understanding of sleep health and preventive strategies.

Keywords: Sleep Hygiene, Sleep Health, Insomnia, Preventive Medicine, Medical Specialty Theses

Introduction

Sleep is a fundamental biological process that plays an essential role in physical health, psychological well-being, and cognitive performance. Adequate and high-quality sleep is necessary for optimal daytime functioning and long-term health outcomes. However, sleep disturbances and insufficient sleep have become increasingly common in modern societies.

Sleep hygiene refers to a set of behavioral and environmental practices that promote healthy sleep patterns and improve sleep quality. These practices include maintaining consistent sleep schedules, reducing exposure to stimulating activities before bedtime, limiting caffeine intake, and creating a sleep-conducive environment. Poor sleep hygiene has been associated with insomnia symptoms, mental health disorders, and impaired daytime functioning (1).

Previous research has demonstrated that inadequate sleep hygiene behaviors may contribute to various health problems, including mood disorders, decreased cognitive performance, and cardiometabolic risk (2). In addition, sleep health has been increasingly recognized as an important public health issue due to its impact on overall health and quality of life (3).

In Türkiye, medical residency theses represent an important source of academic knowledge that reflects emerging healthcare priorities. These theses often address contemporary health problems and contribute to the development of evidence-based clinical practice. Despite the increasing global attention to sleep health and sleep hygiene,

the characteristics and distribution of sleep hygiene-related research in medical residency theses in Türkiye have not yet been comprehensively examined. Therefore, this study aims to analyze the presence, disciplinary distribution, institutional characteristics, and temporal trends of medical residency theses addressing sleep hygiene in Türkiye.

Materials and Methods

This retrospective descriptive study was conducted on February 26, 2026. Medical residency theses focusing on sleep hygiene were identified through the National Thesis Center database of the Council of Higher Education (YÖKTEZ).

The search was performed using the keyword “sleep hygiene” within the title field of the database. All retrieved theses were screened to determine their relevance to the research topic.

The inclusion criteria were:

- medical residency theses
- studies addressing sleep hygiene
- theses published between 2010 and 2026

The titles and related sections of the retrieved theses were reviewed to confirm their relevance. For each thesis, information regarding scientific discipline, institutional affiliation, and year of publication was recorded. The findings were summarized using descriptive statistics.

Results

A total of 13 medical specialty theses addressing sleep hygiene were identified. The majority of these theses were conducted in Family Medicine (46.2%), followed by Psychiatry (15.4%) and Pediatrics (15.4%). Other disciplines included Chest Diseases, Public Health, and Neurology. The temporal distribution indicates an increase in thesis

production after 2020, with the highest number of theses completed in 2023 (Table 1). The institutional distribution showed that Health Sciences University produced the highest number of theses (Table 2).

Table 1. Distribution by Discipline and Year

Discipline	n	%
Family Medicine	6	46.2
Psychiatry	2	15.4
Pediatrics	2	15.4
Chest Diseases	1	7.7
Public Health	1	7.7
Neurology	1	7.7
Total	13	100
Year	n	%
2017	2	15.4
2019	1	7.7
2020	3	23.1
2022	1	7.7
2023	4	30.8
2024	2	15.4
Total	13	100

Table 2. Distribution by Institution

University	n	%
Health Sciences University	5	38.5
Dokuz Eylül University	1	7.7
Giresun University	1	7.7
Hacettepe University	1	7.7
Istanbul University	1	7.7
Trakya University	1	7.7
Van Yüzüncü Yıl University	1	7.7
Çanakkale Onsekiz Mart University	1	7.7
Çukurova University	1	7.7
Total	13	100

Discussion

The findings of this review demonstrate that research addressing sleep hygiene in medical residency theses in Türkiye remains relatively limited but has increased in recent years. This trend parallels the growing global interest in sleep health as an important component of overall well-being.

Previous studies have shown that poor sleep hygiene behaviors are strongly associated with insomnia and sleep disturbances (1). In addition, sleep problems have been linked to psychological distress, impaired cognitive performance, and decreased quality of life (2). These findings highlight the importance of sleep hygiene as a preventive health strategy (3).

Family Medicine accounted for the largest proportion of theses addressing sleep hygiene in this review. This finding may reflect the central role of primary care physicians in identifying and managing sleep-related problems. Family physicians frequently encounter patients presenting with fatigue, insomnia, or other sleep complaints, making sleep hygiene counseling an important component of preventive care.

Psychiatry and Pediatrics also contributed to sleep hygiene-related research, reflecting the relevance of sleep health across different medical specialties. Sleep disturbances are particularly common among children and adolescents, while psychiatric disorders often coexist with sleep problems.

Another notable observation is the increasing number of theses produced after 2020. This trend may reflect growing awareness of sleep health in medical education and research. In addition, the COVID-19 pandemic may have influenced sleep patterns and increased attention to sleep-related health problems.

Despite this increase in research activity, the overall number of theses addressing sleep hygiene remains relatively small. Expanding interdisciplinary research involving family

medicine, psychiatry, neurology, and public health may contribute to a better understanding of sleep health and its determinants.

Conclusion

Sleep hygiene is an important component of sleep health and preventive medicine. This review demonstrates that research addressing sleep hygiene in medical residency theses in Türkiye has increased in recent years but remains limited in scope.

Most theses have been conducted in Family Medicine, while contributions from other disciplines remain relatively scarce. Considering the significant impact of sleep on physical and mental health, broader academic attention to sleep hygiene is warranted.

Strengthening research in this area may contribute to improved awareness of sleep health and the development of evidence-based preventive strategies.

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Evaluation of Fever Phobia Among Parents and Its Impact on Primary Care: A Cross-Sectional Study

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Abstract

Background: Fever is one of the most common reasons for pediatric consultations in primary care. Despite being a natural defense mechanism, it often causes anxiety among parents, a condition known as fever phobia.

Objective: This study aimed to assess parental knowledge, attitudes, and fever phobia levels among parents of children aged 0–6 years presenting to a Family Health Center.

Methods: A cross-sectional study was conducted with 150 parents. Data were collected using a sociodemographic questionnaire and the Fever Phobia Scale. Statistical analysis was performed using SPSS, with $p < 0.05$ considered significant.

Results: Most parents (74%) misidentified fever thresholds, while common fears included febrile seizures (88%) and brain damage (74%). High fever phobia scores were associated with increased emergency visits and antibiotic demand.

Conclusion: Fever phobia remains prevalent regardless of education level. Educational interventions during routine follow-ups may reduce unnecessary healthcare utilization.

Keywords: Fever Phobia, Primary Care, Parental Attitude, Pediatric Health, Family Medicine

Oral Presentation – OP372

Introduction

Fever is a common physiological response to infection and represents an essential component of the immune system. In pediatric populations, it is one of the leading causes of visits to primary care physicians and emergency departments. Despite its protective role, fever often leads to excessive concern among parents.

The term fever phobia was first described to define exaggerated parental fear regarding fever and its complications. Parents frequently associate fever with serious outcomes such as febrile seizures, brain damage, or death. These misconceptions can lead to inappropriate management strategies, including unnecessary medication use, frequent healthcare visits, and inappropriate antibiotic demand.

Understanding parental perceptions and behaviors regarding fever is essential for improving pediatric care and reducing unnecessary healthcare burden. This study aims to evaluate fever phobia levels among parents and examine its impact on primary care utilization.

Materials and Methods

Study Design and Population

This cross-sectional study was conducted in a Family Health Center in Maltepe, Istanbul, Türkiye between 01/01/2025–31/12/2025. A total of 150 parents with children aged 0–6 years were included.

Data Collection Tools

Data were collected using:

- A sociodemographic questionnaire
- The Fever Phobia Scale

The questionnaire included items on:

- Definition of fever
- Perceived risks
- Home management practices

Statistical Analysis

Data were analyzed using SPSS software. Descriptive statistics were presented as percentages and means. Associations between variables were analyzed using appropriate statistical tests, with $p < 0.05$ considered statistically significant.

Results

Sociodemographic Characteristics

The study included 150 parents, the majority of whom were mothers. Educational levels varied, with participants representing diverse socioeconomic backgrounds.

Knowledge About Fever

- 74% of parents incorrectly identified temperatures below 38.0°C as fever
- Only a minority correctly defined fever thresholds

Parental Concerns

The most common fears included:

- Febrile seizures: 88%
- Permanent brain damage: 74%

Home Management Practices

- 82% reported waking children to administer antipyretics
- 40% used alternating paracetamol and ibuprofen without medical advice

Healthcare Utilization

- High fever phobia scores were significantly associated with:
 - Increased emergency department visits
 - Higher demand for antibiotic prescriptions

Discussion

This study demonstrates that fever phobia remains highly prevalent among parents, consistent with previous literature. Despite advances in healthcare access and education, misconceptions about fever persist.

A significant proportion of parents misidentified fever thresholds, indicating inadequate knowledge. The fear of severe complications such as seizures and brain damage was widespread, although these outcomes are relatively rare.

Inappropriate management practices, such as waking children unnecessarily or alternating medications without supervision, highlight the need for better parental education.

Importantly, higher fever phobia levels were linked to increased healthcare utilization, including unnecessary emergency visits and antibiotic requests. This contributes to healthcare system burden and may promote antibiotic resistance.

Family physicians are in a unique position to address these concerns through effective communication and education.

Conclusion

Fever phobia continues to be a significant issue affecting parental behavior and healthcare utilization. Educational interventions integrated into routine child health visits may improve parental knowledge, reduce anxiety, and promote appropriate fever management.

Tables

Table 1. Parental Knowledge and Attitudes About Fever

Variable	Percentage (%)
Incorrect fever definition (<38°C)	74
Fear of febrile seizures	88
Fear of brain damage	74

Table 2. Fever Management Practices

Practice	Percentage (%)
Waking child for antipyretics	82
Alternating medications without advice	40

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Evaluation of Family Physicians' Attitudes Towards Childhood Vaccinations Using the "Vaccine Attitude Scale"

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Abstract

Objective: This study aims to evaluate the attitudes, confidence levels, and approaches of family physicians towards childhood immunization and vaccine hesitancy using a standardized assessment tool.

Method: This cross-sectional study was conducted with 150 family physicians. Data were collected using a socio-demographic form and the 22-item Vaccine Attitude Scale (VAS). The scale consists of five sub-dimensions: Knowledge, Trust, Encouragement, Side Effect Perception, and Neglect/Hesitancy. Statistical analyses were performed using descriptive statistics and independent samples t-tests.

Results: The mean total score was 88.4 ± 12.6 . Trust and Encouragement scores were the highest, while Side Effect Perception was lower. Physicians with >15 years of experience scored higher in Encouragement ($p < 0.05$). Notably, 78% of physicians encounter vaccine-hesitant parents weekly.

Conclusion: While attitudes are generally positive, physicians require more academic support regarding vaccine ingredients and side-effect management.

Keywords: Family Physicians, Childhood Vaccination, Vaccine Hesitancy, Vaccine Attitude Scale, Primary Health Care, Immunization.

1. Introduction

Immunization is one of the most successful and cost-effective public health interventions in history, preventing millions of deaths annually from vaccine-preventable diseases. Family physicians serve as the backbone of primary healthcare, acting as the primary source of information and the most trusted advisors for parents regarding childhood vaccinations.

However, in recent years, vaccine hesitancy defined by the WHO as a delay in acceptance or refusal of vaccines despite availability has become a growing global concern. The attitude of the physician is the single most important factor in overcoming parental hesitation. This study utilizes the Vaccine Attitude Scale (VAS) to quantify the perspectives of family physicians and identify areas where they may require further support.

2. Method

This cross-sectional study was conducted between January and March 2026. A total of 150 family physicians working in primary care centers participated.

2.1. Data Collection Tools

Data were collected using:

1. **Socio-demographic Form:** Including age, gender, and years of professional experience.
2. **Vaccine Attitude Scale (VAS):** Developed by Özümüt and Ergin, this 22-item Likert-type scale measures five sub-dimensions: Knowledge, Trust,

Encouragement, Side Effect Perception, and Neglect/Hesitancy. Higher scores indicate more positive attitudes toward vaccination.

2.2. Statistical Analysis

Data were analyzed using SPSS. Descriptive statistics (mean, standard deviation, percentages) were used for demographic data. Independent samples t-tests were employed to compare scores based on professional experience. A p-value of <0.05 was considered statistically significant.

3. Results

The study population consisted of 150 physicians with a diverse range of experience. The mean total VAS score was 88.4 ± 12.6 (Max: 110), indicating a high level of vaccine acceptance.

Table 1. Distribution of Vaccine Attitude Scale (VAS) Sub-dimension Scores (n=150)

VAS Sub-dimensions	Number of Items	Mean Score	Standard Deviation ($\pm$)
Trust	5	22.5	3.1
Encouragement	5	21.8	2.9
Knowledge	4	18.2	2.4
Neglect / Hesitancy	4	13.5	2.2
Side Effect Perception	4	12.4	3.5
Total VAS Score	22	88.4	12.6

Physicians with more than 15 years of experience demonstrated significantly higher scores in the Encouragement sub-dimension compared to those with less than 15 years ($p=0.034$). Interestingly, 78% of the participants reported encountering vaccine-hesitant parents at least once a week, highlighting the frequency of the challenge in daily practice.

4. Discussion

The high total mean score suggests that family physicians in the study group are well-informed and supportive of the national immunization program. The high scores in trust

and encouragement indicate that physicians believe in the efficacy of vaccines and actively recommend them to their patients.

However, the relatively lower scores in side effect perception suggest that physicians themselves may harbor some concerns regarding rare adverse events or vaccine ingredients (such as adjuvants or preservatives), or they may feel ill-equipped to explain these technical aspects to worried parents. The significant difference in encouragement scores based on experience suggests that clinical seniority brings better communication skills and confidence in handling refusal.

5. Conclusion

Family physicians are the front line in the fight against vaccine-preventable diseases. While their attitudes are overwhelmingly positive, the high frequency of encounters with vaccine-hesitant parents requires more than just clinical knowledge; it requires advanced communication strategies. We recommend the development of targeted academic training programs focusing on vaccine ingredients and the management of anti-vaccination rhetoric to further empower primary care providers.

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A Comprehensive Scale for the Assessment of Elderly Patients in Primary Care: Easy-Care

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Abstract

Objective: Advancing age brings with it many pathophysiological, sociological, and behavioral changes. The assessment of elderly patients, like that of newborns, is unique and there are elements that must not be overlooked. These include a detailed medical history and physical examination, along with an assessment of activities of daily living, evaluation of dementia, depression, and fall risks, and assessment of the individual's dependency status and frailty. The aim of this study is to evaluate individuals aged 65 and older who present to primary care using Easy-Care, a comprehensive scale that assesses all these age-specific conditions.

Material and Methods: The study was conducted at 10 Family Health Centers (ASM) in 3 districts of Antalya. It is cross-sectional. The sample size was calculated as 384 with 95% power, 95% confidence interval, and 5% sampling error. A total of 400 individuals were included. Permission for the study was obtained from the Scientific Research Ethics Committee of Akdeniz University Faculty of Medicine. Inclusion criteria were being 65 years of age or older, being registered at the designated ASMs, having the cognitive ability to answer the questions, and volunteering to participate in the study. Face-to-face interviews were conducted with the participants. First, the participants' current ailments and diseases were recorded by asking questions, then the

Oral Presentation - OP374

Easy-Care scale was applied, newly identified ailments and diseases were recorded, and the results were compared. Easy-Care is a scale consisting of 2 sections and a total of 49 questions. The first section asks about the person's basic medical history, and the second section asks about geriatric characteristics.

Results: 56.7% of participants (n=227) were female, and 43.3% (n=173) were male. Women had attended school for an average of 2.55 years, while men had attended for 5.84 years (p=0.000). 52.3% of participants were married. Family situations were as follows: 41.5% extended family, 43.3% small family consisting of husband-wife, and 13% single. The income of 84.8% of participants only covered their basic needs, and 96% had social security. Of the female participants, 103 had fallen at least once in the past year, as had 50 of the male participants (p=0.001). The likelihood of falling increased with age (p=0.022). Forty-six percent of participants (n=184) received care from others. Those who engaged in regular physical activity were younger and more educated participants, with p values of 0.007 and 0.000, respectively. We compared geriatric syndrome findings identified before and after Easy-Care was applied to participants. Immobilization, incontinence, falls, hearing loss, forgetfulness, depression, pain, insomnia, and neglect were detected at a higher rate in the Easy-Care scale assessment, with a p-value of 0.000 for all. However, there was no significant difference between pressure ulcers and decreased vision, with p-values of 0.21 and 1.0, respectively.

Conclusion: The analysis revealed that some age-related pathologies that had previously been overlooked were detected in the Easy-Care screening, and the results were significant. We believe that if family physicians use appropriate assessment tools in the evaluation of older adults, standardization will be achieved and fewer symptoms in older adults will be overlooked.

Keywords: Family Medicine, Primary Care, Aging, Geriatric Syndrome

INTRODUCTION

Old age is a period during which numerous health problems emerge. The prevalence of many chronic diseases increases with advancing age (1). The fastest-growing subgroup within the elderly population is the “oldest-old,” defined as individuals aged 85 years and above (2), most of whom have multiple chronic conditions (1). Due to this demographic shift, certain modifications in the delivery of healthcare services are required. One of the key challenges is how to increase both the duration and quality of healthy life years (3).

Health problems in the elderly differ in several respects from those in younger populations. Chronic and degenerative diseases are more prevalent, and the rate of comorbidity is higher among older adults (4). In a study conducted in Italy, the most common diseases observed in elderly individuals were, in order of frequency, hypertension, dementia, myocardial infarction, and coronary heart disease (5).

These changes in disease patterns in old age have necessitated a greater emphasis on preventive and care services in healthcare planning. Primary prevention focuses on protecting older adults from preventable diseases, particularly through appropriate vaccination. Secondary prevention involves the identification, monitoring, and treatment of diseases that develop despite preventive measures. Tertiary prevention includes the management and care of disease-related complications (6, 7, 8).

The process of multidimensional assessment of an elderly individual’s medical, psychological, and functional status in order to organize long-term medical follow-up and treatment is referred to as comprehensive geriatric assessment (9).

Advancing age brings with it many pathophysiological, sociological, and behavioral changes. The assessment of elderly patients, like that of newborns, is unique and there are elements that must not be overlooked. These include a detailed medical history and physical examination, along with an assessment of activities of daily living, evaluation of dementia, depression, and fall risks, and assessment of the individual's dependency status and frailty. The aim of this study is to evaluate individuals aged 65 and older who present

to primary care using Easy-Care, a comprehensive scale that assesses all these age-specific conditions.

MATERIAL AND METHODS

This study was coordinated by the Department of Family Medicine, Faculty of Medicine, Akdeniz University, and conducted in family health centers affiliated with the Ministry of Health in Antalya Province. The study was conducted at 10 Family Health Centers in 3 districts of Antalya. It is cross-sectional.

The sample size was calculated as 384 with 95% power, 95% confidence interval, and 5% sampling error. A total of 400 individuals were included.

Permission for the study was obtained from the Scientific Research Ethics Committee of Akdeniz University Faculty of Medicine. Inclusion criteria were being 65 years of age or older, being registered at the designated ASMs, having the cognitive ability to answer the questions, and volunteering to participate in the study. Individuals who did not meet one or more of these criteria were not included in the study. Face-to-face interviews were conducted with the participants. First, the participants' current ailments and diseases were recorded by asking questions, then the Easy-Care scale was applied, newly identified ailments and diseases were recorded, and the results were compared. Easy-Care is a scale consisting of 2 sections and a total of 49 questions. The first section asks about the person's basic medical history, and the second section asks about geriatric characteristics.

Our hypotheses are as follows:

H1 (alternative hypothesis): Family physicians can identify new health problems and functional impairments in older adults by using a geriatric assessment instrument during routine follow-up visits.

H0 (null hypothesis): Family physicians cannot identify new health problems and functional impairments in older adults by using a geriatric assessment instrument during routine follow-up visits.

Statistical analysis was performed using the IBM SPSS 19.0 software package. Descriptive statistics were expressed as numbers, percentages, minimum, and maximum values. For the analysis of categorical data, the McNemar test, chi-square test, and Fisher's exact test were used. Numerical data were analyzed using the Mann-Whitney U test and the Kruskal-Wallis test. A p-value of <0.05 was considered statistically significant.

RESULTS

56.7% of participants (n=227) were female, and 43.3% (n=173) were male. Women had attended school for an average of 2.55 years, while men had attended for 5.84 years ($p=0.000$). 52.3% of participants were married. Family situations were as follows: 41.5% extended family, 43.3% small family consisting of husband-wife, and 13% single.

The income of 84.8% of participants only covered their basic needs, and 96% had social security. The most frequently encountered chronic diseases among the participants, in descending order of prevalence, were hypertension at 66.3% (n=265), diabetes mellitus at 28.2% (n=113), coronary artery disease at 26.8% (n=107), hyperlipidemia at 20.8% (n=83), depression at 19.8% (n=79), chronic obstructive pulmonary disease at 12.3% (n=49), and various malignancies at 7.5% (n=30).

Of the female participants, 103 had fallen at least once in the past year, as had 50 of the male participants ($p=0.001$). The likelihood of falling increased with age ($p=0.022$). Forty-six percent of participants (n=184) received care from others. Those who engaged in regular physical activity were younger and more educated participants, with p values of 0.007 and 0.000, respectively.

We compared geriatric syndrome findings identified before and after Easy-Care was applied to participants (Table 1). Immobilization, incontinence, falls, hearing loss, forgetfulness, depression, pain, insomnia, and neglect were detected at a higher rate in the Easy-Care scale assessment, with a p-value of 0.000 for all. However, there was no significant difference between pressure ulcers and decreased vision, with p-values of 0.21 and 1.0, respectively.

Table 1. Symptoms of geriatric syndrome

Symptoms	Initial value (n)	Last value (n)
Immobilization	17	27
Incontinence	55	168
Number of falls	21	153
Pressure ulcer	1	2
Decreased vision	29	33
Decreased hearing	30	108
Forgetfulness	55	290
Depression	79	186
Pain	198	354
Insomnia	19	278
Neglect	0	12

CONCLUSION

In our study entitled “Elderly Care in Family Medicine,” we sought to determine whether family physicians can identify new health problems and functional impairments in older individuals by using a comprehensive geriatric assessment tool. For this purpose, we interviewed 400 elderly individuals in the Antalya with a mean age of 72.19 years. Using the EASY-Care Questionnaire, we compared the health status of the elderly before and after geriatric assessment.

Accordingly, it was found that among patients aged 65 years and older, a significantly higher number of individuals had pathologies related to pain, memory impairment, insomnia, hearing problems, depression, incontinence, falls, immobilization, and elder neglect than initially reported; this difference was statistically significant. Although a higher number of positive findings were also identified in the second assessment regarding visual impairment and pressure ulcers, the difference in these domains was not statistically significant.

In conclusion, the use of the EASY-Care Geriatric Assessment Questionnaire not only provided valuable information about the current health status of elderly individuals living

in Antalya, but also enabled the identification of previously missed opportunities in their care. Thus, the necessity of using a geriatric assessment instrument in the evaluation of elderly patients by family physicians has been demonstrated. Furthermore, the questionnaire's applicability in all primary care settings—including outpatient clinics and home visits—its rapid and easy administration, and its ability to ensure standardized patient evaluation constitute its key advantages.

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Comparison Of ROCK1 and ROCK2 Gene Expression in Matched Tumor and Normal Breast Tissues in A Turkish Cohort Using Quantitative Real-Time PCR

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INTRODUCTION

Breast cancer is the most common malignancy among women and is one of the leading causes of cancer-related mortality. Early diagnosis of the disease and elucidation of its molecular mechanisms are of great importance both for improving prognosis and for identifying novel therapeutic targets.

Rho-kinase (ROCK) signaling pathways are involved in critical processes in tumor biology, including cell morphology, migration, invasion, and metastasis. ROCK I and ROCK II, which are components of this pathway, are thought to be particularly associated with tumor progression and metastatic potential.

The aim of this study was to determine the expression levels of ROCK I and ROCK II genes in breast cancer cells and to investigate the possible relationship of these genes with breast cancer. The findings obtained were expected to contribute to the understanding of the molecular basis of breast cancer and to the development of future targeted therapeutic approaches.

Oral Presentation - OP377

MATERIALS AND METHODS

A total of 49 patients diagnosed with breast cancer were included in the study. During surgery, tumor tissue and normal breast tissue samples from the same patient were obtained and preserved under appropriate conditions. Thus, a total of 98 tissue samples were included in the study. Clinical data, including demographic characteristics, family history, imaging findings, and metastasis evaluations, were recorded. Local ethics committee approval was obtained for the study.

Total RNA was isolated from the tissue samples, and cDNA synthesis was subsequently performed. ROCK I and ROCK II gene expression levels were then evaluated using the Real-Time PCR method. In the gene expression analysis, Beta-actin was used as the housekeeping gene, and expression levels between tumor tissues and healthy breast tissues were compared.

STATISTICAL ANALYSIS

Statistical analyses for the patient-control group were performed using the t-test. RhoKinase I and RhoKinase II gene expression levels were determined in cells obtained from healthy breast tissue and cancerous breast tissue of the same patient. The values obtained from the normal breast tissue of each breast cancer patient were used as the control group.

RESULTS

In the total of 98 tissue samples obtained from 49 patients included in the study, ROCK I and ROCK II gene expression levels were analyzed by Real-Time PCR. Gene expression data were normalized using the β -actin housekeeping gene.

When breast cancer tissue was compared with normal breast tissue obtained from the same patient, the expression levels of both genes were found to show a generally similar

distribution. Contrary to the expected increase in tumor tissues, no marked elevation in ROCK I and ROCK II gene expression was observed. Although relatively higher expression values were obtained in normal tissues in some samples, these differences were not statistically significant ($p > 0.645$ for ROCK I; $p > 0.606$ for ROCK II).

When the clinical characteristics of the patient group were examined, the majority of cases were found to have been diagnosed with invasive ductal carcinoma, while smaller numbers of invasive lobular carcinoma and other subtypes were also identified. The rate of metastasis was low, and metastases were observed in only a limited number of patients.

Overall, the findings demonstrated that there was no significant difference between breast cancer tissue and normal breast tissue in terms of ROCK I and ROCK II gene expression levels.

DISCUSSION

In this study, ROCK I and ROCK II gene expression levels were compared between breast cancer tissue and matched normal breast tissue from the same patient, and no statistically significant difference was identified between the two groups. Although this finding does not completely exclude the role of the Rho/ROCK signaling pathway in breast cancer biology, it suggests that this effect may not always be directly reflected at the level of gene expression in primary tumor tissue.

Previous studies have demonstrated that the Rho/ROCK pathway plays a role in key steps of tumor progression, including cell migration, invasion, adhesion, and metastasis (1,2). In particular, ROCK activity has been reported to be increased in metastatic breast cancer models, and ROCK inhibition has been shown to reduce cell migration and metastatic spread (3,4). However, some studies have emphasized that ROCK pathway activity in tumor tissue may be associated more closely with protein activity or phosphorylation status rather than mRNA expression levels (5). This may explain why no significant difference in gene expression levels was observed in our study.

In addition, breast cancer is a heterogeneous disease, and the effect of the ROCK signaling pathway may vary depending on tumor subtype, invasive characteristics, and metastatic potential. Therefore, the possible role of ROCK I and ROCK II in breast cancer may be more meaningfully evaluated in larger patient series together with protein levels, activation status, and molecular subtypes.

In conclusion, our study did not demonstrate a significant difference supporting the use of ROCK I and ROCK II gene expression as a distinctive biomarker in breast cancer tissue. Nevertheless, this pathway remains important, particularly in terms of invasion and metastasis biology, and should be re-evaluated in more comprehensive molecular studies.

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Are Chest Pain Referrals from Primary Care Efficient? Diagnostic Yield and Cost Analysis in a Real-World Cohort

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Objective

Chest pain is one of the most common reasons for referral from primary care to cardiology clinics; however, the majority of cases are ultimately non-cardiac. Balancing patient safety with efficient resource utilization remains a major challenge. This study aimed to evaluate the diagnostic yield and cost implications of chest pain referrals from family physicians to a tertiary cardiology outpatient clinic.

Materials and Methods

This retrospective study included 245 patients referred from primary care to a university cardiology clinic between January 2022 and December 2024. Demographic characteristics and diagnostic processes were analyzed. All patients underwent electrocardiography (ECG) and transthoracic echocardiography (TTE). Additional investigations included troponin (n=60), exercise stress testing (n=80), myocardial perfusion scintigraphy (MPS) (n=12), coronary computed tomography angiography (CCTA) (n=38), and invasive coronary angiography (n=14). Major outcomes were defined as percutaneous coronary intervention (PCI), coronary artery bypass grafting (CABG), or medical management. Cost analysis was conducted using standardized national reimbursement values.

Oral Presentation - OP378

Results

Among 245 patients, invasive coronary angiography was performed in 14 patients (5.7%). Revascularization was required in 6 patients (2.4%), including 5 PCI and 1 CABG, while 8 patients were managed medically. A total of 144 advanced diagnostic tests were performed, corresponding to approximately 24 tests per one revascularization. Additionally, one revascularization was identified per 41 referrals. The total cost was calculated as 369,552 TRY, with a mean cost of 1,508 TRY per patient. The cost per revascularized patient was approximately 61,592 TRY, with the majority of total expenditure attributable to diagnostic testing.

Conclusion

Chest pain referrals from primary care are associated with a high diagnostic workload but a low rate of invasive intervention. Only one out of every 41 referrals resulted in an invasive treatment, highlighting a substantial imbalance between resource utilization and clinical yield. The majority of healthcare costs originated from diagnostic testing rather than therapeutic intervention. Our findings do not suggest that referrals are unnecessary; rather, they highlight the need for improved risk stratification in primary care. In line with current guideline recommendations, more effective implementation of risk-based evaluation may enhance diagnostic efficiency and optimize healthcare resource utilization without compromising patient safety.

Key Words: Chest Pain, Primary Health Care, Health Resources Utilization, Risk Assessment

Introduction

Chest pain represents one of the leading causes of referral from primary care to cardiology outpatient services. Despite the clinical importance of excluding life-threatening cardiac

conditions, a considerable proportion of patients presenting with chest pain are ultimately diagnosed with non-cardiac etiologies (1,2).

This discrepancy creates a persistent clinical challenge: balancing the need for patient safety with the imperative to avoid unnecessary diagnostic procedures and excessive healthcare expenditure. In recent years, increasing attention has been directed toward improving the efficiency of healthcare delivery, particularly through the implementation of risk stratification tools and guideline-based evaluation strategies (3,4).

However, real-world data evaluating the diagnostic yield and economic implications of chest pain referrals from primary care remain limited. Therefore, this study aimed to assess both the clinical outcomes and cost burden associated with such referrals in a tertiary care setting.

Materials and Methods

This retrospective observational study included 245 consecutive patients referred from primary care to a university cardiology outpatient clinic between January 2022 and December 2024.

All patients underwent baseline evaluation including electrocardiography (ECG) and transthoracic echocardiography (TTE). Additional diagnostic investigations were performed based on clinical assessment and included troponin measurement (n=60), exercise stress testing (n=80), myocardial perfusion scintigraphy (MPS) (n=12), coronary computed tomography angiography (CCTA) (n=38), and invasive coronary angiography (n=14).

Clinical outcomes were categorized as percutaneous coronary intervention (PCI), coronary artery bypass grafting (CABG), or conservative medical management.

Cost analysis was conducted using standardized national reimbursement rates, and all costs were calculated in Turkish Lira (TRY).

Results

Among the 245 patients included in the study, invasive coronary angiography was performed in 14 patients (5.7%).

Revascularization was required in 6 patients (2.4%), including 5 patients who underwent PCI (2.0%) and 1 patient who underwent CABG (0.4%). The remaining 8 patients (3.3%) were managed conservatively with medical therapy. (Table 1)

A total of 144 advanced diagnostic tests were performed, corresponding to approximately 24 tests per revascularization. Notably, one revascularization was identified for every 41 referrals.

The total healthcare cost was calculated as 369,552 TRY, with a mean cost of 1,508 TRY per patient. The cost per revascularized patient was approximately 61,592 TRY. The majority of the total expenditure was attributable to diagnostic testing rather than therapeutic interventions. (Table 2)

Table 1. Diagnostic and Clinical Outcomes

Variable	Number	Percentage
Total patients	245	100
Coronary angiography	14	5.7
Revascularization	6	2.4
PCI	5	2.0
CABG	1	0.4
Medical management	8	3.3

Abbreviations: PCI, percutaneous coronary intervention; CABG, coronary artery bypass grafting.

Table 2. Diagnostic Tests and Cost Distribution

Procedure	Number	Unit Cost (TRY)	Total Cost (TRY)
ECG	245	16	3920
Echocardiography	245	145	35525
Troponin	60	65	3900
Exercise test	80	233	18640
MPS	12	1892	22704
CCTA	38	1351	51338
Angiography	14	5300	74200

PCI	5	15700	78500
CABG	1	60000	60000

Abbreviations: ECG, electrocardiography; MPS, myocardial perfusion scintigraphy; CCTA, coronary computed tomography angiography; PCI, percutaneous coronary intervention; CABG, coronary artery bypass grafting.

Discussion

The findings of this study demonstrate that chest pain referrals from primary care are associated with a high diagnostic workload but a relatively low rate of clinically significant coronary artery disease requiring intervention.

Consistent with previous studies, the majority of patients presenting with chest pain in primary care settings do not have a cardiac etiology (1,2). This underscores the inherent difficulty in distinguishing high-risk patients from those with benign conditions based solely on initial clinical assessment.

The high number of diagnostic tests required per revascularization observed in this study suggests a potential overutilization of advanced diagnostic modalities. While such an approach may enhance diagnostic safety, it also contributes substantially to healthcare costs (5,6).

Importantly, these findings should not be interpreted as evidence of inappropriate referral practices. Rather, they highlight the need for more effective implementation of validated risk stratification tools in primary care. Clinical decision rules and guideline-directed evaluation strategies have the potential to improve diagnostic precision, reduce unnecessary testing, and optimize resource allocation (3,4).

In this context, strengthening the integration of evidence-based algorithms into primary care practice may represent a key step toward achieving a more balanced and efficient referral system.

Conclusion

Chest pain referrals from primary care impose a substantial diagnostic burden while yielding a relatively low rate of invasive therapeutic intervention.

Only one in 41 referred patients required revascularization, indicating a marked imbalance between resource utilization and clinical benefit.

Enhancing risk stratification and promoting guideline-based evaluation in primary care may improve diagnostic efficiency and contribute to more rational use of healthcare resources without compromising patient safety (3,4).

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Prenatal Breastfeeding Self-Efficacy and Its Determinants Among Pregnant Women: A Cross-Sectional Study

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Abstract

Introduction: Breastfeeding represents the cornerstone of healthy, balanced, and safe infant nutrition. Maternal breastfeeding self-efficacy is considered one of the most important determinants influencing breastfeeding behavior.

Objective: This study aimed to determine the factors associated with prenatal breastfeeding self-efficacy among pregnant women.

Methods: This cross-sectional study was conducted among pregnant women attending family medicine units at Kemalöz Family Health Center in Uşak between February 1 and August 1, 2025, after obtaining ethical approval from the Uşak University Non-Interventional Research Ethics Committee (Decision No: 530-530-08; January 9, 2025). Data were collected using a Personal Information Form and the validated Turkish version of the Prenatal Breastfeeding Self-Efficacy Scale (PBSES) to evaluate breastfeeding-related knowledge and attitudes.

Results: The study included pregnant women registered at the family medicine units of Kemalöz Family Health Center in Uşak who agreed to participate. A total of 147 pregnant

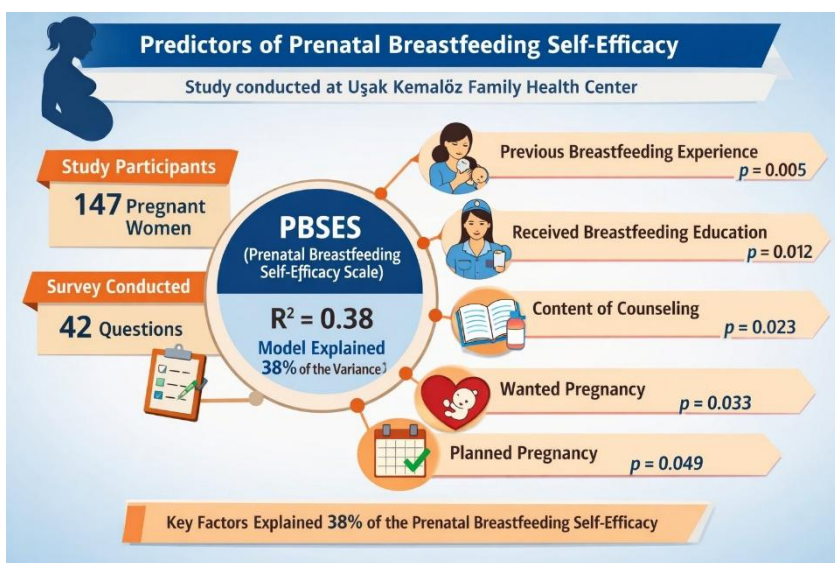
Oral Presentation – OP380

women were enrolled. Data were collected using a 42-item questionnaire consisting of a Personal Health Information Form (23 items) and the Prenatal Breastfeeding Self-Efficacy Scale (PBSES) (19 items). Only 15.6% of the participants ($n = 23$) reported receiving breastfeeding counseling during pregnancy. Previous breastfeeding experience ($p = 0.005$), receiving breastfeeding counseling ($p = 0.012$), the content of breastfeeding counseling ($p = 0.023$), desire for the baby ($p = 0.033$), and planned pregnancy ($p = 0.049$) were identified as significant predictors of PBSES scores.

Conclusion: Prenatal breastfeeding self-efficacy was significantly associated with previous breastfeeding experience, receipt of breastfeeding counseling, the content of counseling, desire for the baby, and planned pregnancy. However, only a small proportion of pregnant women reported receiving breastfeeding counseling during pregnancy. These findings highlight the importance of expanding breastfeeding counseling services and implementing practical training programs to enhance breastfeeding self-efficacy among pregnant women.

Keywords: Breast Feeding, Self Efficacy; Pregnant Women, Prenatal Care, Health Education

Graphical Abstract:



1. Introduction

Breast milk is the optimal and exclusive source of nutrition for infants during the first six months of life. Newborns should be initiated to breastfeeding within the first 30 minutes after birth. From the sixth month after birth, infants should begin receiving complementary foods together with breast milk, and continued breastfeeding up to two years of age or beyond is recommended [1].

Breast milk is a reliable and practical source that provides all essential nutrients and minerals necessary for infant growth and development. Breastfeeding has many benefits for both mother and baby. Breast milk supports physical and cognitive development in infants, and also provides protection against many diseases and conditions such as respiratory diseases, gastrointestinal diseases, necrotizing enterocolitis, allergic diseases, hematological diseases, obesity, diabetes, Crohn's disease, malignancies, and sudden infant death syndrome [2, 3]. Breastfeeding, in addition to being practical and economical for the mother, strengthens the emotional bond between mother and baby, reduces postpartum uterine bleeding by increasing oxytocin secretion, accelerates the mother's return to her pre-pregnancy weight, and reduces the risk of breast and ovarian cancer and osteoporosis in the premenopausal period [4]. In addition to its numerous health benefits, breastfeeding may enhance maternal self-confidence and support the development of maternal self-efficacy [4, 5].

Despite the well-documented benefits of breastfeeding, the 2018 Turkey Demographic and Health Survey (TDHS) reports that only 41% of infants in Türkiye are exclusively breastfed for the first six months. According to the monthly distribution, the prevalence of exclusive breastfeeding is 59% at 0–1 months and 45% at 2–3 months, declining markedly to 14% at 4–5 months. The proportion of children who continue breastfeeding until two years of age is 33.5% [6]. According to the Global Breastfeeding Scorecard 2023, global breastfeeding rates have increased by approximately 10% over the past decade, reaching 48%. The World Health Organization (WHO) has set a target to raise this rate to 50% by 2025 [7].

One of the most important factors influencing breastfeeding is maternal self-efficacy. Breastfeeding self-efficacy refers to a mother's belief in her ability to breastfeed her infant successfully. Factors associated with breastfeeding self-efficacy include previous breastfeeding experience, observing other women breastfeeding, verbal encouragement from family and the social environment, maternal psychological status (e.g., depression and anxiety), and receiving breastfeeding counseling during the prenatal period [8]. Pregnant women with higher levels of breastfeeding self-efficacy and those who receive breastfeeding counseling during pregnancy are more likely to achieve successful breastfeeding in the postpartum period. Therefore, providing breastfeeding counseling to all pregnant women is essential. Furthermore, family health centers should be structured as mother- and baby-friendly institutions to support breastfeeding and maternal-child health.

Although breastfeeding self-efficacy has been widely studied, the majority of existing research has focused on the postpartum period or on women in the late stages of pregnancy. Consequently, evidence examining prenatal breastfeeding self-efficacy throughout the entire pregnancy and identifying modifiable determinants within primary healthcare settings remains limited. Addressing this gap is important for designing early interventions that may improve breastfeeding outcomes. Therefore, this study aimed to assess breastfeeding self-efficacy levels among pregnant women during the prenatal period and to identify the factors associated with these levels.

2. Materials and Methods

Study Design

This study employed a descriptive cross-sectional design.

Study Population and Sample

The study population comprised pregnant women registered with the family medicine units of Kemalöz Family Health Center (FHC) in the central district of Uşak, Türkiye. The sample size consisted of approximately 200 participants. The minimum required sample

size was calculated as 132 pregnant women, assuming a 5% margin of error, a 95% confidence level, and an anticipated response rate of 80% [9]. To account for potential refusals and dropouts and to increase the reliability of the findings, an additional 10% was added to the calculated sample size ($n = 13$). Using a simple random sampling method, a total of 145 participants were targeted for inclusion in the study.

Study Design and Data Collection Form

This cross-sectional study was conducted between February 1 and August 1, 2025, using face-to-face interviews with registered pregnant women aged ≥ 18 years who attended Kemalöz FHC for prenatal follow-up. Data were collected using a 'Personal Health Information Form' developed by the authors based on a review of the literature and the 'Prenatal Breastfeeding Self-Efficacy Scale (PBSES). The PBSES, originally developed by Well et al. (2006), was adapted into Turkish by Uyar Hazar and Uzar Akça (2018) [10, 11]. The scale assesses pregnant women's confidence in their ability to seek breastfeeding-related information and support, cope with concerns about breastfeeding planning, prepare expressed breast milk for others to feed the infant, breastfeed in the presence of others, discuss breastfeeding with others, and continue breastfeeding despite potential disapproval from others. The PBSES consists of 19 items and four subscales: desires (items 5, 6, 7, 8, 13, 16, 17, 18, and 19), information seeking (items 1–4), breastfeeding in the presence of others (items 12, 14, and 15), and skills (items 9–11). The desires subscale evaluates willingness related to breastfeeding; the information-seeking subscale assesses the ability to obtain information about how to breastfeed; the breastfeeding in the presence of others subscale measures feelings of embarrassment when breastfeeding in front of others; and the skills subscale evaluates perceived breastfeeding skills.

The PBSES uses a five-point Likert scale, with response options ranging from 1 (not at all confident) to 5 (completely confident): 1 = not at all confident, 2 = slightly confident, 3 = moderately confident, 4 = very confident, and 5 = completely confident. The total score obtainable from the scale ranges from 19 to 95. The scale does not have a defined cut-off point. Higher scores obtained from the scale indicate greater breastfeeding self-efficacy.

Accordingly, higher scores reflect adequate breastfeeding self-efficacy in participants, whereas lower scores indicate inadequate breastfeeding self-efficacy. The Cronbach's alpha coefficient for the PBSES was 0.86. The Cronbach's alpha coefficients for the subscales—desire, information seeking, breastfeeding in the presence of others, and skills—were 0.83, 0.80, 0.73, and 0.73, respectively.

Participants

The inclusion criteria for the study were as follows: having a healthy pregnancy; being aged 18 years or older; being able to speak, read, and write Turkish; having no visual or hearing impairments; being willing to communicate and cooperate; completing all questionnaire items; and planning to breastfeed.

The exclusion criteria were as follows: being younger than 18 years of age; having a diagnosed psychiatric disorder; having visual and/or hearing impairments; inability to speak Turkish; having a multiple pregnancy (e.g., twins); and refusal to participate in the study.

Ethical Considerations

Ethical approval for this study was obtained from the Non-Interventional Research Ethics Committee of Uşak University (Date: 09 January 2025; Decision No.: 530-530-08).

Statistical Analysis

The data obtained in this study were analyzed using the SPSS version 22 statistical software package. Descriptive statistics were presented as mean $\pm$ standard deviation, as well as frequency and percentage distributions. Normality of the continuous variables was assessed using the Shapiro–Wilk test. The relationships between variables were analyzed using the independent samples t-test, one-way analysis of variance (ANOVA), and Pearson correlation analysis.

Variables with $p < 0.20$ in the bivariate analysis were entered into the regression model. Stepwise multiple linear regression analysis was conducted to determine the variables associated with PBSES scores. Multicollinearity among the independent variables was evaluated by calculating variance inflation factor (VIF) values.

The internal consistency of the scale was assessed using Cronbach's alpha coefficient. Construct validity was evaluated through exploratory factor analysis using principal component extraction with varimax rotation. A p-value of <0.05 was considered statistically significant.

3. Results

The vast majority of participants agreed to participate in the study (97.4%, $n = 147$), whereas only 2.6% ($n = 4$) declined participation (Figure 1). The mean age of the mothers was 30.72 ± 4.37 years (range: 19–42). The mean duration of marriage among the participants ($n = 147$) was 5.80 ± 4.25 years (range: 1–20). A total of 93.9% of the participants ($n = 138$) had health insurance. While 81% of the pregnancies were planned, all participants reported that the pregnancy was desired once it had occurred. Among participants with chronic conditions, hypothyroidism was the most frequently reported disease (31.8%), followed by asthma (22.7%), while other conditions were reported at lower rates (4.5–9.1%) (Table 1).

Figure 1. Graphical abstract of the study

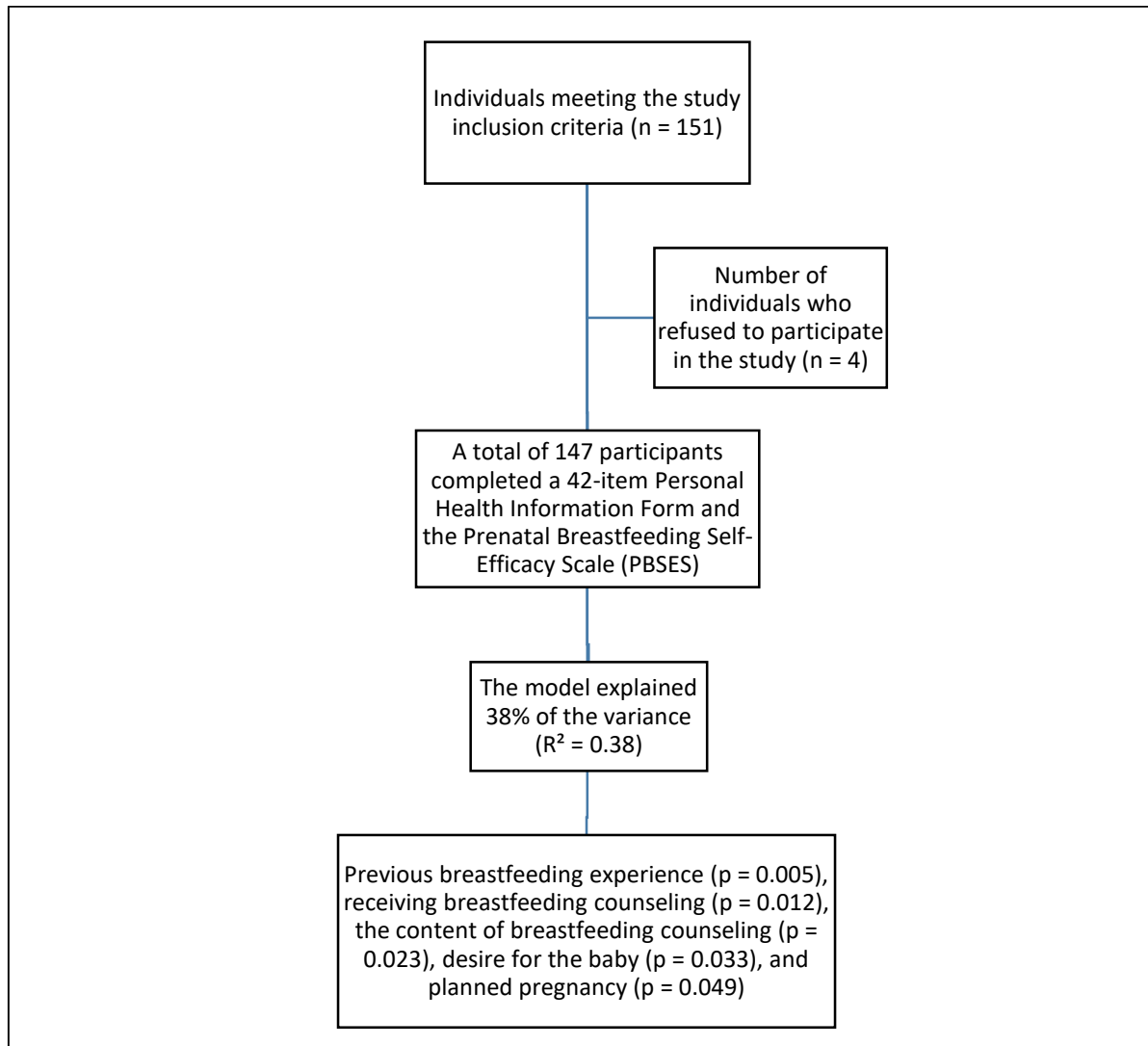


Table 1. Sociodemographic and obstetric characteristics of the study participants

Educational level	n	%
Primary school	3	2
Middle school	12	8.1
High school	36	24.5
University or higher	96	65.4
Total	147	100
Employment status	n	%

Employed	81	55.1
Unemployed	66	44.9
Total	147	100
Knowledge of employees regarding legal rights to breastfeeding leave	n	%
Aware	48	72.7
Not aware	18	27.3
Total	66	100
Monthly household income	n	%
Less than the minimum wage	3	2.0
Minimum wage	26	17.3
>1 and ≤2 times the minimum wage	31	20.7
>2 and ≤3 times the minimum wage	35	23.3
More than 3 times the minimum wage	52	34.7
Total	147	100
Family type	n	%
Nuclear family	144	98
Extended family	3	2
Total	147	100
Tobacco use	n	%
Yes	12	8.2
No	135	91.8
Total	147	100
Presence of chronic disease	n	%
Yes	22	15
No	125	85
Total	147	100
Distribution of chronic diseases	n	%
Hypothyroidism	7	31.8
Asthma	5	22.7
Hypoglycemia	2	9.1
Hashimoto's thyroiditis	2	9.1
Type 1 diabetes mellitus	1	4.5
Familial Mediterranean fever (FMF) + renal failure	2	9.1
Coagulation disorder	1	4.5
Tachycardia	1	4.5
Insulin resistance	1	4.5
Total	22	100
Prenatal period	n	%
1. trimester (1-13 week)	20	13.6
2. trimester (14-27 week)	68	46.3
3. trimester (28-40 week)	59	40.1
Planned/desired nature of pregnancy	n	%
Yes	119	81
No	28	19
Total	147	100

Gender	n	%
Girl	61	41.5
Boy	59	40.1
Unknown	27	18.4
Total	147	100
Number of pregnancies	n	%
1	52	35.4
2	61	41.5
3	21	14.3
4	6	4.1
5 or more	7	4.7
Total	147	100
Number of living children	n	%
0	66	44.5
1	67	45.6
2	13	8.8
3 or more	1	1.1
Total	147	100
Presence of health problems during pregnancy	n	%
Yes	34	23.1
No	113	76.9
Total	147	100
Distribution of pregnancy-related health problems	n	%
Threatened miscarriage	24	70.6
Gestational diabetes mellitus	4	11.8
Placenta previa	2	5.9
Hypothyroidism	2	5.9
Risk of preterm birth	1	2.9
Polyhydramnios	1	2.9
Total	34	100

More than half of the participants (53.7%, $n = 79$) reported previous breastfeeding experience. Among mothers with previous breastfeeding experience, the mean duration of breastfeeding was 18.65 ± 10.23 months (range: 1–54). Only 15.6% of the participants ($n = 23$) received breastfeeding counseling during pregnancy, while the majority (84.4%, $n = 124$) reported receiving no counseling on this topic. When the sources of breastfeeding counseling during pregnancy were examined, the most frequently reported source was pregnancy education classes in public hospitals (65.2%), followed by family health personnel (21.7%). Among pregnant women who received breastfeeding

counseling during pregnancy ($n = 23$), verbal instruction was the most frequently used educational method (82.6%), followed by practical training (43.4%) and written brochures (21.7%) (Table 2).

The mean PBSES score of the participants was 71.83 ± 13.71 (range: 43–95). The scale showed excellent internal consistency (Cronbach's $\alpha = 0.982$). The Cronbach's alpha coefficients for the subscales were 0.908 for desire, 0.886 for information seeking, 0.771 for breastfeeding in the presence of others, and 0.732 for skills. These findings indicate that the scale demonstrates reliability ranging from acceptable to high levels.

The Kaiser–Meyer–Olkin (KMO) measure was 0.93, demonstrating excellent sampling adequacy for factor analysis. Bartlett's Test of Sphericity yielded a significant result ($\chi^2 = 2145.63$, $p < 0.001$), indicating that the data were appropriate for factor analysis. The results of the analysis revealed a four-factor structure accounting for 68.4% of the total variance. The factor loadings were found to range between 0.54 and 0.86.

The bivariate analysis results between PBSES scores and the independent variables are presented in Table 3.

Table 3. Bivariate Analysis of PBSES Scores and Study Variables ($n = 147$)

Variable	Test	Statistic	p
Maternal age	ANOVA	$F = 0.059$	0.994
Education level	ANOVA	$F = 0.630$	0.642
Employment status	t-test	$t = 0.520$	0.604
Knowledge about maternity leave rights	t-test	$t = 1.320$	0.191
Duration of marriage	Pearson correlation	$r = 0.080$	0.347
Monthly income	ANOVA	$F = 1.140$	0.336
Family type	t-test	$t = -0.410$	0.683
Social security	t-test	$t = 0.380$	0.704
Tobacco use	t-test	$t = -1.210$	0.228
Alcohol use	t-test	$t = -0.740$	0.461
Chronic disease	t-test	$t = -0.590$	0.556
Gestational trimester	ANOVA	$F = 1.320$	0.271
Planned pregnancy	t-test	$t = 1.970$	0.051
Desire for the baby	t-test	$t = 2.140$	0.034
Fetal sex	ANOVA	$F = 0.920$	0.401
Number of pregnancies	ANOVA	$F = 1.540$	0.206

Number of living children	ANOVA	F = 1.210	0.309
Pregnancy health problems	t-test	t = -1.020	0.309
Previous breastfeeding experience	t-test	t = 2.870	0.005
Duration of previous breastfeeding	Pearson correlation	r = 0.150	0.072
Receiving breastfeeding counseling	t-test	t = 2.510	0.013
Source of breastfeeding counseling	ANOVA	F = 1.110	0.357
Content of breastfeeding counseling	ANOVA	F = 2.950	0.034

Bivariate analyses revealed statistically significant associations between PBSES scores and desire for the baby ($p = 0.034$), previous breastfeeding experience ($p = 0.005$), receipt of breastfeeding counseling ($p = 0.013$), and the content of breastfeeding counseling ($p = 0.034$). Analysis of the content of breastfeeding counseling indicated that practical hands-on training had the strongest positive association with PBSES scores, followed by verbal education, while provision of written brochures alone was associated with comparatively lower PBSES scores. These findings suggest that practical, hands-on breastfeeding education may be more effective in enhancing prenatal breastfeeding self-efficacy.

In contrast, no statistically significant associations were observed between PBSES scores and maternal age, educational level, employment status, duration of marriage, income level, or other sociodemographic variables ($p > 0.05$).

The stepwise multiple linear regression model examining the variables associated with PBSES scores is presented below. Variables with $p < 0.20$ in the bivariate analyses were entered into the model, and the most significant predictors were identified through a stepwise multiple linear regression approach (Table 4).

Table 4. Final Predictors of PBSES Scores (Stepwise Multiple Linear Regression Model)

Predictor Variable	β	SE	t	p
Previous breastfeeding experience	0,28	1,24	2,89	0,005
Receiving breastfeeding counseling	0,24	1,17	2,55	0,012
Content of breastfeeding counseling	0,21	0,53	2,31	0,023
Desire for the baby	0,18	1,19	2,16	0,033
Planned pregnancy	0,15	1,12	1,98	0,049

Stepwise multiple regression analysis identified previous breastfeeding experience, receipt of breastfeeding counseling, the content of breastfeeding counseling, desire for the baby, and planned pregnancy as significant predictors of PBSES scores. The final model explained 38% of the total variance in PBSES scores ($R^2 = 0.38$, $p < 0.001$).

4. Discussion

A study conducted in Iran reported that prenatal breastfeeding counseling significantly enhances breastfeeding self-efficacy and contributes to the resolution of breastfeeding-related problems during the postpartum period [12]. In a review conducted by McGovern L.M. et al., theory-based and multicomponent interventions implemented during the prenatal period were reported to be more effective in improving breastfeeding self-efficacy [13]. In the present study, only a small proportion of the participants reported having received breastfeeding counseling. PBSES scores were found to be significantly higher among participants who received breastfeeding counseling compared with those who did not receive such counseling. Our findings suggest that prenatal breastfeeding education may enhance mothers' willingness to breastfeed and significantly contribute to the resolution of breastfeeding-related problems. We believe that the low rate of receiving breastfeeding counseling may be attributed to several factors, including limited consultation time of healthcare providers involved in antenatal follow-up (family physicians, family health personnel, and obstetricians), the physical separation between institutions providing antenatal care and those offering educational programs, inadequate referral of pregnant women to antenatal education classes by healthcare facilities, and time constraints experienced by the patients. These findings highlight the need for healthcare planners to expand breastfeeding counseling services both in healthcare institutions where pregnant women receive care and through online platforms.

All women should be supported and encouraged to extend the duration of breastfeeding during the postpartum period. In a study conducted among multiparous women, those without previous breastfeeding experience or with a short breastfeeding history (<3

months) were found to have higher rates of breastfeeding discontinuation. Among women who had breastfed for more than three months, the breastfeeding duration was still considered short in more than 40% of cases [14]. In a study conducted by Alyousefi et al. (2022), women with previous satisfactory breastfeeding experiences and those who had breastfed for six months or longer were observed to have higher PBSES scores [15]. In another study conducted among Chinese women, pregnant women with previous breastfeeding experience were found to have higher breastfeeding rates at 4 and 6 months postpartum [16]. Consistent with the existing literature, a statistically significant difference was observed between previous breastfeeding experience and PBSES scores in our study. We believe that previous breastfeeding experience may contribute to higher levels of knowledge, more positive attitudes, and greater prenatal breastfeeding self-efficacy among mothers. Among mothers without previous breastfeeding experience, coaching and counseling support delivered by experienced individuals or healthcare professionals may increase prenatal breastfeeding self-efficacy and help manage breastfeeding-related problems that may occur in the postpartum period.

In a study conducted among pregnant women with pregestational diabetes mellitus during the last trimester, the content of breastfeeding education was not found to have any effect on breastfeeding rates. However, diabetes-specific targeted breastfeeding education increased knowledge levels and self-confidence among these women [17]. In a study evaluating a telephone-based breastfeeding counseling intervention, no significant difference was observed between the intervention and control groups in terms of exclusive breastfeeding during the first six months or overall breastfeeding rates. However, the intervention supported mothers in becoming more empowered in managing breastfeeding and the transition to complementary feeding [18]. In the group that received prenatal video-assisted breastfeeding education, breastfeeding self-efficacy scores increased significantly compared with both the pre-education levels and the control group [19]. Prenatal breastfeeding education increases breastfeeding self-efficacy and the duration of breastfeeding, particularly when it includes psychological support and counseling components [20]. In our study, a statistically significant difference was

observed between PBSES scores and the content of breastfeeding education. The highest mean scores were found among pregnant women who received practical, hands-on training. Although varying perspectives exist in the literature, our findings are generally consistent with studies demonstrating that practical breastfeeding education strengthens mothers' breastfeeding skills and enhances their breastfeeding self-efficacy perceptions. Educational interventions delivered by healthcare providers that integrate verbal instruction with hands-on training and include psychological support and counseling services may significantly enhance prenatal breastfeeding self-efficacy.

A study conducted in Türkiye demonstrated that women who reported stronger prenatal attachment to their unborn infants exhibited higher levels of prenatal breastfeeding self-efficacy [21]. Similarly, another study found that women who exhibited better adaptation to pregnancy had higher levels of prenatal breastfeeding self-efficacy [22]. Consistent with previous literature, women who reported a stronger desire for their baby demonstrated significantly higher PBSES scores in our study. A strong maternal desire for the baby and better adaptation to pregnancy may positively influence prenatal breastfeeding self-efficacy.

An analysis based on data from the National Survey of Family Growth (2017–2019) demonstrated a significant association between race and parental pregnancy intention with both the initiation and duration of breastfeeding [23]. Compared with planned pregnancies, unintended pregnancies were associated with a higher risk of never initiating breastfeeding and of breastfeeding for less than six months [24]. Consistent with previous findings, planned pregnancy emerged as one of the strongest predictors of PBSES scores in our study. Planning a pregnancy may positively influence prenatal breastfeeding self-efficacy. Therefore, strengthening family planning services to promote planned pregnancies and prevent unintended pregnancies, and ensuring that healthcare providers deliver counseling beginning in the prenatal period, may help improve prenatal breastfeeding self-efficacy.

This study has several limitations. As the study was conducted in a single center among pregnant women with relatively homogeneous sociocultural characteristics, the generalizability of the findings may be limited. Moreover, the questionnaire-based design may have introduced response bias, and participants may have overreported their levels of prenatal breastfeeding self-efficacy and confidence. Another limitation is the absence of postpartum follow-up, as the study was limited to the prenatal period. Future studies that include postpartum follow-up may provide a clearer understanding of the relationship between factors influencing prenatal breastfeeding self-efficacy and breastfeeding practices during the postpartum period.

This study has several strengths. First, the identification of modifiable factors influencing breastfeeding self-efficacy during the prenatal period, rather than the postpartum period, allows healthcare providers to implement early and targeted interventions. Second, our study examined prenatal breastfeeding self-efficacy throughout the entire pregnancy beginning from the first trimester, whereas most previous studies have focused primarily on the third trimester. The use of the PBSES, a scale with established Turkish validity and reliability, further enhances the robustness of our findings. Additionally, the simultaneous evaluation of factors such as previous breastfeeding experience, receipt and content of breastfeeding counseling, desire for the baby, and planned pregnancy provides a more comprehensive understanding of the determinants of prenatal breastfeeding self-efficacy. These results have practical implications for primary care and offer valuable insights for healthcare providers and health policy planners aiming to improve prenatal breastfeeding self-efficacy.

5.Conclusion

In conclusion, previous breastfeeding experience, receipt of breastfeeding counseling, the content of counseling, desire for the baby, and planned pregnancy emerged as key determinants of prenatal breastfeeding self-efficacy. Practical breastfeeding counseling appeared to have a particularly beneficial impact on prenatal breastfeeding self-efficacy. Nevertheless, the relatively low proportion of pregnant women receiving breastfeeding

counseling indicates an important gap in healthcare planning. Developing and implementing accessible, structured prenatal breastfeeding counseling programs—particularly those emphasizing practical training—within healthcare settings where pregnant women receive routine follow-up may enhance prenatal breastfeeding self-efficacy and ultimately improve breastfeeding outcomes in the postpartum period.

Acknowledgments:

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Abbreviations

PBSES	Prenatal Breastfeeding Self-Efficacy Scale
TDHS	Turkey Demographic and Health Survey
WHO	The World Health Organization
FHC	Family Health Center
ANOVA	One-way analysis of variance
VIF	Variance inflation factor
KMO	Kaiser-Meyer-Olkin

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Effectiveness of Embolization Therapy in Patients with Venous Malformations and Hemangiomas and Raising Awareness on Primary Care Utilization

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Abstract

Objective: To evaluate the clinical effectiveness of embolization therapy in patients with venous malformations and hemangiomas and to assess primary care utilization patterns in this patient population.

Materials and Methods: This retrospective study included 111 patients diagnosed with venous malformations or hemangiomas who underwent embolization therapy. Embolization procedures were performed using a combination of N-butyl cyanoacrylate and Lipiodol mixture together with lauromacrogol as a sclerosant. Lesion volumes were evaluated using magnetic resonance imaging, including T1-weighted, T2-weighted, and post-contrast T1-weighted sequences. Pain severity was assessed using the Numeric Rating Scale, where patients rated their pain between 0 and 10.

Results: A total of 111 patients were included, consisting of 52 males (46.8%) and 59 females (53.2%). The mean number of embolization sessions was 1.94 ± 1.38 . The mean number of family health center visits was 0.24 ± 0.47 . Only 25 patients (22.5%) had at least one prior primary care visit for similar complaints.

The mean lesion volume decreased significantly from 210.34 ± 148.52 milliliters before embolization to 57.08 ± 35.37 milliliters after embolization ($p < 0.001$). The mean percentage reduction in lesion volume was 71.78%.

The mean pain score decreased significantly from 7.01 ± 1.83 before treatment to 2.27 ± 0.90 after treatment ($p < 0.001$). The mean percentage reduction in pain score was 65.16%.

Conclusion

Embolization therapy using N-butyl cyanoacrylate, Lipiodol, and lauromacrogol is an effective minimally invasive treatment method for venous malformations and hemangiomas. The low rate of primary care utilization suggests limited awareness at the primary care level, highlighting the need for improved recognition and referral pathways.

Introduction

Vascular anomalies, including venous malformations and hemangiomas, are common vascular lesions characterized by abnormal vascular architecture and altered hemodynamics (1–4). These lesions may present with diverse clinical manifestations such as pain, swelling, and functional impairment, significantly affecting quality of life (2,3).

Venous malformations are low-flow lesions composed of dysplastic venous channels, whereas hemangiomas are vascular tumors with endothelial proliferation (1,5). Despite these differences, both entities may present with overlapping and nonspecific symptoms, leading to diagnostic challenges, particularly in primary care settings (3,4).

Minimally invasive image-guided therapies, including embolization and sclerotherapy, have become key treatment modalities, providing effective symptom control and lesion reduction (6–8). However, the relationship between treatment outcomes and primary care utilization remains insufficiently explored. Therefore, this study aimed to evaluate embolization effectiveness and primary care utilization patterns.

Materials and Methods

Study Population:

This retrospective observational study included 111 patients (52 males, 59 females) diagnosed with venous malformations or hemangiomas who underwent embolization therapy.

Embolization Technique:

All procedures were performed under imaging guidance using a combination of N-butyl cyanoacrylate (NBCA), lipiodol, and lauromacrogol. The NBCA–lipiodol mixture enabled controlled polymerization and effective distribution within the lesion, while lauromacrogol enhanced endothelial damage and thrombosis.

Imaging and Clinical Assessment:

Lesion size and treatment response were evaluated using MRI, including T1-weighted, T2-weighted, and post-contrast T1-weighted sequences. Pain severity was assessed using the Numeric Rating Scale (0–10).

Statistical Analysis:

Data were analyzed using SPSS software. Continuous variables were expressed as mean $\pm$ standard deviation. A p value < 0.05 was considered statistically significant.

Table 1. Demographic characteristics and baseline clinical parameters of the study population.

	Value
Patients	111
Female	59
Male	52
Embolisation Sessions	1.94 $\pm$ 1.38
FHC Visits	25 (22.5%)

Data are presented as number (n), percentage (%), or mean $\pm$ standard deviation. FHC: Family Health Center.

Results

A total of 111 patients were included, with a mean of 1.94 ± 1.38 embolization sessions per patient, indicating that most patients required one or two sessions.

Only 22.5% of patients had prior primary care visits, while the majority (77.5%) were referred without prior evaluation, suggesting a gap in early recognition. Mean lesion volume decreased significantly from 210.34 ± 148.52 mL to 57.08 ± 35.37 mL, corresponding to a 71.78% reduction ($p < 0.001$). Pain scores decreased from 7.01 ± 1.83 (severe pain) to 2.27 ± 0.90 (mild pain), representing a 65.16% reduction ($p < 0.001$).

No significant sex differences were observed in lesion volume, number of sessions, or primary care visits. However, females had significantly higher pre- and post-treatment pain scores, although the relative reduction in pain was similar between sexes.

Table 2. Comparison of pre-procedural and post-procedural lesion volume and pain scores following embolization therapy.

Parameters	Pre-Embolization	Post -mbolization	P value
Lesion Volume (cc)	210.34 ± 148.52	57.08 ± 35.37	<0.001
Pain score	7.01 ± 1.83	2.27 ± 0.90	<0.001

Data are presented as mean $\pm$ standard deviation.

Discussion

The present study demonstrates that embolization therapy provides significant clinical and radiological benefit in patients with venous malformations and hemangiomas. Both lesion volume and pain scores showed marked and statistically significant reductions, indicating that embolization is not only technically effective but also clinically meaningful in improving patient outcomes.

These findings are consistent with previous studies supporting minimally invasive treatment of vascular anomalies, where embolization enables targeted therapy of abnormal vascular structures while avoiding the morbidity associated with surgical approaches (6–9). Percutaneous and endovascular techniques have been widely adopted for low-flow vascular malformations due to their safety and effectiveness (6,8).

The relatively low number of treatment sessions further highlights the efficiency of this approach, suggesting that substantial improvement can be achieved with limited procedural burden. This is in line with prior reports emphasizing the practicality and clinical utility of image-guided interventions in vascular anomalies (6,7).

An important finding of this study is the low rate of primary care utilization. Given that these lesions often present with nonspecific symptoms, the low proportion of prior primary care visits suggests an awareness gap that may contribute to delayed diagnosis and referral (3,4). Improving awareness among primary care physicians may facilitate earlier diagnosis and timely referral to specialized centers.

Although female patients reported higher pain scores both before and after treatment, the relative reduction in pain was similar between sexes, indicating comparable treatment effectiveness. Differences in pain perception between sexes have been reported in the literature and may explain this finding rather than differences in treatment response (10).

This study has several limitations, including its retrospective design, single-center setting, and lack of long-term follow-up data. In addition, lesion subtype characteristics and quality-of-life measures were not evaluated. Despite these limitations, the study provides valuable insights by combining objective radiological outcomes with clinical symptom improvement and highlighting an important gap in primary care awareness.

Conclusion

Embolization therapy is an effective and minimally invasive treatment option for venous malformations and hemangiomas, resulting in significant reductions in lesion volume and pain. The low rate of primary care utilization highlights a potential awareness gap,

emphasizing the need for improved recognition and earlier referral to optimize patient outcomes.

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Assessment of Early Systemic Inflammation in Normoglycemic and Prediabetic Individuals According to Hemoglobin A1c Using Complete Blood Count-Based Indicators

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ABSTRACT

Objective: Prediabetes is an intermediate stage where metabolic and vascular risks begin to become apparent. Hemoglobin A1c (HbA1c) is a reliable marker for classifying normoglycemic and prediabetic individuals. In recent years, studies examining systemic inflammation in prediabetics using markers obtained from hemograms have attracted attention. This study aims to evaluate the Systemic Immune-Inflammation Index (SII), Systemic Inflammation Response Index (SIRI), and Systemic Inflammation Aggregate Index (SIAI), along with Red Cell Distribution Width (RDW) and Mean Platelet Volume (MPV) parameters, in normoglycemic and prediabetic individuals classified according to HbA1c.

Materials and Methods: In this retrospective study, individuals with HbA1c <5.7 were divided into two groups: Group 1 (Normoglycemic); and Group 2 (Prediabetic) with HbA1c 5.7–6.4. In both groups, novel inflammatory markers SII, SIRI, and SIAI obtained from complete blood counts, as well as MPV and RDW, were evaluated. Statistical analyses were performed using appropriate methods.

Results: SII, SIAI, and SIRI values were found to be significantly higher in prediabetic individuals. No significant relationship was found with MPV and RDW. A low-level,

Oral Presentation – OP382

positive and significant correlation was found between HbA1c and SII, and a very low-level positive and significant correlation was found with SIAI and SIRI. According to the logistic regression results, a 1-unit increase in SII increased the probability of prediabetes by 0.4%, and a 1-unit increase in SIAI increased it by 0.6%.

Conclusion: The data obtained indicate that SII and SIAI values may provide additional value in identifying prediabetic individuals. However, large-scale randomized studies are needed to fully determine the biomarker properties.

Keywords: HgA1c, SII, SIAI, SIRI

INTRODUCTION

Diabetes mellitus remains a major global public health concern due to its increasing prevalence and the chronic complications it entails. The development of type 2 diabetes is typically characterized by a prolonged prediabetic phase, which represents a critical window for the prevention or delay of disease onset. Prediabetes is defined as an intermediate metabolic state in which diagnostic criteria for diabetes are not yet met, but metabolic and vascular risks have already begun to emerge (1).

Biochemical markers used in the identification of prediabetes include fasting plasma glucose, the oral glucose tolerance test, and hemoglobin A1c (HbA1c). HbA1c is increasingly preferred in both clinical and research settings, as it reflects the average glycemic status over the preceding 2–3 months, is less affected by daily glucose fluctuations, and is easily applicable in routine practice. Accordingly, HbA1c has emerged as a reliable and standardized marker for classifying normoglycemic and prediabetic individuals. According to the American Diabetes Association (ADA), HbA1c levels are categorized as “normal” when $<5.7\%$, “prediabetes” when $5.7\text{--}6.4\%$, and “diabetes” when $\geq 6.5\%$ (2).

Emerging evidence suggests that prediabetes is not solely a disorder of glucose metabolism but is also closely associated with chronic low-grade systemic inflammation. Insulin resistance, proinflammatory cytokines released from adipose tissue, oxidative stress, and endothelial dysfunction constitute key components of the inflammatory processes that begin during the prediabetic stage (3,4). Although often clinically silent, this inflammatory state provides a critical substrate for the future development of cardiovascular disease and overt diabetes.

Traditional biomarkers used to assess systemic inflammation, such as C-reactive protein, interleukin-6, and tumor necrosis factor-alpha, provide valuable insights but are limited in routine clinical practice due to issues related to cost, accessibility, and standardization. Consequently, there is a growing need for more practical and cost-effective inflammatory markers. In this context, hemogram-derived inflammatory indices based on complete blood count parameters have gained increasing attention as alternative tools (5).

Neutrophils, lymphocytes, monocytes, and platelets are key cellular components involved in inflammation, immune response, and thrombosis. Indices derived from combinations of these cells—such as the Systemic Immune-Inflammation Index (SII), Systemic Inflammation Response Index (SIRI), and Systemic Inflammation Aggregate Index (SIAI)—have demonstrated diagnostic and prognostic value across a wide range of oncological, cardiovascular, and inflammatory conditions (6–10). However, the ability of these indices to reflect systemic inflammation in normoglycemic and prediabetic individuals stratified according to HbA1c remains insufficiently elucidated.

Parameters reflecting erythrocyte and platelet morphology, including red cell distribution width (RDW) and mean platelet volume (MPV), are traditionally used in hematological assessments but have recently attracted attention due to their associations with inflammation and cardiometabolic risk. Elevated RDW levels have been linked to inflammation, oxidative stress, and impaired erythropoiesis, whereas increased MPV is considered an indicator of platelet activation and proinflammatory states. Nevertheless, the relationship between these parameters and inflammatory processes in prediabetic

individuals has been explored in only a limited number of studies, with inconsistent findings (11–13). Furthermore, no study to date has evaluated SII, SIRI, SIAI, RDW, and MPV simultaneously.

In this study, we aimed to comparatively evaluate SII, SIRI, and SIAI indices together with RDW and MPV parameters in normoglycemic and prediabetic individuals classified according to HbA1c levels. Family medicine settings offer a unique opportunity for the early detection of subclinical metabolic risks, as individuals without overt disease frequently seek care at this level. Therefore, this study aims to contribute to the existing literature by identifying early inflammatory markers in normoglycemic and prediabetic individuals based on HbA1c classification and to provide insight into the clinical utility of easily accessible biomarkers. It is anticipated that the findings may support the development of preventive and therapeutic strategies targeting immune and inflammatory pathways, thereby contributing to delaying the onset of diabetes and reducing cardiovascular complications.

MATERIALS AND METHODS

This retrospective study included individuals aged ≥ 18 years who presented to the Karaman Central No. 56 Family Medicine Unit between April 2023 and February 2026, and for whom both hemogram and HbA1c measurements were performed during the same visit. Only individuals with hemoglobin levels between 12–16 g/dL and C-reactive protein (CRP) levels < 5 mg/dL were included.

Individuals with HbA1c $\geq 6.5\%$, a known diagnosis of diabetes mellitus, marked leukocytosis suggestive of acute infection, pregnancy, known rheumatologic or autoimmune diseases, advanced liver or heart failure, malignancy, hypertension, hematological disorders, a history of chronic inflammatory disease, or those using steroids or immunosuppressive agents were excluded.

Laboratory data were obtained through retrospective review of medical records. Serum HbA1c levels and complete blood count parameters, including neutrophil, lymphocyte,

monocyte, and platelet counts, as well as RDW and MPV, were analyzed. The following indices were calculated:

SII (Systemic Immune-Inflammation Index) = (Neutrophils × Platelets) / Lymphocytes

SIRI (Systemic Inflammation Response Index) = (Neutrophils × Monocytes) / Lymphocytes

SIAI (Systemic Inflammation Aggregate Index) = (Neutrophils × Monocytes × Platelets) / Lymphocytes

Participants were divided into two groups based on HbA1c levels: individuals with HbA1c <5.7% were classified as Group 1 (normoglycemic), whereas those with HbA1c 5.7–6.4% were classified as Group 2 (prediabetic).

Ethical approval for the study was obtained from the Ethics Committee of Karamanoğlu Mehmetbey University Faculty of Medicine (Decision No: 01-2026/17, dated 10.02.2026).

Statistical Analysis

Statistical analyses were performed using SPSS version 27.0 (SPSS Inc., Chicago, IL, USA). Normality of distribution was assessed using the Shapiro–Wilk and Kolmogorov–Smirnov tests. Non-normally distributed continuous variables were expressed as median and interquartile range (IQR). Comparisons between groups were conducted using the Mann–Whitney U test for non-parametric variables. Correlation analysis was performed to evaluate relationships between variables. Receiver Operating Characteristic (ROC) curve analysis was used to determine the cut-off values of SII, SIAI, and SIRI. A p-value <0.05 was considered statistically significant at a 95% confidence interval.

RESULTS

A total of 300 individuals (150 males and 150 females) were retrospectively evaluated. The mean age was 37.7±12.9 years in males and 38.9±12.3 years in females. SIRI values, as well as lymphocyte and monocyte counts, were significantly higher in males (p=0.032,

$p=0.014$, and $p<0.001$, respectively), whereas SII values and platelet counts were significantly higher in females ($p=0.006$ and $p=0.031$, respectively). No significant sex-based difference was observed for SIAI.

Participants were categorized into two groups according to HbA1c levels: Group 1 (normoglycemic, HbA1c $<5.7\%$) and Group 2 (prediabetic, HbA1c $5.7-6.4\%$). Neutrophil and platelet counts, as well as SII, SIAI, and SIRI values, were significantly higher in the prediabetic group. No significant associations were found for MPV or RDW (Table 1).

Correlation analysis revealed a weak but statistically significant positive correlation between HbA1c and SII ($r=0.235$, $p<0.001$). Very weak yet statistically significant positive correlations were observed between HbA1c and both SIAI and SIRI. However, no significant correlations were identified for MPV or RDW (Table 2).

ROC curve analysis demonstrated that SII and SIAI had limited but statistically significant discriminative ability for identifying prediabetes (AUC=0.660, 95% CI: 0.598–0.722, $p<0.001$; and AUC=0.621, 95% CI: 0.557–0.685, $p<0.001$, respectively). The optimal cut-off value for SII was 334.5 (sensitivity 65.5%, specificity 50.3%), while for SIAI it was 154 (sensitivity 62.1%, specificity 50.3%).

The predictive performance of SIRI for prediabetes was poor (close to random), although statistically significant (AUC=0.577, 95% CI: 0.512–0.642, $p=0.021$). The cut-off value for SIRI was 0.70 (sensitivity 48.3%, specificity 60%).

According to logistic regression analysis, each one-unit increase in SII was associated with a 0.4% increase in the likelihood of prediabetes, while each one-unit increase in SIAI was associated with a 0.6% increase in risk.

Table 1: Comparison of non-normally distributed variables between groups*

Variables	Group 1 (Normoglycemic, n=155)	Group 2 (Prediabetic, n=145)	p
Lymphocyte count ($10^9/L$)	2,42 (2,05-2,76)	2,32 (1,97-2,77)	0,40
Neutrophil count ($10^9/L$)	3,29 (2,79-4,02)	3,78 (3,07-4,45)	0,003

Monocyte count ($10^9/L$)	0,46 (0,38-0,57)	0,46 (0,37-0,59)	0,86
Platelet count ($10^9/L$)	238 (212-269)	259 (225-294)	<0,001
MPV (fL)	9,8 (8,6-11,0)	9,9 (8,9-10,9)	0,81
RDW (fL)	44,2 (41,7-47,0)	44,5 (41,9-47,0)	0,45
SII	333 (259-415)	413 (295-552)	<0,001
SIAI	153 (116-200)	191 (122-265)	<0,001
SIRI	0,64 (0,50-0,82)	0,69 (0,51-0,98)	0,021

*Data are presented as median (interquartile range, IQR).

Table 2. Spearman correlation analysis of non-normally distributed variables

Variables	SII (r/p)	SIAI (r/p)	SIRI (r/p)	HbA1c (r/p)	MPV (r/p)	RDW (r/p)
SII	1	0,765/<0,001	0,599/<0,001	0,235/<0,001	0,054/0,349	0,062/0,288
SIAI	0,765/<0,001	1	0,891/<0,001	0,194/<0,001	-0,144/0,013	0,106/0,066
SIRI	0,599/<0,001	0,891/<0,001	1	0,124/0,031	-0,074/0,201	0,126/0,029
HbA1c (%)	0,235/<0,001	0,194/<0,001	0,124/0,031	1	-0,029/0,620	0,042/0,466
MPV (fL)	0,054/0,349	-0,144/0,013	-0,074/0,201	-0,029/0,620	1	-0,110/0,058
RDW (fL)	0,062/0,288	0,106/0,066	0,126/0,029	0,042/0,466	-0,110/0,058	1

DISCUSSION

This study has several limitations. First, participants' dietary habits, anthropometric measurements (such as height, weight, and waist circumference), and metabolic parameters including fasting plasma glucose, lipid profile, and insulin levels were not evaluated. Another limitation is the relatively small sample size. In addition, as the study was conducted in a single center, potential regional and socioeconomic differences could not be taken into account. In the present study, SII, SIRI, and SIAI indices, along with RDW and MPV parameters, were compared between normoglycemic and prediabetic individuals classified according to HbA1c levels.

Diabetes mellitus is a highly prevalent chronic metabolic disorder, the global burden of which is increasing at an alarming rate. It is associated with numerous serious complications, including cardiovascular disease, nephropathy, retinopathy, and peripheral arterial disease. These complications significantly impair quality of life while

increasing healthcare costs and mortality rates. Accumulating evidence suggests that chronic inflammation plays a central role in the pathogenesis of diabetes and is strongly linked to both the onset and progression of its complications (14).

Hemogram-derived indices such as SII, SIRI, and SIAI integrate alterations in multiple inflammatory cell types, thereby providing a more comprehensive reflection of systemic inflammatory status. In recent years, these indices have been increasingly investigated as biomarkers of systemic inflammation in various conditions, including cancer, diabetes, cardiovascular diseases, and infectious disorders. A systematic review of 22 studies highlighted that SII effectively reflects systemic immune responses and is closely associated with diabetic nephropathy, retinopathy, all-cause mortality, and cardiovascular mortality (14). Moreover, SII has been identified as an independent risk factor for diabetes mellitus, with higher SII levels associated with an increased likelihood of developing type 2 diabetes (15). In a study by Yesilyurt et al., SII, SIRI, and SIAI values in the prediabetic group were found to correlate with glucose and HbA1c levels (9).

Consistent with the literature, the present study demonstrated that SII, SIAI, and SIRI values were significantly higher in prediabetic individuals. Additionally, a weak but statistically significant positive correlation was observed between HbA1c and SII, while very weak yet significant positive correlations were found between HbA1c and both SIAI and SIRI. Although the discriminative power of these indices for identifying prediabetes was limited, the associations remained statistically significant. Furthermore, each one-unit increase in SII and SIAI was associated with a 0.4% and 0.6% increase in the likelihood of prediabetes, respectively.

RDW reflects the variability in erythrocyte size, whereas MPV indicates the average platelet volume. RDW tends to increase as a result of inflammation-induced alterations in erythropoiesis and oxidative stress, while MPV serves as a marker of platelet activation that may vary depending on the severity of inflammation. Previous studies have shown that RDW is elevated in inflammatory diseases, whereas MPV may increase or decrease depending on disease activity. The combined evaluation of these parameters may be

useful, particularly in detecting subclinical inflammation (13, 16–18). However, in the present study, no significant association was found between MPV or RDW and prediabetes. Similarly, no significant relationship was observed between HbA1c and either MPV or RDW.

Several studies in the literature have demonstrated associations between lipid parameters and both MPV and RDW. Reductions in LDL and triglyceride levels, along with increases in HDL levels, have been associated with significant decreases in MPV and RDW values. In addition, hyperglycemia and hyperinsulinemia may influence MPV and RDW levels (13,19–22). The lack of significant associations in the present study may be attributed to the absence of data on fasting glucose, insulin, and lipid parameters.

Even within similar clinical conditions, SII, SIAI, and SIRI values may vary according to sex. These differences have been linked to sex hormones (22,23). In a study conducted in patients with hypertension, SII levels were found to be significantly higher in females (24). Similarly, in the present study, SII values were higher in females. In contrast, SIRI values were higher in males, while no significant sex-related difference was observed for SIAI.

CONCLUSION

To the best of our knowledge, there is no study in the literature evaluating SII, SIRI, SIAI, RDW, and MPV simultaneously. In this regard, the present study may represent a novel contribution. The findings suggest that SII and SIAI may provide additional value in identifying individuals at increased risk of developing prediabetes.

Easily accessible and cost-effective biomarkers may offer substantial benefits in primary care settings for the early identification of at-risk individuals and the implementation of preventive health strategies. However, given that this study was conducted in a single center with a relatively small sample size, the findings cannot be generalized to larger populations. Large-scale, prospective, and randomized studies are needed to further clarify the biomarker potential of these indices.

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Clinical and Epidemiological Characteristics of Respiratory Syncytial Virus Infections in Children: A Single-Center Retrospective Study

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Abstract:

Introduction: Respiratory syncytial virus (RSV) is a leading cause of acute respiratory tract infections across all age groups and represents the most common etiological agent of lower respiratory tract infections in children under one year of age. The majority of children are infected with RSV by the age of two years. This study aimed to evaluate the epidemiological and clinical characteristics, as well as the treatment modalities and treatment responses, of pediatric patients aged 0–18 years who presented to our hospital with respiratory symptoms and were diagnosed with RSV infection.

Methods: This retrospective study was conducted in pediatric patients aged 0–18 years at Çukurova University Faculty of Medicine, Balcalı Hospital, between January 2022 and January 2025. Patients who presented with symptoms of lower respiratory tract infection during the study period and were found to be RSV-positive by multiplex real-time polymerase chain reaction (RT-PCR) testing of nasopharyngeal swab specimens were included in the study.

Results: A total of 26 patients were included in the study, of whom 22 were male (84.6%). The median age was 19.5 months (min-max: 1-186 months). A history of prematurity was present in 7 patients (26.9%), and 16 patients (61.5%) had underlying chronic diseases. When the presenting complaints were evaluated, cough was present in 76.9%, fever in 53.8%, and respiratory distress in 61.5% of the patients.

When chest radiographs were examined, bilateral infiltration was observed in 46.1%, unilateral infiltration in 11.6%, and hyperinflation in 15.3% of the patients. RSV was identified as the sole pathogen in 15 patients, while among co-infections, RSV-rhinovirus co-infection was the most common.

A total of 19 patients (73%) required oxygen support; of these, 52.6% received nasal cannula, 10.5% reservoir mask, 21.1% high-flow nasal cannula oxygen (HFNC), and 15.8% invasive mechanical ventilation support. Complications developed in 2 patients during treatment, 5 patients were admitted to the pediatric intensive care unit, and 1 patient died.

Discussion: Respiratory syncytial virus (RSV) is one of the most common causes of acute lower respiratory tract infections, particularly in children under two years of age, and in our study, the majority of cases were also observed in the younger age group. Prematurity and the presence of underlying diseases stand out as important risk factors for a more severe course of the disease. In our study, the presence of oxygen requirement in a significant proportion of patients supports that RSV infections can lead to severe clinical conditions. Therefore, in addition to early diagnosis and appropriate treatment, it is of great importance to raise awareness among families regarding hygiene measures, avoidance of household cigarette smoke exposure, and adherence to the national immunization schedule.

Keywords: respiratory syncytial virus, child, lower respiratory tract infection

Introduction: Respiratory syncytial virus (RSV) is a leading cause of acute respiratory tract infections across all age groups and represents the most common etiological agent of lower respiratory tract infections in children under one year of age (1). The majority of children are infected with RSV by the age of two years (2). This study aimed to evaluate the epidemiological and clinical characteristics, as well as the treatment modalities and treatment responses, of pediatric patients aged 0–18 years who presented to our hospital with respiratory symptoms and were diagnosed with RSV infection.

Methods: This retrospective study was conducted in pediatric patients aged 0–18 years at Çukurova University Faculty of Medicine, Balcalı Hospital, between January 2022 and January 2025. Patients who presented with symptoms of lower respiratory tract infection during the study period and were found to be RSV-positive by multiplex real-time polymerase chain reaction (RT-PCR) testing of nasopharyngeal swab specimens were included in the study.

Results: A total of 26 patients were included in the study, of whom 22 were male (84.6%). The median age was 19.5 months (min–max: 1–186 months). A history of prematurity was present in 7 patients (26.9%), and 16 patients (61.5%) had underlying chronic diseases. When the presenting complaints were evaluated, cough was present in 76.9%, fever in 53.8%, and respiratory distress in 61.5% of the patients.

When chest radiographs were examined, bilateral infiltration was observed in 46.1%, unilateral infiltration in 11.6%, and hyperinflation in 15.3% of the patients. RSV was identified as the sole pathogen in 15 patients, while among co-infections, RSV–rhinovirus co-infection was the most common. RSV infections were most frequently observed in December (57.7%), followed by January (30.8%).

A total of 19 patients (73%) required oxygen support; of these, 52.6% received nasal cannula, 10.5% reservoir mask, 21.1% high-flow nasal cannula oxygen (HFNC), and 15.8% invasive mechanical ventilation support. During the course of treatment, complications developed in two patients, both of which were identified as pneumonia.

Five patients were admitted to the pediatric intensive care unit, and one patient died. The deceased patient had an underlying metabolic disorder.

Discussion: Respiratory syncytial virus (RSV) is one of the most common causes of acute lower respiratory tract infections, particularly in children under two years of age, and in our study, the majority of cases were also observed in the younger age group. Prematurity and the presence of underlying diseases stand out as important risk factors for a more severe course of the disease. Chronic lung disease, chronic heart disease, Down syndrome, asthma, and immunodeficiency are important risk factors for acute lower respiratory tract infections. RSV management is primarily supportive and includes fluid therapy and respiratory support (3,4). In our study, the presence of oxygen requirement in a significant proportion of patients supports that RSV infections can lead to severe clinical conditions. Therefore, in addition to early diagnosis and appropriate treatment, it is of great importance to raise awareness among families regarding hygiene measures, avoidance of household cigarette smoke exposure, and adherence to the national immunization schedule. In addition, the monoclonal antibody Nirsevimab, which has recently been approved for single-dose use in both healthy and high-risk infants, represents an important advancement in RSV prophylaxis (5-7).

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Evaluation of the Relationship Between Bone Mineral Density and Metabolic Syndrome and Quality of Life Index

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ABSTRACT

Introduction and Purpose: Osteoporosis (OP), characterized by deterioration in bone mass and the microarchitecture of bone tissue, and metabolic syndrome (MetS), which carries significant cardiovascular risk factors, are common diseases in our country. Our study aimed to investigate whether there is a relationship between bone mineral density (BMD) and MetS and to examine the changes these diseases cause in individuals' quality of life.

Materials and Methods: Our study, designed as an analytical, cross-sectional study, was conducted among patients who applied to the Nuclear Medicine Clinic of Gülhane Training and Research Hospital, Health Sciences University, for bone mineral density (BMD) measurement. Volunteers who agreed to participate in the study and completed the informed consent form were administered a questionnaire that assessed their sociodemographic characteristics, knowledge and attitudes about diseases, lifestyles, intake of calcium-containing foods or supplements, physical activity using the International Physical Activity Questionnaire, and their quality of life using the EQ-5D. In addition, the patients' fasting blood glucose (FBG), lipid panel, and BMD

measurement values were recorded from the hospital information management system in a data collection form. The "Statistical Package for the Social Sciences (SPSS) for Windows 22" software was used to analyze the data.

Results: A total of 380 participants took part in the study. The average age was 58.01 ± 11.98 years, with a range from 20 to 84. Among them, 87.9% (n=334) were female. MetS was found in 35.3% (n=134) of participants, while OP was identified in 35.8% (n=136). The study examined the links between MetS and sociodemographic factors. Statistically significant relationships were found with age, sex, education level, and occupation ($p < 0.05$). For OP, a significant link appeared only with place of residence ($p < 0.05$). The rate of nonalcoholic steatohepatitis (NASH) was notably higher in participants with MetS than in those without (43.7% vs. 29.7%, $p = 0.039$).

Regarding anthropometric and biochemical parameters, we found significant links with OP status for age, height, weight, and body mass index (BMI) ($p < 0.05$). There was no significant connection between MetS and OP ($p > 0.05$). However, lumbar vertebral T-scores were noticeably higher in participants diagnosed with MetS ($r = 0.107$, $p = 0.037$). We assessed quality of life using the EQ-5D instrument, which produced a mean index score of 0.64 ± 0.27 (range: -0.513 to 0.93). Participants with MetS reported significantly lower quality of life scores compared to those without MetS (mean rank: 159.69 vs. 207.28; $p < 0.001$). We found no significant link between bone mineral density (BMD) measurements, OP diagnosis, and quality of life.

Conclusion: High BMD due to high body mass index (BMI) rates in participants diagnosed with MetS may be protective against the risk of OP. However, MetS reduces quality of life. In primary care settings, recommendations for appropriate nutrition and physical activity are important for protecting the elderly patient population, especially postmenopausal women, from both diseases.

Keywords: Bone Mineral Density, Metabolic Syndrome, Quality of Life

INTRODUCTION

Metabolic syndrome (MetS), also known as insulin resistance syndrome and Syndrome X, is a systemic endocrinopathy characterized by the presence of metabolic disorders such as abdominal obesity, glucose intolerance or diabetes mellitus (DM), dyslipidemia, hypertension (HT), and coronary artery disease (CAD), all of which begin with insulin resistance (1). Osteoporosis (OP), on the other hand, is defined as a progressive metabolic bone disease resulting in increased bone fragility and a tendency toward fractures due to low bone mass and impaired bone microarchitecture (2).

MetS poses a risk, particularly in developed societies, due to technological advancements, sedentary lifestyles, and dietary habits. The prevalence of MetS and obesity is largely proportional to one another (3,4). Given that the prevalence of obesity is expected to rise further in the future, an increase in the prevalence of MetS is also anticipated.

The World Health Organization (WHO) defines quality of life as an individual's perception of their place in life in relation to their goals, expectations, standards, and interests within the context of their culture and value systems (5,6). Pain, decreased back muscle strength, loss of flexibility, deformities, changes in mood, and vertebral or non-vertebral fractures that may develop due to OP can negatively affect patients' quality of life. It has been reported that a decrease in T-scores on the BMD measurement is associated with a decline in quality of life, and it has been determined that a decrease in BMD is proportional to advanced age, low income, low activity levels, a sedentary lifestyle, prolonged menopause, and a history of fractures (7).

The aim of this study is to investigate whether there is an association between bone mineral density (BMD) and metabolic syndrome (MetS) and to examine the changes these conditions cause in individuals' quality of life.

METHODS

Study Design

Our study, designed as an analytical, cross-sectional study, was conducted between November 2019 and November 2020 on 380 patients who presented to the Nuclear Medicine Clinic at Gülhane Training and Research Hospital, University of Health Sciences, for BMD measurement. Volunteers who agreed to participate in the study and completed the informed consent form were administered a questionnaire assessing sociodemographic characteristics and disease status, the International Physical Activity Questionnaire, and a questionnaire assessing quality of life using the EQ-5D. Additionally, data on patients' fasting blood glucose (FBG), lipid panel, and BMD measurement values were recorded in the data collection form from the hospital information management system.

Study sample

The study population consisted of patients aged 18 and older who presented to the BMD measurement unit at the outpatient clinic of the Nuclear Medicine Clinic at Gülhane Training and Research Hospital, Health Sciences University. Using the Epi-Info program, the sample size was calculated to be at least 380 patients, based on a 95% confidence interval and a 5% margin of error. Inclusion criteria for the study were: having visited the Nuclear Medicine Outpatient Clinic and agreed to participate in the study, having undergone a BMD measurement, having provided informed consent to participate in the study, and being 18 years of age or older.

QUESTIONNAIRES AND SCALES

Socio-demographic characteristics: The questionnaire consists of 13 questions, including year of birth, gender, marital status, educational background and occupation,

place of residence, monthly household income, family structure, health insurance, and comorbid conditions.

The International Physical Activity Questionnaire (IPAQ): The short form is a subjective method used to assess individuals' levels of physical activity. The questionnaire covers high-intensity activity, moderate-intensity activity, and walking. It consists of a total of 7 questions and asks individuals to estimate the duration (in minutes) and frequency (in days) of the activities they performed over the past 7 days. For the assessment, activities must have been performed continuously for at least 10 minutes. For each activity, the duration is multiplied by the corresponding MET value, and the total of all activities is calculated to determine the overall physical activity score.

The validity and reliability study of the Turkish version of the IPAQ was conducted by Sağlam and colleagues in 2010.

EQ-5D General Quality of Life Scale: Quality of life can be assessed using general health scales and/or disease-specific scales. The EQ-5D is a general health scale used for this purpose. It was developed by the EuroQol group in 1987, published in 1990, and has maintained its five-dimensional structure since 1991. It has been translated into over 60 languages, and a Turkish version is also available. The scale consists of two sections.

EQ-5D index scale: The instrument consists of five dimensions: mobility, self-care, usual activities, pain/discomfort, and anxiety/depression. Each dimension has three response levels: no problems, some problems, and severe problems. This structure defines 243 ($3^5 = 243$) possible health states. An index score ranging from -0.59 to 1 is calculated based on these five dimensions. In the scoring system, 0 represents death and 1 indicates perfect health, while negative values reflect health states considered worse than death (e.g., unconsciousness or being bedridden).

EQ-5D VAS scale: This is a Visual Analogue Scale on which individuals rate their current health status by assigning a value between 0 and 100 and marking it on a thermometer-like scale. The instrument provides a quality of life score ranging from 0 to 100.

The Turkish validity and reliability of the scale were established in 2009 by Kahyaoğlu H. in a master's thesis titled *"Quality of life in patients with acute coronary syndrome: Validity and reliability study of the EQ-5D scale."*

Lifestyle: Patients' lifestyle characteristics were assessed using a 10-item questionnaire that evaluated smoking and alcohol use (presence and amount), general dietary habits and intake of calcium-rich foods, exercise habits, and weekly exposure to sunlight.

Disease and habits: Participants' comorbid conditions, presence of nonalcoholic steatohepatitis (NASH) as determined by ultrasonography (USG), age at menopause and fertility history, treatments used and their duration, medication use, history of surgeries, use of dietary supplements and herbal products, use of traditional methods, and general nutritional knowledge were assessed using a 17-item questionnaire.

Data collection: Anthropometric measurements, including height, weight, and waist circumference, were obtained and recorded. In addition, FBG, lipid profile (HDL, triglycerides), and BMD values were retrieved from the hospital information management system.

RESULTS

A total of 380 participants were included in the study. The mean age was 58.01 ± 11.98 years (range: 20–84), and 87.9% (n=334) were female. Metabolic syndrome (MetS) was identified in 35.3% (n=134) of the participants, while osteoporosis (OP) was detected in 35.8% (n=136). When the associations between MetS and sociodemographic factors were examined, statistically significant relationships were found with age, sex, education level,

and occupation ($p < 0.05$). For OP, a significant association was observed only with place of residence ($p < 0.05$).

According to OP status, significant associations were found between anthropometric characteristics and biochemical parameters, specifically with age, height, weight, and body mass index (BMI). Participants diagnosed with OP had a mean age of 60.49 ± 10.62 years ($p = 0.001$), mean height of 159.49 ± 8.19 cm ($p < 0.05$), mean weight of 68.71 ± 12.01 kg ($p < 0.001$), and mean BMI of 27.04 ± 4.45 kg/m² ($p < 0.001$) (Table 1). No significant association was found between MetS and OP ($p > 0.05$).

Table 1. Evaluation of osteoporosis status in terms of anthropometric characteristics and biochemical parameters

Parameters	OP (-)	OP (+)	p	Z
Age (years)	56,63±12,48	60,49±10,62	0,001	-3,223
Height (cm)	161,3±7,47	159,49±8,19	0,037	-2,081
Weight (kg)	75,01±13,83	68,71±12,01	<0,001	-4,362
Body Mass Index (BMI) (kg/m ²)	28,88±5,28	27,04±4,45	0,001	-3,272
Waist circumference (cm)	96,96±15,29	94,38±14,64	0,073	-1,792
Fasting blood glucose (mg/dL)	104,98±41,70	98,58±30,80	0,636	-0,473
HDL (mg/dL)	52,57±12,22	54,82±13,22	0,18	-1,342
Triglycerides (mg/dL)	147,93±84,55	130,01±62,47	0,065	-1,843
Systolic blood pressure (mmHg)	122,32±16,54	119,82±14,52	0,128	-1,524
Diastolic blood pressure (mmHg)	74,90±12,53	75,09±10,51	0,915	-0,107
Daily calcium intake (mg)	927,26±516,98	892,99±539,90	0,436	-0,778
Mann-Whitney U test p<0.05: level of statistical significance Mean rank: average of ranks				

A statistically significant difference was found between the frequency of MetS and the total score of the General Quality of Life Scale. No significant difference was observed

between MetS and femoral neck BMD or total hip T-score. However, a significant association was identified between MetS and lumbar vertebra T-score ($p=0.037$, $z = -2.086$) (Table 2).

Table 2. Evaluation of the association between metabolic syndrome frequency, total score of the general quality of life scale, and bone mineral density T-scores

Parameters	MetS	n	Mean rank	p	Z
Total Score of the General Quality of Life Scale (EQ-5D Index)	Yok	246	207,28	<0,001	-4,067
	Var	134	159,69		
Femoral Neck T-Score	Yok	246	183	0,071	-1,806
	Var	134	204,28		
Lumbar Spine T-Score	Yok	246	181,83	0,037	-2,086
	Var	134	206,42		
Total Hip T-Score	Yok	246	187,36	0,45	-0,756
	Var	134	196,26		
Mann–Whitney U test p<0.05: level of statistical significance Mean rank: average of ranks					

When examining the distribution of patients across MetS groups according to the presence of NASH and comorbid diseases, a statistically significant difference was found between groups in terms of NASH status ($p=0.039$; $r=4.274$).

DISCUSSION

In our study, participants who underwent BMD measurements were evaluated in terms of sociodemographic characteristics, biochemical parameters, comorbid diseases and their features, and physical activity levels. The associations of these factors with quality of life and MetS were also examined.

In our study, the prevalence of osteoporosis increased in correlation with advancing age, while it was inversely associated with height and BMI. No statistically significant association was found between osteoporosis and menopausal status. In the study conducted by Indhavivadhana et al., the prevalence of osteoporosis was reported to be higher in older women and in those who were postmenopausal (8). This largely reflects

the fact that osteoporosis, characterized by low bone mass and deterioration of bone microarchitecture, increases the risk of fractures. Established risk factors for fractures include age, low body weight, reduced estrogen levels, physical inactivity, diet, and genetic factors (8–10). The lack of a significant association in our study may be attributed to the classification of participants into menopausal, non-menopausal, and perimenopausal groups, as well as the inclusion of male participants, which may have reduced the sample size related to menopausal status.

There are studies demonstrating the effect of MetS on quality of life. In our study, participants without a diagnosis of MetS were found to have higher quality of life scores. According to the study by Han et al., individuals with MetS reported higher levels of pain and discomfort on the EQ-5D scale compared to those without MetS, and this finding is consistent with previous studies (11–15).

The main objective of our study was to evaluate the relationship between BMD, MetS, and quality of life. In our study, lumbar spine T-scores were found to be significantly higher in participants diagnosed with MetS. Although femoral neck T-scores were also higher in the MetS group, this difference was not statistically significant. When reviewing the literature, Park et al. reported that patients with MetS had significantly higher BMD values, particularly at the femoral neck and lumbar spine. They also found no significant association between BMD parameters and physical activity. In the Third National Health and Nutrition Examination Survey, Kinjo et al. demonstrated higher lumbar BMD measurements in women with MetS (16,17). Similarly, studies conducted by Kinjo et al., Mühlen et al., and Ahmed et al. reported a positive effect of MetS on BMD values (16,18,19). In contrast, Hwang et al. found lower BMD measurements in patients with MetS (20). In a meta-analysis by Zhou et al., the relationship between MetS, its components, and osteoporosis was reported to be inconsistent (21). It was suggested that MetS had a negative effect on BMD in men, whereas no such effect was observed in women. Another meta-analysis by Xue et al. indicated that MetS may have a positive effect

on BMD in the white population (22). However, Tseng et al. reported no association between MetS and bone mineral density loss (23).

In our study, participants diagnosed with osteoporosis had lower quality of life scores; however, this difference was not statistically significant. In the study conducted by Ferrera et al., postmenopausal women with osteoporosis were found to have lower quality of life scores (24). This discrepancy may be explained by the use of a non-osteoporosis-specific quality of life scale, the high prevalence of comorbid conditions unrelated to osteoporosis among participants, and the relatively small sample size.

LIMITATIONS

Our study had a cross-sectional design, which limited our ability to determine the effect of BMD on metabolic syndrome and to establish causal relationships.

CONCLUSION

As demonstrated in our study and in similar studies, individuals diagnosed with MetS were found to have higher bone mineral density measurements compared to those without MetS. Similarly, participants with higher body mass index were observed to have higher bone mineral density. Based on these findings, higher body weight may have a protective effect against osteoporosis. Considering that muscle loss increases with advancing age, increasing physical activity may reduce both muscle and bone loss, thereby providing a protective effect against sarcopenia and osteoporosis.

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Hematological Parameters and Procalcitonin in Early Detection of Late-Onset Neonatal Sepsis in Moderate Preterm Infants

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Abstract

Introduction and Objective: Late-onset neonatal sepsis (LOS) in preterm infants is a major cause of mortality and morbidity in low- and middle-income countries. Non-specific symptoms make timely diagnosis difficult, and there is no specific biomarker available in current diagnostic methods. Hematological parameters can serve as a biomarker for early diagnosis, are crucial for prompt treatment, and improve prognosis. They can be easily assessed even in routine blood tests, requiring no additional staff or costs. Our aim is to evaluate the importance of haematological parameters in LOS in moderate preterm infants.

Materials and Methods: The study included moderately preterm newborns (n=64) diagnosed with late-onset neonatal sepsis and a healthy control group (n=64). White blood cell count, immature granulocytes (%) (IG), neutrophil-to-lymphocyte ratio (N/LR), platelet count, mean platelet volume (MPV), platelet count, MPV/platelet ratio, and procalcitonin (PCT) were analysed at the time of sepsis diagnosis. For comparisons between the two groups regarding continuous variables that did not follow a normal distribution, the Mann-Whitney U test was applied. Relationships between categorical variables were assessed using the chi-square test.

Oral Presentation - OP385

Results: During the diagnosis of sepsis in moderately preterm newborns, the patient group showed a significant increase in IG (%) ($p<0.001$), PCT ($p<0.001$), and N/LR ($P=0.017$), which were statistically significant. No statistically significant difference was found in other hematological indices.

Conclusion: PCT remains the most effective biomarker in LOS. The N/L ratio and IG show promise in demonstrating early inflammation.

Keywords: Late-Onset Sepsis, Newborn, Hematological Indices

Introduction

Serious infections that develop 72 hours after birth are referred to as late-onset neonatal sepsis (1). Neonatal sepsis remains a significant cause of morbidity and mortality, particularly in developing countries. Globally, it is estimated that 2,202 out of every 100,000 live births develop sepsis, with a mortality rate of 11–19% (2). The diagnosis of sepsis in the middle preterm period is made through the combined evaluation of clinical and laboratory findings and is frequently confused with non-sepsis-related causes. Despite ongoing research, reliable, specific laboratory biomarkers that facilitate early diagnosis are lacking. In addition to blood, urine, and cerebrospinal fluid cultures—which are the gold standard for diagnosis before initiating antibiotic therapy—the inclusion of hematological indices and inflammation biomarkers may improve diagnostic accuracy. Given that blood culture results typically take 2–5 days to become available, there is a need for biomarkers that can provide faster results to improve diagnostic efficiency. Laboratory biomarkers commonly used for late-onset neonatal sepsis (LOS) diagnosis demonstrate inconsistent performance in distinguishing infected infants from uninfected ones (3). This study evaluated the effectiveness of hematological indices as a new biomarker in moderately preterm newborns.

Materials and Methods

The study was conducted at the Neonatal Intensive Care Unit of Mersin University Faculty of Medicine between January 1, 2017, and January 1, 2021. The medical records of patients diagnosed with late-onset neonatal sepsis during this period were retrospectively reviewed. Infants with any major congenital malformations, severe congenital heart disease, inborn metabolic disorders, infants of substance-dependent mothers, a history of early-onset sepsis, or incomplete laboratory data were excluded from the study. Infants diagnosed with late neonatal sepsis who met the inclusion criteria and were born at the moderately preterm gestational age (32–37 weeks) were included in the study and constituted our LOS cohort. If an infant had multiple episodes of LOS, only the first episode was included. The control group included infants with neonatal indirect hyperbilirubinemia resolved by phototherapy alone (not due to hemolytic causes), neonatal transient tachypnea resolved within the first 24 hours, infants who did not experience a sepsis episode, and those admitted for non-infectious causes. Exclusion criteria for the control group were defined as perinatal asphyxia, meconium aspiration, polycythemia, intraventricular hemorrhage, pneumothorax, hemolysis including Rh and ABO isoimmunization, and incomplete laboratory data. The study was divided into two groups: patients (n=64) and controls (n=64). A matched control group (1:1 ratio) was selected after adjusting for prematurity and corrected gestational age. The infants were categorized as mid-to-late preterm (less than 37 weeks).

Demographic datas (gestational age, birth weight, mode of delivery, sex, APGAR scores (at 1st and 5th minutes), age in days at the time of diagnosis of LOS, duration of antibiotic therapy, length of hospital stay, and final outcome (deceased, recovered), laboratory datas (white blood cell count at the time of sepsis diagnosis, neutrophil-to-lymphocyte ratio (N/L R), percentage of immature granulocytes (IG), platelet count, mean platelet volume (MPV), plateletcrit, and PCT) were recorded.

Statistical Analysis

All data are expressed as mean and standard deviation (SD), median and interquartile range, or frequency and percentage. Categorical variables were compared using the chi-square test or Fisher's exact test, as appropriate. Ordinal variables were compared using the Mann-Whitney test, and continuous variables were analyzed using Student's t-test. Findings were considered statistically significant at $p < 0.05$.

Results : From a demographic perspective, gestational age, mode of delivery, sex and age at onset of sepsis were found to be similar between the patient and control groups (Table 1). Upon examination of APGAR scores, both the 1st minute and 5th minute scores were found to be significantly lower in the patient group compared with the control group ($p=0.028$ and $p=0.018$) Whilst maternal infection was higher in the patient group ($p=0.033$), the use of antenatal steroids was found to be statistically significantly higher in the control group ($p<0.001$). When assessed in terms of clinical course, the length of hospital stay was significantly longer in the patient group ($p<0.001$) and mortality was observed only in the patient group ($p=0.023$).

Table 1. Demographic data

	Late preterm n (%) median (IQR)	Late preterm control n (%) median (IQR)	p
Gestational age	35 (3,65)	34,15 (3,13)	0,157
Mode of delivery			
Cesarean section	55 (85,9%)	54 (84,4%)	1,000
Normal vaginal delivery	9 (14,1%)	10 (15,6%)	
Birth weight (g)	2415 (885)	2293 (658)	0,481
Sex			
Female	28 (43,8%)	31 (48,4%)	0,723
Male	36 (56,3%)	33 (51,6%)	
APGAR at 1st minute	7 (1,75)	7 (2)	0,028
APGAR at 5th minute	8 (2)	9 (1)	0,018
Age at onset of sepsis	9 (8)	9 (7)	0,650
Maternal infection			
None	52 (81,3%)	60 (93,8%)	0,033
Present	12 (18,8%)	4 (6,2%)	

Duration of antibiotic therapy	14 (11)	0 (0)	<0,001
Length of hospital stay	31 (29,5)	16 (8,75)	<0,001
Antenatal steroids			
Full course	16 (25%)	50 (78,1%)	<0,001
One course	15 (23,4%)	-	
None	33 (51,6%)	14 (21,9%)	
Current status			
Discharged	59 (92,2%)	64 (100%)	0,023
Mortality	5 (7,8%)	-	

When laboratory findings were compared at the time of sepsis diagnosis in moderately preterm newborns, the white blood cell count was found to be similar between the patient and control groups ($p=0.336$). There were no differences between the groups in platelet count, MPV, MPV/platelet, or plateletcrit values (Table 2). The N/L R was found to be significantly higher in the patient group ($p=0.017$). IG and PCT were markedly elevated in the patient group and were found to be statistically significantly higher ($p<0.001$).

Table 2. Diagnostic efficacy of hematological indices in late-onset neonatal sepsis

	Preterm (patient) mean $\pm$ SD	Preterm (control) mean $\pm$ SD	p
White blood cells (mm^3)	10395 (± 8695)	11515 (± 4170)	0,336
Neutrophils/lymphocytes ratio (N/L R)	1.86 ($\pm 2,26$)	1.21 (± 1.95)	0.017
Immature granulocytes (%)	1.6 ($\pm 2,9$)	0.8 (± 1)	<0.001
Platelets (mm^3)	2215 (± 1758)	2470 (± 1070)	0.128
MPV (mean platelet volume)	10.48 (± 1.40)	10.50 (± 1.85)	0.687
MPV/platelet	0.05 (± 0.05)	0.04 (± 0.02)	0.063
Platecrit	0.28 ($\pm 0,15$)	0.25 ($\pm 0,13$)	0.510
Procalcitonin (PCT)	3.6 ($\pm 10,3$)	0.82 (± 1)	<0.001

Discussion

The diagnosis of neonatal sepsis presents particular challenges due to nonspecific clinical signs and the inability of newborns to communicate their symptoms (4). Early diagnosis of neonatal sepsis relies primarily on clinical evaluation. According to the literature, changes in white blood cell count, mean corpuscular volume (MCV), and platelet count

serve as early paramaters and can therefore be used as diagnostic tools for the early diagnosis of neonatal sepsis; they also facilitate better diagnosis of sepsis, enabling appropriate management and antibiotic therapy (5). Delayed or late diagnosis can lead to septic shock, multiple organ failure, and death. Therefore, there is a need for rapid and accurate diagnostic methods to identify newborns at risk for moderate preterm LOS. This study is a retrospective cross-sectional analysis aimed at examining hematological markers in moderate preterm LOS. The objective is to provide diagnostic information regarding moderate preterm LOS. The adequacy of hematological laboratory parameters in neonatal sepsis varies. Meta-analysis data indicate that in cases where maternal infection/inflammation triggers preterm birth, infants have a higher likelihood of developing sepsis not only immediately after birth but also during the first weeks of life (6, 7). Comprehensive meta-analyses have reported that antenatal steroid administration does not increase the risk of neonatal infection; on the contrary, it may indirectly reduce the risk of infection by decreasing respiratory morbidity and, consequently, invasive procedures (8). Consistent with the literature, this study demonstrated that the development of LOS in late preterm infants is associated with low APGAR scores and maternal infection. The higher incidence of antenatal steroid use in the control group supports the protective effect of steroids, as noted in the literature. Furthermore, as is well known, the development of sepsis increases hospital length of stay and mortality. The fact that the groups were demographically similar suggests that the observed differences are attributable to clinical and perinatal factors.

The significant elevation of PCT in the diagnosis of sepsis in moderately preterm infants supports the strong role of these markers in early diagnosis. In a meta-analysis evaluating the diagnostic potential of PCT for neonatal sepsis, diagnostic accuracy was found to be higher in infants with LOS compared to those with early-onset neonatal sepsis (9). It has been noted that the neutrophil-lymphocyte ratio is similar between preterm infants with and without LOS, and that LOS is a weak predictor (10). It has been suggested that this inconsistency may stem from rapid inflammatory changes occurring in response to infection (11). Güney et al. demonstrated that N/L R values increase during an episode of

LOS in preterm infants (12). Immature granulocytes have been examined as a predictor of neonatal sepsis and a potential surrogate for the immature-to-total neutrophil ratio (13). However, since a left shift may be present at birth, it is difficult to determine what constitutes an abnormality for IG% in the absence of a well-defined normal absolute IG count. Although our study suggested that a significant increase in the N/L R and IG% may indicate an early inflammatory response, it was concluded that prospective studies with larger sample sizes are needed in this regard.

A meta-analysis evaluating MPV in neonatal sepsis suggested that it could serve as a useful marker for sepsis and provide promising accuracy for disease detection; however, it emphasized the need for large-scale prospective studies due to heterogeneity among the studies (14). In our study, the lack of significant differences in white blood cell count, platelet count, and platelet indices suggests that diagnostic efficacy is insufficient in the early stages of moderate-to-late preterm sepsis and that platelet activation has not yet become evident.

Limitations

The retrospective design and potential confounding factors (such as details regarding the timing of antenatal steroid administration and the inability to systematically assess invasive procedures) may have influenced the results. The single-center nature of the study limits the generalizability of the findings.

A strength of our study is that homogeneity was ensured by attempting to match patient and control groups one-to-one while evaluating perinatal factors.

Conclusion

In moderate preterm LOS, PCT retains its status as the most effective biomarker. The N/L R and IG% show promise in indicating early inflammation. In contrast, the diagnostic power of white blood cell and platelet indices is limited. The combination of biomarkers for early and accurate diagnosis in moderate preterm LOS should be investigated in multicenter prospective studies.

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Clinical Characteristics of Children with Congenital Solitary Kidney and the Importance of Follow-up

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ABSTRACT:

Congenital solitary kidney is one of the urinary system anomalies resulting from the congenital absence of one kidney (renal agenesis) or multicystic dysplastic kidney (MKDB). The aim of this study was to evaluate the clinical and laboratory characteristics of pediatric patients diagnosed with congenital solitary kidney and followed up at a tertiary centre. This retrospective study included 59 pediatric patients diagnosed with congenital solitary kidney, identified by ultrasound and confirmed by DMSA scintigraphy, who were followed up at the pediatric nephrology outpatient clinic. Of the 59 patients included in the study, 32 (54.2%) were male and 27 (45.8%) were female. The mean age of the patients was 2.80 ± 3.96 years. 89.8% of the patients were asymptomatic, and the diagnosis was incidentally made during ultrasound examinations performed for other reasons. In the DMSA scintigraphy performed, the non-functioning kidney was the left kidney in 37 patients (62.7%) and the right kidney in 22 patients (37.3%). A history of intrauterine abnormalities was present in 18 patients (30.5%), and a family history in 6 patients (10.1%). Recurrent urinary tract infections were observed in three patients (5%), and voiding dysfunction in four patients (6.7%). Hypertension was present in only one patient, whilst haematuria and proteinuria were not detected in any patient. As most

Oral Presentation - OP386

children with congenital solitary kidney are asymptomatic, regular follow-up is often carried out in primary care. Regular blood pressure measurement, urine analysis for proteinuria screening, and monitoring of growth and development contribute to the early detection of potential renal complications.

Introduction

Congenital solitary kidney is one of the urinary system anomalies resulting from the congenital absence of one kidney (renal agenesis) or multicystic dysplastic kidney (MKDB). It occurs in approximately one in 2,000 live births (1). With the widespread use of prenatal ultrasound, congenital kidney anomalies can now be diagnosed at an earlier stage. In individuals with a solitary kidney, compensatory hypertrophy and hyperfiltration develop in the remaining kidney due to a reduction in the total number of nephrons. Although this mechanism helps preserve renal function in the early stages, it may increase the risk of developing hypertension, proteinuria and chronic kidney disease in the long term.

The aim of this study was to evaluate the clinical and laboratory characteristics of pediatric patients diagnosed with congenital solitary kidney and followed up at a tertiary centre, and to highlight the role of general practice in the management of these patients.

Methods

This retrospective study included 59 pediatric patients diagnosed with congenital solitary kidney, identified by ultrasound and confirmed by DMSA scintigraphy, who were followed up at the pediatric nephrology outpatient clinic. The patients' demographic characteristics, clinical findings, laboratory parameters and radiological findings were obtained from patient records and electronic health records.

Serum creatinine, urea, electrolyte and haemoglobin levels were assessed as laboratory parameters. Urinalyses were performed to investigate the presence of haematuria and proteinuria. The duration of follow-up and any clinical findings that developed during the follow-up period were also recorded.

Statistical analyses were performed using IBM SPSS Statistics for Windows, version 25.0 (IBM Corp., Armonk, NY, USA). Descriptive data were expressed as mean $\pm$ standard deviation or count (percentage).

Results

Of the 59 patients included in the study, 32 (54.2%) were male and 27 (45.8%) were female. The mean age of the patients was 2.80 ± 3.96 years. 89.8% of the patients were asymptomatic, and the diagnosis was made incidentally during ultrasound examinations performed for other reasons. Among patients with symptoms, four had enuresis and two had abdominal pain. In the DMSA scintigraphy performed, the non-functioning kidney was the left kidney in 37 patients (62.7%) and the right kidney in 22 patients (37.3%). A history of intrauterine abnormalities was present in 18 patients (30.5%), and a family history in 6 patients (10.1%). Recurrent urinary tract infections were observed in three patients (5%), and voiding dysfunction in four patients (6.7%). Hypertension was present in only one patient, whilst haematuria and proteinuria were not detected in any patient. Associated anomalies (congenital heart disease, Turner syndrome, epilepsy, vesicoureteral reflux, nephrolithiasis, inguinal hernia, ureterocele, spina bifida) were observed in a total of 21 patients (35%). In laboratory assessments, the mean haemoglobin (Hb) level was 12.16 ± 1.57 g/dL. The mean urea level was 19.16 ± 8.43 mg/dL, and the creatinine level was 0.27 ± 0.11 mg/dL, both within the normal range. Serum electrolyte levels were within normal limits: sodium (Na) 138.79 ± 2.78 mmol/L, potassium 4.75 ± 0.52 mmol/L, calcium 10.11 ± 0.60 mg/dL, magnesium 2.22 ± 0.30 mg/dL, and phosphorus 5.50 ± 0.82 mg/dL, all within normal limits. 88.1% of all patients had renal agenesis. Seven of the patients had MKDB.

A VCUG was performed on 22 (37.2%) patients with a preliminary diagnosis of vesicoureteral reflux. VUR was detected in five (8.4%) patients. Surgical intervention was performed on four of these patients. The mean follow-up period was 56.67 ± 39.73 months, and no patient developed renal failure or proteinuria during follow-up.

Discussion

The mean age at diagnosis in the cohort of 59 patients evaluated in our study was approximately 2.80 ± 3.96 years, indicating that a significant proportion of cases were identified during early childhood. Similarly, the literature reports that the majority of children with congenital solitary kidneys are asymptomatic and that the diagnosis is frequently made incidentally (2).

In the presence of a solitary kidney, compensatory hypertrophy and hyperfiltration develop in the remaining kidney. According to Brenner's hyperfiltration hypothesis, a reduction in the number of nephrons leads to an increase in intraglomerular pressure in the remaining nephrons, and this situation paves the way for the development of glomerular damage, proteinuria and chronic kidney disease over time (3). For this reason, long-term follow-up of individuals with congenital solitary kidneys is recommended.

In our study, serum creatinine levels were found to be within normal limits at the initial assessment in the vast majority of patients. This finding is consistent with the information reported in the literature that renal function is generally preserved in the early stages. A large cohort study conducted by Westland and colleagues also reported that renal function was normal in a significant proportion of children with a solitary kidney during early childhood (2).

However, long-term follow-up studies have shown that the risk of developing hypertension and proteinuria may be increased in individuals with a solitary kidney. A study by Argueso et al. reported that hypertension was detected in 47% of patients with unilateral renal agenesis, proteinuria in 19%, and impaired GFR in 13% (4). Similarly, in a long-term follow-up study by Corbani et al., a decrease in glomerular filtration rate and the development of proteinuria were observed in some patients as they aged (5).

The absence of proteinuria and haematuria in our patients may be attributed to the fact that the patient cohort was predominantly assessed at an early age. The literature also

reports that renal damage generally becomes more pronounced during adolescence and adulthood (2). These findings are consistent with the results of our study.

This study has certain limitations. Firstly, due to its retrospective design, it may be subject to selection bias. Secondly, the study is single-centre and has a limited number of patients, which may restrict the generalisability of the results. Furthermore, the follow-up period may not be sufficient to identify long-term complications such as proteinuria or chronic kidney disease. Therefore, there is a need for prospective studies with larger sample sizes and longer follow-up periods.

As most children with a congenital solitary kidney are asymptomatic, regular monitoring is often carried out in primary care. From this perspective, coordination between general practice and pediatric nephrology is of great importance in the follow-up of these children. Regular blood pressure measurements, urine analysis with screening for proteinuria, and monitoring of growth and development can contribute to the early detection of potential renal complications.

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The Relationship Between Late-Night Sleeping Habits and Daily Water Intake and Anthropometric Measurements in Patients Presenting to the Obesity Clinic

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Abstract

Introduction: Obesity is a significant public health issue with a multifactorial etiology and an increasingly rising prevalence. It has been reported that the habit of going to bed late may disrupt the circadian rhythm and lead to metabolic dysfunction, while insufficient and irregular sleep is associated with obesity. Additionally, it has been suggested that adequate water intake may influence weight control through mechanisms related to energy intake and satiety. The aim of this study was to evaluate the relationship between bedtime and daily water intake and anthropometric measurements in patients visiting an obesity clinic.

Methods: This study was conducted as a retrospective analysis of data obtained from the hospital information management system for patients who presented to the Obesity Clinic at Tokat Gaziosmanpaşa University Faculty of Medicine Hospital between January 1, 2024, and March 25, 2026. The sample size was calculated using the G*Power 3.1.9.6 program with 80% power, a 5% significance level, and an effect

Oral Presentation - OP387

size of 0.30, determining that the minimum required sample size for the study was 111. Taking potential missing data into account, a total of 129 patients who met the criterion of being 18 years of age or older were included in the study using consecutive sampling. Bedtime was classified as early (<23:00), moderate (23:00–01:00), and late (>01:00). Daily water intake was categorized as insufficient (<1500 mL), intermediate (1500–2500 mL), and adequate (>2500 mL). Data analysis included descriptive statistics (mean $\pm$ standard deviation, frequency, and percentage), independent samples t-test, one-way analysis of variance (ANOVA), chi-square test, and Pearson correlation analysis; statistical significance was set at $p < 0.05$.

Results: Of the 129 patients included in the study, 82.2% were women; the mean age was 45.41 ± 13.82 years, and the mean BMI was 35.91 ± 5.24 kg/m². In the analysis based on bedtime, no statistically significant differences were found in anthropometric measurements among the early, middle, and late sleepers ($p > 0.05$). In the comparison based on daily water intake, significant differences were identified in the variables of age ($p = 0.037$), height ($p = 0.022$), weight ($p = 0.010$), and waist circumference ($p = 0.016$). In the group with adequate water intake, the mean age was lower, while height, weight, and waist circumference values were higher. No significant differences were found between the groups in terms of BMI and hip circumference ($p > 0.05$). In the correlation analysis, a strong positive correlation was found between BMI and waist circumference ($r = 0.732$, $p < 0.001$) and between BMI and hip circumference ($r = 0.870$, $p < 0.001$); this indicates that waist and hip circumference are closely related to BMI.

Conclusion: This study demonstrated that bedtime had no significant effect on anthropometric measurements, whereas daily water intake was associated with certain anthropometric parameters. The finding that adequate water intake was associated with higher body weight and waist circumference is consistent with the results of a 2024 cross-sectional study by Khil and colleagues, a finding that may be explained by the increased fluid requirements associated with higher body mass. The findings emphasize the importance of a comprehensive assessment of lifestyle factors in obesity management and

support the need to address hydration habits alongside diet and physical activity. Prospective studies with larger sample sizes are needed to validate these results.

Keywords: Obesity, Bedtime, Water Intake, Anthropometric Measurements, Body Mass Index

Introduction

Obesity has become one of the most significant public health issues worldwide and is associated with rising rates of disease and mortality. According to the World Health Organization, the global prevalence of obesity has nearly tripled since 1975, affecting more than 650 million adults worldwide [1]. Obesity is a multifactorial condition influenced by genetic, metabolic, environmental, and behavioral factors and is strongly associated with chronic diseases such as type 2 diabetes, cardiovascular diseases, hypertension, and certain types of cancer [2,3].

In recent years, lifestyle behaviors such as sleep patterns, dietary habits, and hydration status have garnered significant attention as modifiable risk factors contributing to the development of obesity [4]. Among these factors, sleep plays a critical role in metabolic regulation and energy balance. Previous studies have shown that insufficient or irregular sleep can disrupt hormonal pathways involved in appetite regulation—including the secretion of leptin and ghrelin—which may ultimately lead to increased calorie intake and weight gain [5,6]. Experimental studies have shown that sleep restriction is associated with increased hunger, altered glucose metabolism, and impaired insulin sensitivity [7].

In addition to sleep habits, fluid intake has been identified as a key factor influencing body weight regulation. Adequate water intake can contribute to weight management through various mechanisms, such as increased feelings of fullness, enhanced thermogenesis, and reduced energy intake [8]. Some studies suggest that replacing calorie-containing beverages with water can significantly reduce daily total energy intake and support

weight loss efforts [9]. However, the relationship between water consumption and anthropometric indicators remains inconsistent across studies, and further research is needed to clarify these relationships [10].

Another important consideration in obesity research is the distribution of body fat, particularly central adiposity. Anthropometric indicators such as body mass index (BMI), waist circumference, and hip circumference are widely used to assess health risks associated with obesity [11]. Among these measurements, waist circumference is considered a strong predictor of cardiometabolic risk because it reflects visceral fat accumulation [12].

Although the literature examining lifestyle factors associated with obesity is growing, there are relatively few studies that simultaneously address the relationship between sleep times, daily water intake, and anthropometric measurements in patients visiting obesity clinics. Understanding these relationships could provide valuable insights for developing more effective lifestyle interventions for obesity management.

Therefore, the aim of this study is to evaluate the relationship between sleep time, daily water intake, and anthropometric measurements among patients presenting to an obesity clinic. We hypothesized that later sleep times and inadequate daily water intake would be associated with higher BMI, waist circumference, and hip circumference.

Material and Methods

This retrospective cross-sectional study was conducted at the Obesity Clinic of the Faculty of Medicine Hospital at Gaziosmanpaşa University in Tokat, Turkey, between January 2024 and March 25, 2026. The study aimed to investigate the relationship between bedtime, daily water intake, and anthropometric measurements in adult patients seeking treatment for obesity.

The sample size was calculated using the G*Power 3.1.9.6 program with 80% power, a 5% significance level, and an effect size of 0.30, determining that the minimum required sample size for the study was 111. Taking potential missing data into account, a total of 129 patients who met the criterion of being 18 years of age or older were included in the study using consecutive sampling. Patients under the age of 18 were excluded from the study. Of the participants included in the study, 82.2% were female (n=106) and 17.8% were male (n=23).

Measurements of participants' height, weight, body mass index (BMI), waist circumference, and hip circumference were obtained from outpatient clinic records using standard methods. Body weight was measured using a calibrated digital scale while participants were wearing light clothing and were barefoot. Height was measured using a stadiometer while participants stood upright with their heels together and their heads aligned with the Frankfort horizontal plane. BMI was calculated by dividing body weight in kilograms by the square of height in meters. Waist circumference was measured at the midpoint between the lower edge of the ribcage and the iliac crest using a non-elastic measuring tape, while hip circumference was measured at the widest part of the hips. All anthropometric measurements were recorded with a precision of 0.1 units.

Information regarding bedtime and daily water intake was obtained from patient records in the hospital information management system based on the patients' self-reports. Participants were divided into three groups based on their reported usual bedtime: early sleepers (before 23:00), intermediate sleepers (between 23:00 and 01:00), and late sleepers (after 01:00). Daily water intake was assessed based on self-reported average consumption and categorized into three groups: insufficient intake (<1500 mL/day), moderate intake (1500–2500 mL/day), and sufficient intake (>2500 mL/day). These classifications were used to evaluate potential associations between lifestyle behaviors and anthropometric indicators.

Statistical analyses were performed using IBM SPSS Statistics for Windows, version 26.0 (IBM Corp., Armonk, NY, USA). Descriptive statistics were calculated; continuous variables were expressed as mean $\pm$ standard deviation, and categorical variables as frequency and percentage. Differences between groups were analyzed using the independent samples t-test for two-group comparisons and one-way analysis of variance (ANOVA) for three or more groups. Chi-square tests were used for categorical variables. Pearson correlation analysis was performed to evaluate the relationships between anthropometric measurements such as BMI, waist circumference, and hip circumference. A p-value less than 0.05 was considered statistically significant.

Results

A total of 129 patients who presented to the obesity clinic were included in the study. Of the participants, 82.2% (n=106) were women and 17.8% (n=23) were men. The distribution of participants by sleep duration and daily water intake is presented.

Comparison of Anthropometric Measurements According to Daily Water Intake

Daily water intake categories were analyzed using one-way ANOVA (insufficient: <1500 mL/day, moderate: 1500–2500 mL/day, sufficient: >2500 mL/day). As shown in Table 1, statistically significant differences were observed in terms of age, height, weight, and waist circumference ($p < 0.05$). Participants who reported higher daily water intake were generally younger and had higher values for height, weight, and waist circumference. Post-hoc comparisons revealed that the sufficient intake group differed significantly from the insufficient and moderate intake groups in terms of these variables. No significant difference was observed in terms of BMI ($p = 0.679$) or hip circumference ($p = 0.329$). This observed trend may reflect an increased hydration need in individuals with higher body mass.

Table 1. Comparison of anthropometric measurements according to daily water intake

Variable	Daily Water Intake			p-Value*
	Insufficient (< 1500 mL/day)	Moderate (1500-2500 mL/day)	Sufficient (>2500 mL/day)	
	Mean ± SD	Mean ± SD	Mean ± SD	
Age (Years)	48,22±11,75 (a)	44,5±14,58 (ab)	35,5±15,25 (b)	0,037
Height (cm)	160,76±8,7 (a)	161,57±8,96 (a)	170,5±13,54 (b)	0,022
Weight (kg)	92,36±14,68 (a)	93,35±14,09 (a)	110,26±27,94 (b)	0,010
BMI (kg/m ²)	35,79±5,47	35,82±5,06	37,5±5,8	0,679
Waist Circumference(cm)	107,33±10,63 (a)	107,3±11,95 (a)	119,75±14,65 (b)	0,016
Hip Circumference(cm)	119,8±10,94	122,11±10,01	124,63±12,39	0,329

*A one-way ANOVA analysis was performed. Different letters (a, b) in the same row indicate statistically significant differences between groups ($p < 0.05$). Statistically significant p-values (<0.05) are shown in bold.

Correlation Analysis

Pearson correlation analysis was performed to examine the relationships between key anthropometric indicators. As presented in Table 2, statistically significant positive correlations were found between many variables.

Age showed a negative correlation with height ($r = -0.427$, $p < 0.001$) and weight ($r = -0.218$, $p = 0.013$), indicating that older participants tended to be shorter and weigh less. Height was positively correlated with weight ($r = 0.510$, $p < 0.001$) and waist circumference ($r = 0.180$, $p = 0.041$), and negatively correlated with BMI ($r = -0.211$, $p = 0.016$).

Strong positive correlations were observed between body weight and BMI ($r = 0.725$, $p < 0.001$), waist circumference ($r = 0.769$, $p < 0.001$), and hip circumference ($r = 0.746$, $p < 0.001$). The analysis revealed very strong positive correlations between BMI and waist circumference ($r = 0.732$, $p < 0.001$) and between BMI and hip circumference ($r = 0.870$, $p < 0.001$). Waist circumference was also strongly correlated with hip circumference ($r = 0.645$, $p < 0.001$). These results indicate that increases in BMI are closely associated with increases in both central and peripheral adiposity indicators.

Table 2. Pearson correlation matrix of continuous variables

		Age(Years)	Height(cm)	Weight(kg)	BMI(kg/m ²)	Waist Circumference(cm)	Hip Circumference(cm)
Age(Years)	r	1	-0,427*	-0,218*	0,088	0,163	-0,049
	p		<0,001	0,013	0,319	0,064	0,579
Height(cm)	r	-0,427*	1	0,510*	-0,211*	0,180*	-0,022
	p	<0,001		<0,001	0,016	0,041	0,808
Weight(kg)	r	-0,218*	0,510*	1	0,725*	0,769*	0,746*
	p	0,013	<0,001		<0,001	<0,001	<0,001
BMI(kg/m ²)	r	0,088	-0,211*	0,725*	1	0,732*	0,870*
	p	0,319	0,016	<0,001		<0,001	<0,001
Waist Circumference(cm)	r	0,163	0,180*	0,769*	0,732*	1	0,645*
	p	0,064	0,041	<0,001	<0,001		<0,001
Hip Circumference(cm)	r	-0,049	-0,022	0,746*	0,870*	0,645*	1
	p	0,579	0,808	<0,001	<0,001	<0,001	

*: p < 0.05. Pearson correlation coefficient was used.

Summary of Results

In summary, the study population consisted predominantly of female participants (82.2%) with obesity (mean BMI: 35.91 ± 5.24 kg/m²) and elevated central adiposity (mean waist circumference: 108.09 ± 11.91 cm). While sleep timing did not show any statistically significant association with anthropometric measurements, daily water intake was significantly associated with age, height, weight, and waist circumference, with participants consuming higher amounts of water being younger and having greater body dimensions. No significant associations were found between categorical variables. Strong positive correlations between BMI and both waist and hip circumference highlight the close relationship between overall adiposity and body fat distribution.

Discussion

The present study investigated the relationship between sleep timing, daily water intake, and anthropometric measurements among individuals attending an obesity outpatient

clinic. The findings of this study revealed three main outcomes. First, most of the study population consisted of individuals classified as obese according to body mass index values. Second, sleep timing was not significantly associated with anthropometric measurements such as BMI, waist circumference, or hip circumference. Third, daily water intake demonstrated statistically significant associations with age, body weight, and waist circumference. In addition, strong positive correlations were observed between BMI and other anthropometric indicators, particularly waist circumference and hip circumference.

Obesity is a complex and multifactorial condition influenced by behavioral, environmental, and biological factors. According to the World Health Organization, the global prevalence of obesity has increased dramatically in recent decades, representing one of the most important public health challenges worldwide [13]. Numerous studies have demonstrated that obesity is strongly associated with an increased risk of chronic diseases including cardiovascular disease, type 2 diabetes, hypertension, and certain cancers [14-16]. Therefore, identifying lifestyle factors that contribute to obesity is crucial for developing effective prevention and management strategies.

One of the lifestyle factors frequently investigated in obesity research is sleep behavior. Sleep plays an essential role in metabolic regulation, hormonal balance, and energy homeostasis. Previous research has demonstrated that sleep restriction may alter the secretion of appetite-regulating hormones such as leptin and ghrelin, which may lead to increased hunger and energy intake [17,18]. Experimental studies have also reported that inadequate sleep can impair glucose metabolism and reduce insulin sensitivity [19]. Despite these findings, the relationship between sleep timing and obesity-related anthropometric indicators remains less clear.

In the present study, no statistically significant association was observed between sleep timing and anthropometric measurements. Although individuals who reported later sleep times tended to have slightly higher BMI and waist circumference values, these differences were not statistically significant. Similar findings have been reported in

several previous studies suggesting that sleep duration may play a more important role than sleep timing in obesity risk [20]. For example, a large epidemiological study conducted by Knutson and colleagues reported that short sleep duration rather than bedtime itself was associated with increased obesity prevalence [21]. Likewise, research by Spiegel and Taheri demonstrated that sleep deprivation affects metabolic hormones and appetite regulation, but the timing of sleep may not independently influence body weight outcomes [18,22].

Another important lifestyle factor examined in the present study was daily water intake. Hydration status has been increasingly recognized as a potential determinant of metabolic health and weight management. Adequate water intake may influence energy balance through mechanisms such as increased satiety, reduced caloric intake, and enhanced thermogenesis [23]. Several intervention studies have suggested that increasing water consumption may support weight loss, particularly when water replaces sugar-sweetened beverages [24].

In the current study, participants who reported higher daily water intake demonstrated significantly higher body weight and waist circumference values. This finding is consistent with a recent cross-sectional study by Khil and colleagues (2024), which reported that higher water intake was associated with higher body weight and waist circumference [25]. One possible explanation for this finding is that individuals with higher body mass may naturally require greater fluid intake due to increased metabolic demand and body surface area. Previous research has suggested that water intake often increases proportionally with body size and total energy expenditure [26]. Therefore, the observed association between higher water consumption and higher anthropometric measurements may reflect physiological fluid requirements rather than a causal relationship between water intake and obesity. Clinically, this finding suggests that higher water intake should not be interpreted as a risk factor for obesity; rather, it may indicate increased hydration needs among individuals with higher body mass.

Furthermore, the strong positive correlations observed between BMI, waist circumference, and hip circumference in this study are consistent with existing literature. Waist circumference is widely recognized as an important indicator of central adiposity and cardiometabolic risk [27]. Several studies have shown that abdominal fat accumulation is more strongly associated with metabolic disorders than overall body weight alone [28]. Research conducted by Klein and colleagues emphasized that visceral adiposity plays a critical role in the development of insulin resistance and cardiovascular disease [29]. Therefore, the strong correlation observed between BMI and waist circumference in the present study further supports the importance of evaluating central obesity indicators in clinical practice.

The findings of this study contribute to the growing body of literature examining lifestyle factors associated with obesity. While sleep timing alone did not show a significant relationship with anthropometric outcomes, hydration habits demonstrated measurable associations with certain anthropometric indicators. These results suggest that lifestyle behaviors should be evaluated comprehensively when addressing obesity management in clinical settings. Specifically, clinicians should consider both sleep patterns and hydration status, rather than focusing on weight and diet alone, when assessing patients seeking obesity treatment.

Despite these contributions, several limitations should be considered when interpreting the findings of this study. First, the retrospective design limits the ability to establish causal relationships between lifestyle factors and anthropometric measurements. Second, sleep timing and water intake were assessed based on self-reported information, which may introduce recall and reporting bias. Third, the study was conducted in a single obesity outpatient clinic, which may limit the generalizability of the findings to other populations. Fourth, sleep duration was not recorded, which may be a more critical factor than sleep timing for body weight regulation.

Future prospective studies including larger and more diverse populations, as well as objective measurements of sleep timing (e.g., actigraphy) and water intake (e.g., hydration biomarkers), are needed to better clarify the relationships between sleep behaviors, hydration status, and obesity-related outcomes.

Clinical Implications

The findings of this study provide clinically valuable insights for healthcare professionals working in obesity management. Although sleep timing alone showed no significant association with anthropometric indicators, the observed relationships between daily water intake and certain body composition parameters underscore the importance of hydration behaviors in obesity care. Clinicians should routinely evaluate lifestyle factors such as hydration habits alongside traditional anthropometric measurements during obesity assessments. Incorporating simple behavioral counseling strategies to improve daily water consumption may contribute to more comprehensive lifestyle interventions for patients with obesity. Furthermore, the strong correlations identified between BMI and central adiposity indicators emphasize the importance of routinely monitoring waist and hip circumferences to more accurately assess cardiometabolic risk.

Conclusion

In conclusion, this study examined the relationship between sleep timing, daily water intake, and anthropometric measurements among individuals attending an obesity outpatient clinic. The findings demonstrated that sleep timing alone was not significantly associated with key anthropometric indicators such as body mass index, waist circumference, or hip circumference. However, daily water intake showed statistically significant associations with age, body weight, and waist circumference. Notably, higher water intake was associated with higher body weight and waist circumference, which may reflect increased fluid requirements among individuals with greater body mass rather than a causal relationship.

Therefore, these results suggest that while sleep timing may not independently influence obesity-related anthropometric outcomes, hydration behaviors represent an important and often overlooked lifestyle factor associated with body composition and metabolic health. Additionally, the strong correlations observed between BMI, waist circumference, and hip circumference reinforce the importance of comprehensive anthropometric assessment in obesity management and clinical monitoring.

The findings contribute to the growing body of literature investigating lifestyle factors related to obesity and highlight the need to consider hydration habits as part of behavioral interventions aimed at improving metabolic health. Nevertheless, due to the retrospective design and reliance on self-reported lifestyle variables, causal relationships cannot be established.

Future prospective and longitudinal studies involving larger and more diverse populations are required to further clarify the complex interactions between sleep patterns, hydration behaviors, and obesity-related health outcomes. A better understanding of these relationships may help inform more effective, personalized lifestyle-based strategies for obesity prevention and management.

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Sources of Information on the Rotavirus Vaccine: An Analysis of YouTube Videos

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Abstract: Rotavirus is one of the most common causes of severe gastroenteritis in infants and young children worldwide, leading to significant morbidity and mortality, particularly in regions where vaccination is not widespread. Despite the availability of effective vaccines, the fact that the rotavirus vaccine is not included in Turkey's national immunization program and that its cost must be covered by individuals leads to inequities in vaccine access and causes parents to turn to alternative sources of information. Today, the internet and social media platforms, particularly YouTube, are widely used to access health-related information; however, the scientific accuracy and reliability of content on these platforms can vary. This study aims to comprehensively evaluate Turkish-language videos on YouTube regarding the rotavirus vaccine in terms of quality, reliability, and popularity.

Method: In this cross-sectional observational study, the first 100 videos obtained from searches conducted on YouTube between October 1–30, 2025, using the keywords “rotavirus vaccine,” “rota vaccine,” and “rota vaccine information” were reviewed, and 41 videos meeting the inclusion criteria were analyzed. To minimize personalization bias during data collection, searches were conducted in incognito mode. The videos were evaluated using the modified DISCERN (mDISCERN), Global Quality Scale (GQS), and JAMA criteria; popularity was also measured using the Video Power Index (VPI). The

videos were scored by two independent raters using a double-blind method, and inter-rater agreement was found to be adequate (ICC=0.692). Nonparametric tests and correlation analyses were used in the statistical analyses, and a significance level of $p<0.05$ was adopted.

Results: The findings revealed that the average number of views per video was 22,066 and that the videos generally demonstrated moderate reliability (mDISCERN: 2.9 ± 0.8) and moderate-to-good quality (GQS: 3.6 ± 0.9). While 58.5% of the videos fell into the high-quality category, 29.3% were classified as moderate quality and 12.2% as low quality. The moderate JAMA scores (3 ± 1.9) indicate that the content contained some deficiencies in terms of transparency. Analysis by publisher type revealed that high-quality content was predominantly produced by physicians, and all physician-sourced videos fell into the high-quality group. In contrast, videos uploaded by independent users were found to have significantly lower quality scores. On the other hand, no significant relationship was found between video popularity (VPI) and quality or reliability; this indicates that high view counts and engagement do not always align with accurate and reliable information.

Conclusion: In conclusion, while YouTube serves as an important and accessible resource for individuals seeking information about the rotavirus vaccine, the quality, reliability, and transparency of its content vary widely. Since the scientific accuracy of popular content is not always guaranteed, this increases the risk of users being exposed to incorrect or incomplete information. Therefore, health professionals playing a more active role on digital platforms and increasing the production of evidence-based and transparent content could help reduce vaccine hesitancy by making it easier for parents to access accurate information.

Keywords: Rotavirus, Youtube, Social Media, Vaccine

Introduction

Rotavirus is one of the most common causes of severe diarrhea in infants and young children worldwide.(1) In countries where the vaccine is not widely administered, it accounts for 35–60% of acute severe diarrhea cases in children under 5 years of age.(2) Despite the availability of effective vaccines, rotavirus continues to cause significant morbidity and mortality, particularly in developing countries. It is estimated that rotavirus caused approximately 122,000–215,000 child deaths annually between 2013 and 2017.(1) The rotavirus vaccine provides effective protection against severe rotavirus-associated gastroenteritis. The World Health Organization recommends the inclusion of rotavirus vaccines in national immunization programs, and a significant reduction in hospitalizations and morbidity has been reported following their implementation. However, vaccine efficacy may vary between countries, a phenomenon attributed to factors such as nutritional status, concomitant infections, and maternal antibodies. (1) Rotavirus infection constitutes a significant public health burden in Turkey, with reported rotavirus positivity rates in children with acute gastroenteritis ranging from 9.8% to 40%.(2) Despite this, the rotavirus vaccine is not included in the national immunization program, and the cost is borne by families. This situation leads to inequities in access to vaccination. Additionally, concerns about rare but notable adverse effects, such as intussusception, can influence parents' vaccination decisions.(3) Today, parents rely heavily on the internet and social media platforms to access health-related information.(4) YouTube is a major video-sharing platform capable of reaching a wide audience. (5) However, the content on this platform is largely not subject to academic review, raising questions about the quality of the information.(6) Although there are studies in the literature evaluating YouTube content regarding various diseases and vaccines, no study has examined the quality of content on this platform specifically regarding the rotavirus vaccine. (4,7,8) The aim of this study is to evaluate videos related to the rotavirus vaccine on the YouTube platform in terms of quality, reliability, and

popularity. Accordingly, it is hypothesized that the videos are generally of low to moderate quality.

Materials and Methods

This study is a cross-sectional observational study. Since publicly available data were used, ethical committee approval was not required. A search was conducted on the YouTube platform between October 1–30, 2025, using the Turkish keywords “Rotavirus vaccine,” “Rota vaccine,” and “Rota vaccine information.”. The search was conducted in incognito mode to minimize personalization bias, and the first 100 videos were included in the evaluation. These videos were considered to represent the content users encounter most frequently. Turkish-language content related to the rotavirus vaccine was included; however, duplicate videos, advertisements, and videos shorter than 1 minute or longer than 20 minutes were excluded.

Three validated tools widely used in the literature were employed to evaluate the videos. The modified DISCERN (mDISCERN), developed in 1999 and modified in 2012: This five-item tool is used to assess the reliability of health-related information. Each item is scored as 0 or 1, and the total score ranges from 0 to 5. Higher scores indicate greater reliability.(9,10) Global Quality Scale (GQS): A 5-point Likert-type scale used to assess the overall quality, flow, and educational value of the videos (1 = low quality, 5 = high quality). Scores are classified as 1–2 (low quality), 3 (moderate), and 4–5 (high quality). (11) Journal of the American Medical Association (JAMA) Criteria: This scale, used to assess the transparency of content, includes four criteria—authorship, citation, disclosure of conflicts of interest, and timeliness—each evaluated on a 1-point scale (total score 0–4)(12). Popularity was also assessed using the Video Power Index (VPI). The VPI is calculated as follows: Like rate = (likes × 100) / (likes + dislikes) View rate = total views / days since upload VPI = (like rate × view rate) / 100. (13) These metrics have been widely used in previous YouTube-based health content analyses and have been shown to be valid. The selected videos were scored by two independent evaluators in the field of family medicine using a double-blind method. IBM SPSS Statistics for Windows (Version

27) software was used for the analyses. Inter-rater reliability was determined using Cohen's Kappa coefficient or the Intraclass Correlation Coefficient (ICC). Data distribution (normality) was assessed using the Kolmogorov-Smirnov test. For variables not showing a normal distribution, the Kruskal-Wallis and Mann-Whitney U tests were used. Categorical data were compared using the chi-square test. Pearson or Spearman correlation tests were applied to determine the relationships between video characteristics. A p-value of <0.05 was considered statistically significant.

Results

A total of 41 out of 100 videos were included in the study. Inter-rater agreement (ICC = 0.692) was determined to be at an adequate level. The average number of views for the videos was 22,066. The mean mDISCERN score was 2.9 ± 0.8 , indicating that the videos generally had moderate reliability. The mean JAMA score was 3 ± 1.9 , suggesting that the content was partially adequate in terms of transparency but had some shortcomings. The average GQS value was 3.6 ± 0.9 ; when classified by score, 12.2% were of low quality, 29.3% of moderate quality, and 58.5% of high quality. When classified by publisher type, videos uploaded by doctors accounted for 19.5%, those uploaded by healthcare personnel for 31.7%, and content uploaded by independent users for 48.8%. In the analysis by publisher type, a statistically significant difference was found between physicians and non-physician sources in terms of high-quality content production (GQS ≥ 4) ($p < 0.001$). Of the 27 videos classified as high quality, 66.7% ($n=18$) were uploaded by medical doctors. While all videos shared by physicians (100%) fell into the high-quality group, independent users had significantly lower GQS scores ($p=0.007$). No significant difference was found between the groups in terms of view count ($p=0.640$).

Discussion

In this study, the quality and reliability of YouTube videos related to the rotavirus vaccine were evaluated, and it was found that, overall, the videos were of moderate quality. The average GQS and mDISCERN scores are consistent with those reported in other YouTube

analysis studies in the literature.(4,8) Studies in the literature on childhood vaccines and the herpes zoster vaccine have similarly reported that content quality is variable and that high-quality videos are limited in number. These findings indicate that YouTube is a heterogeneous source of health information.

In our study, it was observed that the content creator has a significant impact on video quality. Videos prepared by healthcare professionals were found to have higher quality scores, while those uploaded by independent users were found to be of lower quality. The fact that all content provided by physicians is of high quality underscores the importance of the presence of professional healthcare workers on digital platforms. Although more than half of the videos in our study fell into the high-quality category, the fact that mDISCERN scores remained at a moderate level suggests that while the content may be high-quality in terms of presentation, it contains deficiencies in terms of scientific reliability. A wide distribution in terms of popularity was observed among the videos, and it was noted that the number of videos with high VPI values was limited.

A striking finding is the absence of a significant correlation between popularity metrics (VPI) and video quality. This suggests that the videos users watch or like the most do not always provide the most accurate medical information; rather, engagement-focused content may take precedence. Similar results have been reported in other YouTube analysis studies. This suggests that users may struggle to distinguish quality when selecting content. Since the rotavirus vaccine is not included in Turkey's national immunization program, parents are turning to alternative information sources. In this context, the quality of information on YouTube can directly influence vaccine hesitancy. (14) In particular, incomplete or inaccurate information regarding adverse effects can negatively impact parents' decisions. (15) The fact that JAMA scores were moderate in our study indicates that the content also lacks transparency. Insufficient elements such as citation and timeliness may make it difficult for users to access accurate information and could trigger vaccine hesitancy. (16)

Our study has several key strengths. First, while there are studies in the literature on HPV and other adult vaccines, this is the first study in the Turkish YouTube literature to focus specifically on the rotavirus vaccine. Second, given that the vaccine is not part of the national immunization program, the study holds significant practical value in assessing the impact of YouTube on parents' decision-making processes. Finally, the fact that medical content achieves a flawless quality score demonstrates the effectiveness of healthcare professionals in digital platforms and how powerful these platforms can be as educational tools when used correctly. Among the study's limitations are the fact that only YouTube was examined, the inclusion of only Turkish-language videos, the cross-sectional design, and the limited sample size.

Conclusion

While YouTube is an important resource for individuals seeking information about the rotavirus vaccine, the quality and reliability of the content vary. While content produced by healthcare professionals is of higher quality, popularity metrics do not reflect content accuracy. Therefore, healthcare professionals playing a more active role on digital platforms and producing evidence-based content is crucial for reducing vaccine hesitancy.

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YouTube as a Source of Information on Creatine Monohydrate Supplementation: Analysis of the Quality, Reliability, and Scientific Accuracy of Turkish-Language Videos

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Abstract

Creatine monohydrate is one of the most widely used and most extensively studied ergogenic aids worldwide for improving exercise performance. Although its safety and efficacy have been demonstrated in the literature, substantial misinformation and myth-based content about creatine use remains widespread on digital platforms.

As shown in previous studies on rotavirus and herpes zoster vaccination, individuals often prefer visual platforms such as YouTube rather than professional counselling when seeking health-related information. This study aimed to evaluate the reliability and overall quality of Turkish-language YouTube videos about creatine supplementation using standardised tools such as mDISCERN and the Global Quality Scale (GQS).

The 16 most-viewed Turkish-language YouTube videos retrieved using the search terms “creatine use”, “what is creatine”, and “creatine harms” were included in the analysis. Videos were assessed using mDISCERN for reliability, the Global Quality Scale (GQS) for overall quality, and JAMA benchmark criteria for transparency. According to the

uploader profile, the videos were categorised into two groups: healthcare professionals (physicians/dietitians) and independent content creators (fitness trainers/vloggers). In line with the methodology used in the reference studies, descriptive statistics were applied, and differences between groups were analysed using the Mann-Whitney U test.

The mean GQS score of videos uploaded by healthcare professionals was 4.1, which was significantly higher than that of videos uploaded by independent content creators (mean 2.4; $p < 0.05$). More than 60% of the 16 videos had a JAMA score below 2, indicating that most videos did not cite any scientific literature or guideline source. In terms of content, 45% of the videos included scientifically unsupported claims suggesting that creatine causes kidney damage (nephrotoxicity). Only 30% of the videos provided information fully consistent with the literature regarding the loading phase and the recommended daily dose of 3–5 g. A popularity paradox was also observed: videos with the highest Video Power Index (VPI) scores were among those with the lowest mDISCERN scores, suggesting that the most viewed content was often the least scientifically reliable.

This study once again demonstrates the inverse relationship between popularity and quality in health-related YouTube content. The digital misinformation problem previously reported in studies on paediatric appendicitis and rotavirus vaccination appears to be even more pronounced for nutritional supplements such as creatine. The frequent appearance of unsupported claims such as “creatine causes hair loss” or “creatine damages the kidneys” in popular videos may pose a risk from both a public health and sports nutrition perspective. In conclusion, it is difficult for individuals who rely on YouTube to distinguish high-quality information from misleading content about creatine supplementation. Healthcare professionals and nutrition experts should actively fill this digital gap by producing short, accessible, and scientifically grounded content. These findings also underline the importance of being selective when recommending online resources to patients. A major strength of this study is the systematic evaluation of Turkish-language videos on a current topic using standardised assessment tools. However, the relatively small sample size, inclusion of only the most-viewed Turkish-

language videos, and the dynamic nature of YouTube content may limit the generalisability of the findings.

Keywords: Creatine Monohydrate, Social Media, Youtube Videos, Information Quality

Introduction

Creatine monohydrate is among the most widely used and extensively studied ergogenic aids for improving high-intensity exercise performance. Despite a large body of evidence supporting its efficacy and safety, misinformation surrounding creatine use remains common in public discourse. Claims related to nephrotoxicity, hair loss, fluid retention, or harmful loading practices are frequently repeated on digital platforms, often without adequate scientific support.

The growing role of internet-based media in health information seeking has made social media platforms highly influential in shaping public perceptions. YouTube is particularly prominent because of its accessibility, broad reach, and strong visual appeal. However, the platform allows content to be shared without formal peer review or editorial oversight, which may lead to major variability in accuracy, reliability, and educational quality.

Previous analyses on topics such as rotavirus vaccination, herpes zoster vaccination, and paediatric appendicitis have shown that highly viewed videos are not necessarily the most reliable. A similar concern is relevant for sports nutrition, where engagement metrics may easily be mistaken for scientific credibility.

This study aimed to assess how creatine monohydrate supplementation is represented in Turkish-language YouTube videos and to evaluate their reliability, overall quality, and transparency using standardised tools. A further objective was to compare videos uploaded by healthcare professionals with those uploaded by independent content creators.

Methods

This study was designed as a cross-sectional descriptive content analysis of publicly available YouTube videos. Since only open-access material was evaluated, no interventional procedure was involved.

The 16 most-viewed Turkish-language videos retrieved using the search terms “creatine use”, “what is creatine”, and “creatine harms” were included in the analysis. Only Turkish-language videos directly related to creatine monohydrate supplementation were considered eligible.

Videos were assessed using three standardised instruments. mDISCERN was used to evaluate reliability, the Global Quality Scale (GQS) was used to assess overall quality, flow, and educational value, and the JAMA benchmark criteria were used to assess transparency in terms of authorship, attribution, disclosure, and currency. According to uploader profile, videos were classified into two categories: healthcare professionals (physicians/dietitians) and independent content creators (fitness trainers/vloggers).

Descriptive statistics were used to summarise the findings, and differences between groups were analysed using the Mann-Whitney U test. Statistical significance was accepted at $p < 0.05$.

Results

Videos uploaded by healthcare professionals demonstrated substantially higher quality scores than those uploaded by independent content creators. The mean GQS score of healthcare professional videos was 4.1, compared with 2.4 for independent creators, and this difference was statistically significant ($p < 0.05$). These findings suggest that uploader profile may have a meaningful effect on educational quality.

In terms of transparency, more than 60% of the included videos had a JAMA score below 2, indicating that most did not cite scientific literature, guideline documents, or clearly attributable evidence sources. Even when content was presented in a confident and accessible manner, the lack of source transparency limited its trustworthiness.

Regarding scientific content, 45% of the videos contained unsupported claims suggesting that creatine causes kidney damage. Furthermore, only 30% of the analysed videos provided information fully consistent with the literature on the loading phase and the recommended daily dose of 3–5 g. This indicates that even basic practical information on creatine supplementation may be conveyed inaccurately or incompletely on YouTube.

A notable popularity paradox was also identified. Videos with the highest Video Power Index values were among those with the lowest mDISCERN scores, showing that the most viewed or most engaging videos were often the least scientifically reliable.

Discussion

The present study demonstrates that Turkish-language YouTube videos on creatine monohydrate vary substantially in quality, reliability, and transparency. These findings are consistent with previous studies evaluating YouTube as a source of health information in other fields, where popularity has repeatedly failed to predict scientific accuracy.

The higher GQS scores observed in videos uploaded by healthcare professionals support the view that expert-generated content offers important educational advantages. At the same time, the generally low transparency scores indicate that many videos lack sufficient reference to scientific evidence or guideline-based recommendations, which makes it difficult for viewers to independently judge credibility.

Claims such as “creatine damages the kidneys” or “creatine causes hair loss” are especially problematic because they are simple, memorable, and easily amplified through algorithm-driven platforms. However, the scientific literature provides a more balanced and evidence-based perspective on the safety of creatine monohydrate when used appropriately in healthy individuals. Repetition of weakly supported claims may therefore contribute to misinformation in both public health and sports nutrition contexts.

A major strength of this study is the systematic evaluation of Turkish-language videos on a current and widely discussed topic using standardised assessment tools. The

comparison between healthcare professionals and independent content creators also provides a meaningful contribution from a digital health literacy perspective. Nevertheless, the relatively small sample size, inclusion of only the most-viewed Turkish-language videos, and the dynamic nature of YouTube content may limit the generalisability of the findings.

These results underline the need for healthcare professionals and nutrition experts to play a more active role on digital platforms by producing short, accessible, and scientifically grounded content. They also highlight the importance of carefully selecting online resources when making recommendations to patients or the general public.

Conclusion

YouTube is an easily accessible source of information for individuals seeking guidance on creatine monohydrate supplementation, but the quality, reliability, and transparency of the available content are inconsistent. Videos uploaded by healthcare professionals appear to provide higher quality information, whereas popularity metrics do not reliably reflect scientific accuracy. Distinguishing trustworthy from misleading content therefore remains difficult for viewers. Greater participation of healthcare professionals and nutrition experts in digital content production may help reduce this information gap.

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Evaluation of Changes in Motivation and Future Expectations Among Medical Students*

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ABSTRACT

Aim: Medical education is a demanding process that not only involves the intensive transfer of academic knowledge but also aims to foster professional identity formation. In this context, students' levels of academic motivation and their satisfaction with the educational process are critical indicators for the sustainability of educational quality. This study aims to evaluate the changes in motivation among medical students during their education, the factors influencing these changes, and their post-graduation career plans.

Methods: This cross-sectional and descriptive analytical study was conducted between April 15, 2023 and July 1, 2023, with the participation of 624 students enrolled at Afyonkarahisar Health Sciences University Faculty of Medicine. Data were collected online (via Google Forms) using a structured questionnaire developed by the researchers based on a literature review. The questionnaire assessed students' sociodemographic characteristics,

Oral Presentation - OP390

*This study is an original evaluation of motivational changes and future expectations parameters that could not be elaborated in detail within the thesis text. It is based on the dataset of the specialty thesis titled "Evaluation of Empathy and Sense of Coherence in Medical Students," completed in 2023 at Afyonkarahisar Health Sciences University Faculty of Medicine by Research Assistant Dr. Kübra Aslan under the supervision of Assist. Prof. Gamze Dur.

motivational changes during medical education, levels of satisfaction, and post-graduation career plans. Ethical approval was obtained from the Scientific Research Ethics Committee of Afyonkarahisar Health Sciences University. Data analysis was performed using IBM® SPSS® version 26, and a p-value of <0.05 was considered statistically significant.

Results: The mean age of the participants was 21.8 ± 2.1 years (min: 18, max: 29), and 59.8% (n=373) were female. Overall, 51.7% of the students reported being satisfied with studying in medical school. Regarding motivational changes, 15.9% of the students reported an increase in motivation toward the medical profession from the time they were admitted to medical school until the time of the study, whereas 47.4% reported a decrease and 36.7% reported no change. The rate of increased motivation was significantly higher during the preclinical period (68.7%), whereas the rate of decreased motivation was significantly higher during the clinical period (68.6%) ($p < 0.05$). The main reasons for increased motivation were reported as increased curiosity and interest in the profession (27.3%) and the transition from basic sciences to clinical practice (25.3%). The primary reasons for decreased motivation included the demanding nature of medical education/profession (26.2%), concerns about the future (20.9%), and violence in healthcare settings (19.5%). Regarding post-graduation plans, 67.3% of students aimed to practice medicine in Türkiye, while 25.6% planned to pursue their careers abroad.

Conclusion: The findings indicate a significant decline in motivation during medical education, particularly with the transition to clinical years and reveal that approximately one-quarter of students plan to continue their careers abroad. Although increased knowledge and clinical experience are key factors enhancing motivation, structural issues such as heavy educational workload, concerns about professional future, and violence in healthcare overshadow this motivation. Despite more than half of the students being satisfied with their education, the high rate of motivational decline suggests that the issue may stem more from uncertainties regarding future professional prospects than from the quality of education itself. Supporting medical curricula with strategies to enhance psychological resilience and improving the socio-economic status of the medical

profession are of strategic importance for preventing brain drain and maintaining a qualified healthcare workforce.

Keywords: Motivation, Medical Education, Medical Student, Career Planning

Introduction

Motivation is defined as a fundamental process that initiates, directs, and sustains goal-oriented behaviors, serving as an intrinsic driving force that enables individuals to achieve their needs and objectives (1). Medical education is a comprehensive process aimed at training physicians capable of meeting the demands of modern healthcare systems, requiring not only knowledge and clinical skills but also motivation, psychological resilience, and ethical competence (2).

The intensive academic workload and clinical training may induce stress in students, thereby negatively affecting motivation, academic performance, and adaptation to the educational process (3). Motivation represents a key determinant reflecting students' persistence in continuing their education despite challenges and is a critical factor directly influencing success in medical education (5-7).

The literature indicates that motivation exhibits a dynamic nature throughout the educational process and may change over time. Therefore, monitoring changes in motivation is important for identifying periods of difficulty and for developing appropriate educational support mechanisms (4). This study aims to evaluate motivation changes among medical students, the factors influencing these changes, and their post-graduation career plans.

Materials and Methods

This cross-sectional and descriptive-analytical study was conducted between April 15, 2023 and July 1, 2023, with the participation of 624 students enrolled at Afyonkarahisar Health Sciences University Faculty of Medicine. Data were collected online (via Google Forms) using a structured questionnaire developed by the researchers based on a

literature review, which assessed students' sociodemographic characteristics, motivational changes during medical education, levels of satisfaction, and post-graduation career plans.

Ethical approval for the study was obtained from the Afyonkarahisar Health Sciences University Scientific Research Ethics Committee. Data analysis was performed using IBM® SPSS® 26 software. Descriptive statistics were presented as frequencies, percentages, means, and standard deviations. Categorical variables were compared using the Chi-square and Fisher's exact tests. A p-value of <0.05 was considered statistically significant.

Results

A total of 624 medical students from Afyonkarahisar Health Sciences University Faculty of Medicine participated in the study. The mean age of the participants was 21.8 ± 2.1 years, and 373 (59.8%) were female. Regarding changes in motivation since entering medical school, 296 students (47.4%) reported a decrease, 229 (36.7%) reported no change, and 99 (15.9%) reported an increase. The most commonly reported reasons for increased motivation were heightened interest and curiosity toward the profession (52.6%) and the transition from basic sciences to clinical practice (37.4%). The most frequently cited reasons for decreased motivation included the demanding nature of medical education/profession (42.2%), concerns about the future (20.9%), violence in healthcare settings (19.5%), and negative patient attitudes and behaviors (17.4%) (Table 1).

Table 1. Distribution of participants' sociodemographic characteristics and motivation change data

Variables	n	%
Gender		
Male	251	40,2
Female	373	59,8
Academic year		
1st year	120	19,2
2nd year	103	16,5

3rd year	93	14,9
4th year	105	16,8
5th year	97	15,5
6th year	106	17,0
Motivational change since enrollment in medical school		
Decreased	296	47,4
Remained unchanged	229	36,7
Increased	99	15,9
Reasons for increased motivation		
Increased curiosity and interest in the profession	52	52,6
Transition from basic sciences to clinical practice	37	37,4
The social prestige of the profession	4	0,6
Reasons for decreased motivation		
The demanding nature of education/profession	119	42,2
Future anxiety	59	20,9
Violence in healthcare settings	55	19,5
Negative attitudes and behaviors of patients	49	17,4

In the preclinical period (years 1–3), the number of students reporting an increase in motivation (68.7%) was significantly higher, whereas in the clinical period (years 4–6), the number of students reporting a decrease in motivation (68.6%) was significantly higher ($p < 0.05$) (Table 2, Figure 1). Among students who reported being satisfied with studying at medical school, the proportion of those whose motivation increased (79.8%) was significantly higher compared with those whose motivation decreased (36.8%) ($p < 0.05$). No statistically significant association was found between motivation change and gender, voluntary choice of medical school or post-graduation career plans ($p > 0.05$) (Table 2).

Table 2. Evaluation of factors affecting participants' motivation change

Variables	Motivation change		p value
	Increased (n=99)	Decreased (n=296)	
	n (%)	n (%)	
Gender			
Male	38 (38,4)	115 (38,9)	0,934
Female	61 (61,6)	181 (61,1)	

Education period			
Preclinical (years 1–3)	68 (68,7)	93 (31,4)	<0,001
Clinical (years 4-6)	31 (31,3)	203 (68,6)	
Voluntary choice of medical school			
Yes	91 (91,9)	258 (87,2)	0,201
No	8 (8,1)	38 (12,8)	
Satisfaction with studying at medical school			
Completely dissatisfied	0 (0,0)	32 (10,8)	<0,001
Dissatisfied	4 (4,0)	42 (14,2)	
Undecided	16 (16,2)	113 (38,2)	
Satisfied	46 (46,5)	100 (33,8)	
Completely satisfied	33 (33,3)	9 (3,0)	
Postgraduate career plans			
Practicing medicine in Turkey	68 (68,7)	189 (63,9)	0,673
Practicing medicine abroad	27 (27,3)	82 (27,7)	
Pursuing a non-medical profession in Turkey	2 (2,0)	16 (5,4)	
Pursuing a non-medical profession abroad	0 (0,0)	2 (0,7)	
Undecided	2 (2,0)	7 (2,4)	

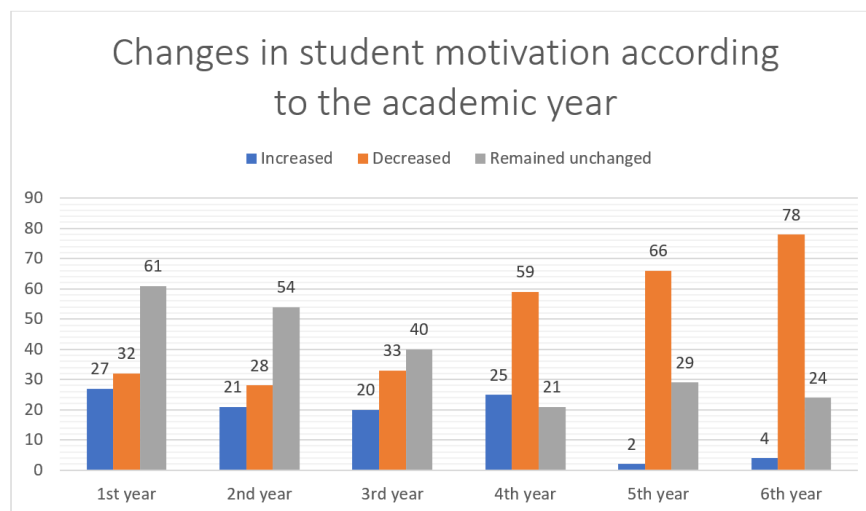


Figure 1. Changes in student motivation according to the academic year

The preferred specialty fields among students were internal sciences in 45%, surgical sciences in 36%, and basic sciences in 3%. While 15% of the students reported being

undecided about their specialty field, 1% stated that they planned to work as general practitioners (Figure 2).

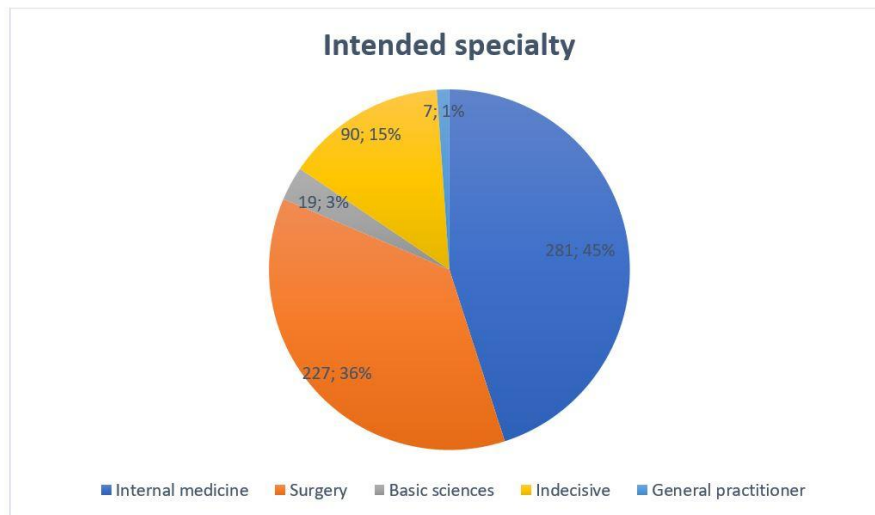


Figure. Intended specialties of the students

Discussion

Medical education is a process that requires high levels of professionalism and ethical standards, in which the sustainability of motivation is critical (8). The motivation of medical students is of great importance, given their key role in making appropriate decisions in healthcare delivery (6). In recent years, it has been emphasized that research on motivation should become a greater focus within medical education (9). Previous studies have demonstrated that motivation is associated with learning strategies and academic achievement (10,11). In a study evaluating 56 articles, motivation was found to influence learning and study behaviors, academic performance, and the intention to continue medical education (11).

In the literature, it has been reported that motivation varies according to the year of education (11). Orozco-Jimenez et al. evaluated 1,326 students and reported that motivation was high in the preclinical period but significantly decreased in the clinical period, with a partial increase observed again in the sixth year (1). Our study is consistent with these findings, demonstrating a marked decline in motivation during the clinical

period. However, the rebound observed in the sixth year was not detected in our study. This may be associated with increased clinical responsibilities, heavy on-call duties, and professional uncertainty, suggesting that motivation is related not only to the educational process but also to career expectations.

When the determinants of motivation are examined, Orozco-Jimenez et al. identified curiosity about the profession as the main factor contributing to increased motivation, whereas workload was reported as the primary factor associated with decreased motivation (1). In a study conducted by Zvrko et al. with 210 medical students, it was emphasized that the strengthening of professional interest and a sense of satisfaction, along with increased knowledge levels, are important contributors to enhanced motivation (12). Similarly, in our study, increased interest in and curiosity about the profession emerged as the leading reasons for increased motivation, whereas the demanding nature of both education and the profession constituted the main basis for decreased motivation. These findings indicate that motivation in medical education is a dynamic and multidimensional construct shaped by the interaction of cognitive gains with emotional and environmental factors. In particular, it should be considered that the increased workload and stress during the clinical period may suppress intrinsic motivation and increase the risk of burnout.

In the study by Abdulrahman et al. involving 429 medical students, it was reported that students who selected medical school as their first choice had significantly higher levels of motivation, self-efficacy, and engagement in learning (2). In our study, although an increase in motivation was more frequently observed among students who voluntarily chose medical school, this difference did not reach statistical significance. This finding suggests that motivation is shaped not only by initial preference but also by educational experiences, the learning environment, and individual adaptation processes. Indeed, in our study, it was found that motivation levels increased as students' satisfaction with studying at medical school increased. This result highlights that strengthening intrinsic motivational components and enhancing student satisfaction are critical for sustaining academic motivation over time.

Perceived stress during undergraduate medical education may influence future career choices (13). In a study evaluating 56 articles, Kruskar et al. reported that motivation affects the selection of specialty fields (11). Regarding career preferences, Zvrko et al. found that 29.5% of students preferred internal specialties, while 20.9% preferred surgical specialties (12). Similarly, in our study, preference for internal specialties was higher compared with surgical specialties.

This trend suggests that contemporary medical students consider not only professional interest but also factors such as working conditions, work–life balance, occupational risks, and long-term sustainability in their career planning. In particular, the relatively lower interest in surgical specialties, which are associated with a high workload and elevated stress levels, indicates a structural relationship between motivation and career choice.

Conclusion

Overall, the findings of our study indicate that motivation among medical students follows a fluctuating course throughout the educational process and is shaped by the interaction of individual, educational, and environmental factors. In this context, implementing supportive interventions aimed at enhancing student motivation, particularly during the clinical and internship periods (such as mentoring programs, workload balancing, and psychosocial support mechanisms), may provide significant benefits in terms of both academic achievement and professional.

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Smoking Behaviour: Addiction or Emotional Coping? A Cross-Sectional Study

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ABSTRACT

This study aimed to examine the relationship between nicotine dependence level and emotional expression in individuals who presented to a smoking counselling stand. The study was designed as a cross-sectional and descriptive study. The study population consisted of 60 individuals aged 18 years and above who were active smokers and who applied to the smoking counselling stand set up for one day at Necmettin Erbakan University Faculty of Medicine Hospital. Data were collected through a structured questionnaire, the Fagerström Nicotine Dependence Test (FTND), and the Emotional Expressivity Scale (EEQ). The mean age of participants was 42 years and 80% were male. The mean FTND score was 5.55 and the mean EEQ score was 66. The EEQ score of the low dependence group (74.40 ± 7.26) was significantly higher than that of the moderate dependence group (60.90 ± 19.76) ($p=0.033$).

Dependence levels were significantly lower in university graduates compared with primary and high school graduates ($p<0.05$). These findings support the view that nicotine dependence carries not only a biological but also an emotional coping dimension. It is recommended that psychoeducation components aimed at strengthening emotional awareness and expression skills be incorporated into smoking cessation programmes.

Keywords: Smoking Addiction, Nicotine, Emotional Expression; Fagerström, Coping

INTRODUCTION

Smoking addiction is a chronic and recurrent disease that develops as a result of chronic exposure to nicotine, a highly addictive substance found in tobacco products, and is classified by the World Health Organization (WHO) under ICD-10 code F17 as "Mental and behavioural disorders due to use of tobacco" (1). The neurobiological basis of addiction rests on nicotine binding to $\alpha 4\beta 2$ nicotinic acetylcholine receptors in the brain, stimulating dopamine release and creating an artificial sense of pleasure and reward; receptor adaptation over time gives rise to withdrawal symptoms including irritability, anxiety, and insomnia. Globally, tobacco use causes more than eight million deaths annually; in Europe, approximately 24% of the population aged 15 and above smokes, with tobacco-related annual deaths reaching around 700,000 (1). In Turkey, the adult smoking prevalence was 28.3% as of 2022, with 41.3% of men and 15.5% of women smoking daily; 52.4% of smokers in Turkey were reported to have started before the legal age of 18 (2,3).

Emotional expression is defined as the verbal or non-verbal communication of one's feelings, wishes, and needs to others, and plays a directly determinative role in mental health, psychological recovery, and social adjustment (4). Smoking behaviour is regarded as a dysfunctional form of coping with negative emotions such as stress, anxiety, and tension; nicotine increases dopamine release and creates a temporary sense of relief, generating a vicious cycle in which emotions are suppressed through nicotine (2,5,6). It is hypothesised that deficiencies in emotional expression and regulation skills increase smoking behaviour, whereas strengthening these skills may reduce the need for smoking (7). Current guidelines emphasise that teaching individuals "how to cope with emotions" is as critically important as pharmacological support in smoking cessation treatment (1). The aim of this study was to evaluate whether there is a significant relationship between nicotine dependence level and emotional expression in individuals presenting to a smoking counselling stand.

MATERIAL AND METHODS

This study was planned as a cross-sectional and descriptive study. The study population consisted of individuals who applied to the smoking counselling stand set up for one day at Necmettin Erbakan University Faculty of Medicine Hospital; individuals aged 18 years and above who were active smokers and who consented to participate were included. Written and verbal informed consent was obtained from all participants. Data were collected through a structured questionnaire administered by face-to-face interview.

Fagerström Nicotine Dependence Test (FTND)

The FTND is a standard six-item scale that objectively assesses the level of physical dependence on nicotine in smokers; total score ranges from 0 to 10 and dependence is classified as low (0–3), moderate (4–6), and high (7–10) (1).

Emotional Expressivity Scale (EEQ)

The EEQ is a 15-item, seven-point Likert-type scale developed by King and Emmons (1990) and adapted into Turkish by Kuzucu (2011) (Cronbach's alpha $\approx$ 0.85). It comprises three subscales: intimacy expression, positive emotion expression, and negative emotion expression; higher scores indicate a greater tendency to express emotions (7).

Statistical Analysis

Analyses were performed using IBM SPSS Statistics version 20.0. Descriptive statistics were presented as mean $\pm$ standard deviation. Normality was assessed with the Shapiro–Wilk test. Student's t-test was used for two-group comparisons; one-way ANOVA with Tukey HSD post-hoc test was used for comparisons among three or more groups. The statistical significance threshold was set at $p < 0.05$.

RESULTS

The mean age of participants was 42 years (min:22, max:73), 80% (n=48) were male, 41.7% (n=25) were university graduates, and 75% (n=45) were employed; the median smoking duration was 20 years (min:1, max:40). A total of 83.3% (n=50) of participants

had previously attempted to quit smoking. The mean FTND score was 5.55 (min:0, max:10), with 40% (n=24) classified as highly dependent; the mean EEQ score was 66 (min:22, max:103). Sociodemographic characteristics are presented in Table 1.

Table 1. Sociodemographic characteristics and smoking-related data of participants

Variable	n	%
Sex		
Female	12	20.0
Male	48	80.0
Educational Level		
Primary school	12	20.0
High school	23	38.3
University	25	41.7
Marital Status		
Married	48	80.0
Single	12	20.0
Family Structure		
Nuclear family	53	88.3
Extended family	7	11.7
Employment Status		
Employed	45	75.0
Unemployed	15	25.0
Smoking at Home		
Yes	38	63.3
No	22	36.7
Previous Quit Attempt		
Yes	50	83.3
No	10	16.7
Nicotine Dependence Level (FTND)		
Low (0-3)	15	25.0
Moderate (4-6)	21	35.0

Variable	n	%
High (7–10)	24	40.0

FTND: Fagerström Nicotine Dependence Test. *Answered by the 50 participants who had made a quit attempt.

The rate of smoking at home among employed participants (73.3%) was significantly higher than among unemployed participants (33.3%) ($p=0.005$). Regarding educational level, the mean FTND score of university graduates (3.88 ± 2.89) was significantly lower than that of primary school graduates (6.33 ± 2.46 ; $p=0.030$) and high school graduates (6.96 ± 2.51 ; $p=0.001$). EEQ scores did not differ significantly across educational groups ($p=0.139$). When EEQ scores were compared across FTND dependence groups, the overall difference was statistically significant ($p=0.041$); Tukey HSD post-hoc analysis revealed that the EEQ score of the low dependence group (74.40 ± 7.26) was significantly higher than that of the moderate dependence group (60.90 ± 19.76) ($p=0.033$). No significant difference was found between the low–high ($p=0.177$) or moderate–high ($p=0.623$) dependence groups. All comparisons are presented in Table 2.

Table 2. Comparison of FTND and EEQ scores by sociodemographic variables

Variable	FTND Mean $\pm$ SD	EEQ Mean $\pm$ SD	p (FTND)	p (EEQ)
Sex				
Female	4.92 $\pm$ 3.37	74.00 $\pm$ 18.85	0.417	0.053
Male	5.71 $\pm$ 2.91	64.00 $\pm$ 14.87		
Educational Level				
Primary (a)	6.33 $\pm$ 2.46	58.50 $\pm$ 15.33	ac: 0.030	0.139
High school (b)	6.96 $\pm$ 2.51	65.87 $\pm$ 16.83	bc: 0.001	
University (c)	3.88 $\pm$ 2.89	69.72 $\pm$ 15.03		
Family Structure				
Nuclear	5.87 $\pm$ 2.98	64.91 $\pm$ 15.88	0.022	0.149
Extended	3.14 $\pm$ 1.77	74.29 $\pm$ 16.35		

Variable	FTND Mean±SD	EEQ Mean±SD	p (FTND)	p (EEQ)
Employment				
Employed	5.51±2.98	65.09±14.65	0.863	0.452
Unemployed	5.67±3.13	68.73±20.13		
Smoking at Home				
Yes	5.84±2.89	63.42±16.64	0.325	0.103
No	5.05±3.15	70.45±14.35		
EEQ by FTND Dependence Group (Tukey HSD)				
Low (a)		74.40±7.26		ab: 0.033*
Moderate (b)		60.90±19.76		
High (c)		65.21±14.89		

FTND: Fagerström Nicotine Dependence Test; EEQ: Emotional Expressivity Scale; SD: Standard deviation. *p* values were calculated using Student's *t*-test (two groups) and one-way ANOVA/Tukey HSD (three groups). **p*<0.05.

DISCUSSION

The most noteworthy finding of this study was that individuals with low nicotine dependence expressed their emotions significantly better than those with moderate dependence. This finding is consistent with the theoretical framework suggesting that the ability to express emotions serves a protective function against stress and anxiety, and that emotional expression capacity declines as addiction deepens. Studies on alexithymia and emotion regulation support this finding: Linn et al. demonstrated that when access to emotional information is restricted, the tendency towards maladaptive behaviours — including smoking — and the amount of cigarettes smoked increase significantly (13). Similarly, Sarıkaya et al. showed that individuals who smoke have difficulty processing emotions at a cognitive level and tend to suppress their emotions chemically (14).

The predominance of male participants is consistent with the findings of studies conducted in Saudi Arabia and Lebanon, confirming that smoking behaviour is more prevalent among men regardless of cultural context (8,9). The significantly lower dependence level observed in university graduates aligns with the literature indicating

that educational attainment acts as a protective factor (11,12). The fact that employed participants smoked at home at a rate twice that of unemployed participants may be interpreted as occupational stress factors being carried into the home environment, or as employed individuals perceiving smoking as a reward or relaxation tool (10).

The cross-sectional design, single-centre structure, and relatively small sample size of the study limit generalisability. Nevertheless, the study contributes to the literature by examining the relationship between nicotine dependence and emotional expression in a Turkish sample, and by addressing smoking addiction not solely as a biological process but also as an emotional coping mechanism.

CONCLUSION AND RECOMMENDATIONS

This study demonstrated that individuals with greater capacity to express their emotions have lower levels of nicotine dependence, revealing that smoking behaviour carries an emotional coping dimension. Structuring psychoeducation and psychological counselling services aimed at teaching individuals how to cope with emotions — in addition to pharmacological treatment in primary care and all smoking cessation programmes — may contribute to improving individual success rates. Longitudinal studies encompassing larger and diverse sociocultural groups, addressing alexithymia, emotional intelligence, emotion regulation difficulties, and emotional expression skills in combination, will help to more clearly delineate the causal role of emotional factors in the initiation, maintenance, and cessation of smoking.

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Use of Artificial Intelligence in Family Medicine Specialty Theses and the Change in Related Themes: A Descriptive Analysis of National Thesis Center Data

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ABSTRACT

Aim: Artificial intelligence (AI) technologies have become increasingly visible in academic research, particularly following the widespread release of large language models such as ChatGPT in 2022. This study aimed to determine the frequency and thematic distribution of AI-related theses in Departments of Family Medicine between 2018 and 2025.

Materials and Methods: This descriptive cross-sectional study was conducted using National Thesis Center data. All family medicine specialty theses completed between 2018 and 2025 were screened. AI-related theses were identified using relevant keywords in thesis titles. The year 2022 was accepted as a breakpoint, and theses were compared between 2018–2021 and 2022–2025. Data were summarized using descriptive statistics.

Results: A total of 5,171 theses were identified, of which 21 were AI-related. The proportion increased from 0.05% (2018–2021) to 0.60% (2022–2025), with 95.2% conducted after 2022. Most studies were questionnaire-based, and the predominant themes were attitudes, anxiety, readiness, and literacy. The University of Health Sciences

Oral Presentation – OP392

was the leading institution. Recent studies also included clinical decision support, risk prediction, and large language model applications.

Conclusion: AI-related theses in family medicine have increased markedly after 2022; however, they remain largely focused on conceptual aspects, with limited emphasis on clinical applications. These findings indicate that AI research in family medicine is still in an early stage and highlight the need for more practice-oriented studies.

Keywords: Family Practice, Theses, Artificial Intelligence

INTRODUCTION

Artificial intelligence (AI) is defined as the ability of a computer, a computer (controlled robot, or a programmable device to perform functions such as perception, learning, reasoning, decision) making, problem-solving, and communication in a manner similar to humans (1). Since its emergence, AI has been a subject of discussion and research in the medical field and has rapidly contributed to the development of new applications in healthcare (2,3).

A thesis is an important academic document that demonstrates a research assistant's research skills, critical thinking ability, and mastery of a subject. It enables engagement in a structured and evidence-based process and is a mandatory component of specialty training. In particular, its evidence-based nature and literature review component ensure that thesis topics reflect current academic discussions (4-7). Furthermore, analyzing theses and publications in a field can help determine the current state of knowledge and guide future research needs (6,8-10).

Although studies have examined artificial intelligence in various areas of healthcare, the interest of the discipline of family medicine in AI remains insufficiently explored (6,3). However, AI Technologies (especially large language models such as ChatGPT) have become increasingly prominent in academic research since their widespread release in

2022 (5). Therefore, the aim of this study was to determine the frequency and thematic distribution of AI-related theses completed in Departments of Family Medicine between 2018 and 2025.

MATERIALS AND METHODS

This descriptive and cross-sectional study was conducted between March 25 and March 28, 2026, using data obtained from the National Thesis Center. All open-access and restricted-access specialty theses completed in the Departments of Family Medicine between 2018 and 2025 were screened.

Theses related to artificial intelligence were identified using the keywords “yapay zeka, artificial intelligence, AI, makine öğrenmesi, machine learning, ML, derin öğrenme, deep learning, DL, büyük dil modeli, BDM, large language model, LLM, ChatGPT, Gemini, Bard, Claude, and Grok” in thesis titles.

Since ChatGPT became publicly available in 2022, this year was accepted as the breakpoint, and theses were compared between the periods 2018–2021 and 2022–2025. Statistical analysis was performed using descriptive statistics, and the data were summarized as numbers and percentages.

RESULTS

In this descriptive and cross-sectional content analysis, a total of 5,171 family medicine specialty theses were identified in the National Thesis Center between 2018 and 2025. Of these, 1,845 were completed between 2018–2021 and 3,326 between 2022–2025.

Keyword-based screening identified 4,031 theses. Following detailed evaluation of thesis titles, 4,010 theses were found to be unrelated to artificial intelligence, and 21 theses were included in the study (Figure 1).

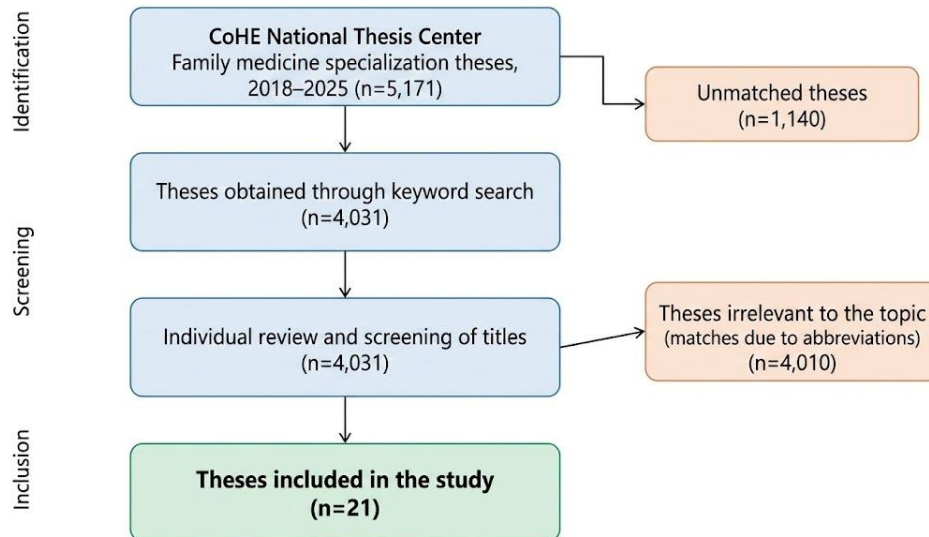


Figure 1. Flow diagram of study identification, screening, and inclusion

Of the theses related to artificial intelligence, 95.2% (n=20) were conducted after 2022. Most of the theses (61.9%, n=13) were quantitative studies in which data were collected using questionnaires. The most common institution where these theses were produced was the University of Health Sciences (n=12, 57.1%).

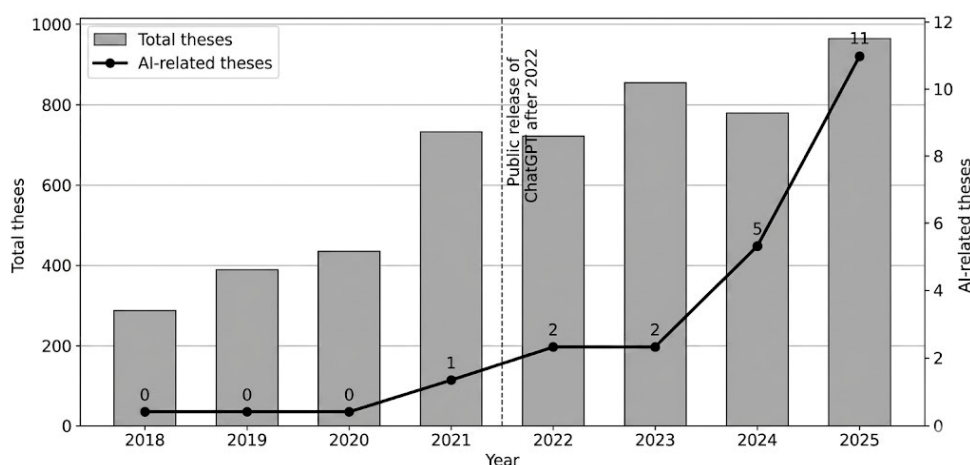


Figure 2. Theses produced by year and the number of AI-related theses

When the thematic distribution of AI-related theses was examined, 61.9% (n=13) were related to attitudes, anxiety, readiness, and literacy toward artificial intelligence, while 38.1% (n=8) focused on the clinical use of artificial intelligence (Table 1).

Table 1. Distribution of theses by thematic focus

Thematic Focus	n	%
Anxiety toward AI	7	33.3
Readiness toward AI	6	28.6
Attitudes toward AI	3	14.3
Disease prediction/diagnosis using machine learning	3	14.3
Dermatological diagnostic support using AI	2	9.5
AI literacy	2	9.5
AI acceptance	1	4.8
AI-supported web application development	1	4.8
AI-supported nutritional intervention	1	4.8
Evaluation of accuracy of large language models	1	4.8

**Some theses covered more than one theme. **AI: Artificial intelligence*

The most frequently studied group was residents (23.8%), followed by patients and datasets using clinical data and FAQs (19.0%) (Table 2).

Table 2. Distribution of theses by study group

Study Group	n	%
Residents	5	23.8
Patients	4	19.0
Datasets using clinical data and FAQs	4	19.0
Medical students	3	14.3
Physicians (general/multidisciplinary)	3	14.3
Family physicians	2	9.5
Healthcare professionals (mixed)	1	4.8

**One thesis was conducted among medical students and resident physicians.*

DISCUSSION

This study is important in demonstrating the level of interest of the discipline of family medicine in artificial intelligence. In their 2023 study, Alkan and Selvi examined master's theses on artificial intelligence in Türkiye and reported that recent studies have mainly

focused on the fields of health and economics, attributing this to the most pressing needs and problems in these areas (11). However, since there is no study specifically addressing primary care and family medicine, the present study may serve as an important starting point in this field.

Most of the AI-related theses included in this study were produced in 2025. It has been reported that a total of 130 theses related to artificial intelligence methods in healthcare were conducted between 2015 and 2022 (5). For example, in the field of dentistry, AI-related theses began to emerge in 2018, increased rapidly, and reached their peak in 2023 (3). These timelines are consistent with the increasing implementation and accessibility of artificial intelligence technologies.

Since this study focused only on family medicine theses, comparisons with other disciplines were not performed. The majority of identified theses were concentrated on attitudes, anxiety, and readiness toward artificial intelligence, whereas studies focusing on clinical applications were relatively limited. Similarly, in their bibliometric analysis of postgraduate theses on AI in healthcare between 2015 and 2022, Alp et al. reported that the number of theses increased after 2019 and that studies focusing on model development and disease prediction remained limited (5). In contrast, studies in dentistry have been more focused on diagnosis and treatment planning (3). While attitude-based studies are important in the early stages of a field to understand awareness and acceptance, the increasing use of artificial intelligence over time may lead to a greater number of studies focusing on clinical applications.

From the perspective of family medicine, the most comprehensive study in Türkiye evaluated 492 theses conducted between 2005 and 2015, following the implementation of family medicine practice (6). Although this study did not cover the period of widespread AI use, it provides an important basis for comparison.

In the literature, prior to the widespread adoption of artificial intelligence, topics such as “educational technologies” and “digital literacy” were more prominent (7,8). For instance,

digital literacy studies have shown a marked increase since 2020. Researchers have emphasized the need for further studies not only in education but also in fields such as economics, healthcare, and communication (7). Consistent with this trend, the present study found that AI-related theses have increased over time, reaching their highest number in 2025.

CONCLUSION

Studies on artificial intelligence in family medicine specialty theses have shown a marked increase, particularly after 2022, when AI models such as ChatGPT became widely accessible. However, most theses have predominantly focused on conceptual and perceptual dimensions such as attitudes, anxiety, readiness, and literacy toward artificial intelligence, while studies addressing clinical applications, decision support systems, and real-world data remain limited.

These findings suggest that artificial intelligence in the field of family medicine is still in an early adoption phase, with research primarily centered on understanding awareness and acceptance. In the coming years, there will be an increasing need for applied and interventional studies tailored to the needs of primary care, particularly those that support clinical decision-making and improve patient outcomes.

In conclusion, more research and discussion are needed on artificial intelligence, which has only recently entered family medicine theses. In theses to be conducted in the coming years, the addressing of topics specific to primary care by artificial intelligence—with the dimensions of diagnostic support, patient management, and preventive medicine—and the increase of studies that evaluate and guide the integration of the rapid development in the field of artificial intelligence into family medicine practice will be of critical importance for the future positioning of the discipline of family medicine.

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Evaluation of Obstetric and Neonatal Outcomes According to Maternal Age Groups: A Retrospective Study

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ABSTRACT

Maternal age is a critical determinant of pregnancy outcomes. This retrospective cross-sectional study included 341 women who delivered at Necmettin Erbakan University, Department of Obstetrics and Gynecology (September 2025–February 2026), stratified into four groups: Group 1 – adolescent (<19 years, n=52); Group 2 – optimal reproductive age (19–35 years, n=167); Group 3 – late reproductive age (35–39 years, n=81); Group 4 – advanced maternal age (≥40 years, n=41). The neonatal intensive care unit (NICU) admission rate was highest in Group 1 (36.5%), with low birth weight approximately fifty-fold more frequent than in Group 2. The caesarean section rate peaked in Group 3 (88.9%). Maternal comorbidity burden increased progressively with age, reaching 61.0% in Group 4. Fetal growth restriction (FGR) was most prevalent in Group 1, and congenital anomaly rates tended to increase with advancing maternal age. These findings underscore the need for age-specific antenatal protocols, genetic counselling for older gravidae, and integrated obstetric–primary care models.

Oral Presentation – OP393

Keywords: Maternal Age; Obstetric Outcomes; Neonatal Outcomes; Adolescent Pregnancy; Advanced Maternal Age

INTRODUCTION

Maternal age is widely recognised as one of the most significant demographic determinants of pregnancy and delivery outcomes. According to World Health Organization (WHO) data, approximately 21 million adolescent girls become pregnant each year in low- and middle-income countries, rendering adolescent pregnancy a serious global public health concern (1). Concurrently, rising educational attainment, career prioritisation, and the widespread availability of assisted reproductive technologies have led to a progressive increase in advanced-age pregnancies, with women aged 35 years and older constituting a growing proportion of all pregnancies (2,3). Adolescent pregnancies are associated with inadequate prenatal care, anaemia, pre-eclampsia, preterm delivery, low birth weight, and increased neonatal mortality (4,5). Advanced maternal age is linked to gestational diabetes mellitus (GDM), gestational hypertension (GHT), elevated caesarean rates, and increased risk of fetal anomalies (7,8), with chromosomal abnormality risk rising markedly at 40 years and above (9,10). From a family medicine perspective, maternal age-related obstetric risks are equally relevant to primary healthcare: family physicians play a pivotal role in preconceptional counselling, early pregnancy detection, risk stratification, and referral management (11). Studies simultaneously examining all four maternal age categories and integrating both obstetric and primary care perspectives within the Turkish context remain scarce. This study therefore aimed to compare obstetric and neonatal outcomes among delivering women stratified by maternal age group, and to evaluate the implications of findings for both obstetrics and gynaecology and family medicine practice.

MATERIAL AND METHODS

This retrospective cross-sectional study included 341 women who delivered at the Department of Obstetrics and Gynaecology, Necmettin Erbakan University Faculty of Medicine between September 2025 and February 2026. All women with singleton live

births were eligible; multiple gestations and cases with incomplete records were excluded. Participants were stratified by maternal age: Group 1 – adolescent (<19 years, n=52); Group 2 – optimal reproductive age (19–35 years, n=167); Group 3 – late reproductive age (35–39 years, n=81); Group 4 – advanced maternal age (≥40 years, n=41). Recorded variables included gravidity, parity, mode of delivery (normal vaginal delivery [NVD] / caesarean section [CS]), gestational age at birth, birth weight, 1st and 5th minute APGAR scores, NICU requirement, maternal systemic comorbidity, perioperative blood transfusion, additional surgical interventions, amniotic fluid status, fetal growth restriction (FGR), and congenital anomalies. All analyses were performed with IBM SPSS Statistics v27.0. Categorical variables were compared with chi-square or Fisher's exact test; continuous variables with the Kruskal–Wallis test. Bonferroni correction was applied for post-hoc pairwise comparisons (corrected $\alpha=0.0083$). Statistical significance was set at $p<0.05$.

RESULTS

Gravidity and parity increased significantly across groups ($p<0.001$). Caesarean section rates differed significantly between groups ($p=0.004$), peaking in Group 3 (88.9%); post-hoc analysis identified significant differences between Group 1 vs. Group 3 ($p<0.001$) and Group 2 vs. Group 3 ($p=0.008$). Preterm delivery before 34 weeks was highest in Group 1 (7.7% vs. 0.6% in Group 2; $p=0.001$). Low birth weight (<2499 g) was markedly elevated in Group 1 (30.8%), approximately fifty-fold higher than in Group 2 (0.6%; $p<0.001$). No significant intergroup difference was found in APGAR scores ($p=0.508$). NICU admission was significantly highest in Group 1 (36.5%) compared with all other groups ($p<0.001$). Full data are presented in Table 1.

Table 1. Delivery mode, gestational age, birth weight, APGAR scores, and NICU admission by group

Variable	Group 1 <19 yrs n=52	Group 2 19–35 yrs n=167	Group 3 35–39 yrs n=81	Group 4 ≥40 yrs n=41	p
CS, n (%)	33 (63.5)	124 (74.3)	72 (88.9)*†	29 (70.7)	0.004

Variable	Group 1 <19 yrs n=52	Group 2 19–35 yrs n=167	Group 3 35–39 yrs n=81	Group 4 ≥40 yrs n=41	p
Preterm <34 wks, n (%)	4 (7.7)*	1 (0.6)	2 (2.5)	2 (4.9)	0.033
LBW <2499 g, n (%)	16 (30.8)*†	1 (0.6)	9 (11.1)	3 (7.3)	0.018
APGAR 1st min (median)	5.02	5.07	5.16	4.85	0.508
NICU admission, n (%)	19 (36.5)*†‡	10 (6.0)	10 (12.3)	0 (0.0)	<0.001

CS: Caesarean section; LBW: Low birth weight; NICU: Neonatal intensive care unit. *Significant vs. Group 2 (Bonferroni-corrected, $p<0.0083$). †Significant vs. Group 3. ‡Significant vs. Group 4.

Maternal comorbidity increased progressively with age, from 13.5% in Group 1 to 61.0% in Group 4 ($p<0.001$). The most prevalent comorbidity across all groups was hypothyroidism (11.7%), followed by GDM+GHT combined (4.1%), GDM alone (2.9%), and GHT alone (2.9%). Blood transfusion rates did not differ significantly between groups (22.6% overall; $p=0.145$). Bilateral tubal ligation (BTL) rates were significantly elevated in Groups 3 (40.7%) and 4 (36.6%) compared with Groups 1 and 2 ($p<0.001$). Oligohydramnios differed significantly across groups ($p=0.003$), and FGR was most frequent in Group 1 (11.5%; $p<0.001$). Congenital anomalies were detected in 7.9% ($n=27$) of all participants; the most common was renal ectasia (4.7%), followed by ASD/VSD (1.5%) and sacrococcygeal teratoma (0.6%). No maternal mortality occurred. Full data are presented in Table 2.

Table 2. Maternal and fetal complications by group

Variable	G1 n=52	G2 n=167	G3 n=81	G4 n=41	Total n=341	p
Maternal comorbidity, n (%)	7 (13.5)	55 (32.9)	45 (55.6)	25 (61.0)	132 (38.7)	<0.001
Blood transfusion, n (%)	8 (15.4)	42 (25.1)	14 (17.3)	13 (31.7)	77 (22.6)	0.145
BTL, n (%)	0 (0.0)	9 (5.4)	33 (40.7)*	15 (36.6)*	57 (16.7)	<0.001
Uterine atony, n (%)	3 (5.8)	21 (12.6)	10 (12.3)	5 (12.2)	39 (11.4)	n.s.
Oligohydramnios, n (%)	4 (7.7)	2 (1.2)	7 (8.6)	2 (4.9)	15 (4.4)	0.003
FGR, n (%)	6 (11.5)*	4 (2.4)	4 (4.9)	1 (2.4)	15 (4.4)	<0.001
Congenital anomaly, n (%)	2 (3.8)	10 (6.0)	9 (11.1)	6 (14.6)	27 (7.9)	n.s.
Maternal mortality	0	0	0	0	0	—

BTL: Bilateral tubal ligation; FGR: Fetal growth restriction; n.s.: not significant. *Significant vs. Groups 1 and 2 (Bonferroni-corrected, $p < 0.0083$).

DISCUSSION

The most striking finding of this study was that adolescent women (Group 1) exhibited NICU admission and low birth weight rates substantially exceeding those of all other groups — low birth weight being approximately fifty-fold more prevalent than in the optimal reproductive age group. This concretely demonstrates the considerable neonatal morbidity burden associated with adolescent pregnancy. A multicentre WHO study similarly reported significantly elevated preterm delivery and low birth weight risks in adolescent compared with adult pregnancies (4). The concomitant elevation of FGR in Group 1 — with the significant post-hoc difference confined to the Group 1 vs. Group 2 comparison — supports a pattern of placental insufficiency specific to adolescent pregnancies, underscoring the need for intensified antenatal surveillance in this population (13,14).

In advanced-age groups, the caesarean section rate peaked in the 35–39 age stratum and maternal comorbidity burden reached 61.0% in the ≥ 40 age group. The significant divergence of Group 3 from both Groups 1 and 2 suggests that elevated caesarean risk follows an age-specific pattern. Cleary-Goldman et al. reported increased caesarean rates

and perinatal complication burden in women aged 35 and above (7), while Jacobsson et al. demonstrated significantly elevated GDM and pre-eclampsia risks beyond 40 years (8). The tendency toward higher congenital anomaly rates in Groups 3 and 4 supports prioritising these women for detailed ultrasonographic evaluation and genetic counselling (9,10). The markedly high BTL rates in Groups 3 and 4 — without a significant difference between these two groups — suggest a comparable family planning profile, implying that women experiencing unintended pregnancies at advanced age may not have received effective preconceptional contraceptive counselling (12). The predominance of hypothyroidism, GDM, and GHT as comorbidities highlights the importance of family physician-level screening and optimisation of these conditions prior to conception to improve maternal-fetal outcomes (11). Limitations include retrospective design, single-centre data, and inability to adjust for socioeconomic status, educational attainment, or number of antenatal visits. The relatively small Group 4 sample constrains statistical power.

CONCLUSION AND RECOMMENDATIONS

Maternal age group exerts a decisive influence on delivery mode, birth weight, NICU requirement, maternal comorbidity, and congenital anomaly risk. Adolescent pregnancies carry a disproportionate burden of neonatal morbidity, while advanced maternal age is associated with elevated caesarean rates and systemic disease burden. Age-specific intensified antenatal protocols should be established; genetic counselling should be standardised for older gravidae; and NICU capacity should be planned with regard to high-risk age groups. At the primary care level, reproductive health education and contraceptive counselling should be strengthened to prevent adolescent and unintended advanced-age pregnancies, and preconceptional optimisation of chronic conditions — particularly hypothyroidism, diabetes, and hypertension — should be routinely implemented. Integrated obstetric–family medicine models will be pivotal in improving maternal and neonatal outcomes across all age groups.

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Is the Timed Up and Go Test More Than Just a Measure of Mobility? Its Associations with Functional, Cognitive and Psychological Status in Adults Aged 80 and Over

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Abstract

Introduction: Although the Timed Up and Go (TUG) test is widely used to assess mobility and the risk of falls, its ability to reflect multidimensional geriatric domains—including functional, cognitive and psychological status—has not been sufficiently investigated. This study aimed to investigate the relationship between TUG performance and functional, cognitive, nutritional, and psychological parameters, as well as the burden of comorbidities, in individuals aged 80 Years and Older, and to identify the independent predictors of poor TUG performance.

Methods: This cross-sectional study included 100 individuals aged 80 years and older assessed at the Healthy Ageing Centre. Functional status (Katz Index), cognitive function (Mini-Mental Test, MMT), depressive symptoms (Geriatric Depression Scale, GDS), nutritional status (MNA-SF), comorbidity burden (Charlson Comorbidity Index) and polypharmacy were recorded as part of a comprehensive geriatric assessment. Participants were divided into high (≥ 13.5 seconds) and low (< 13.5 seconds) fall risk groups based on TUG performance. Non-parametric tests

and multivariate logistic regression analyses were performed to identify factors independently associated with high fall risk (TUG ≥ 13.5 seconds).

Results: The mean age of participants was 85.03 ± 3.76 years, and 60% were women. Fifty per cent of individuals were in the high fall risk group. In the high-risk group, participants were older ($p=0.007$), had lower functional independence ($p<0.001$), and were more likely to have cognitive impairment ($p=0.007$) and depression ($p=0.003$). No significant association was found between TUG performance and nutritional status, comorbidity burden, number of chronic diseases, or polypharmacy ($p>0.05$). In the multivariate analysis, age (OR=1.21, 95% CI: 1.05–1.39, $p=0.009$) and depressive status (OR=0.21, 95% CI: 0.05–0.83, $p=0.026$) were identified as independent predictors.

Conclusion: In individuals aged 80 and over, TUG performance was associated with functional status, cognitive impairment and depressive symptoms in univariate analyses; however, in multivariate analysis, only age and depression remained as independent predictors. These findings suggest that the TUG may reflect specific aspects of geriatric status, particularly psychological vulnerability, rather than serving as a comprehensive indicator of overall functional capacity.

Keywords: Timed Up and Go, Elderly, Fall Risk, Depression, Functional Status, Comprehensive Geriatric Assessment

Introduction

With ageing, there is a decline in physiological reserves, an increase in multimorbidity and functional decline; this makes the risk of falls a significant public health issue among older adults (1). Falls are one of the leading causes of mortality and morbidity in the elderly population and are closely associated with loss of independence, hospital admission and reduced quality of life (2). Therefore, the early identification of fall risk is important for the planning of protective and preventive approaches (3).

The Timed Up and Go (TUG) test is a simple and practical tool widely used to assess mobility and the risk of falls in older adults. However, studies in the literature indicate that mobility is not determined solely by musculoskeletal function, but may also be influenced by cognitive status, mood disorders and overall functional capacity (4).

Comprehensive geriatric assessment (CGA) covers many areas, including physical function, cognition, nutrition and psychological status. In clinical practice, there is a need for simple tools that can reflect this multidimensional structure (5,6). In this context, the present study aimed to investigate whether the TUG test reflects only mobility or is associated with multidimensional geriatric parameters, including functional status, cognitive function, depression and nutritional status, in individuals aged 80 and over. The aim was also to identify independent predictors of a high TUG risk.

Materials and Methods

This study was conducted with individuals aged 80 and over who attended the Healthy Ageing Centre at İzmir City Hospital between 1 September 2025 and 27 February 2026. In this comparative cross-sectional study, participants were divided into groups with low and high risk of falling based on their TUG test results, with 50 individuals in each group. A total of 100 individuals were included in the study.

Functional status was assessed using the Katz Activities of Daily Living Index (ADL), which evaluates independence in six basic activities, with scores ranging from 0 to 6, higher scores indicating greater independence (7). Cognitive function was evaluated using the 30-point Mini-Mental Test (MMT), assessing orientation, attention, memory, and language (8). Depressive symptoms were measured using the 15-item Geriatric Depression Scale (GDS-15), with higher scores indicating more severe symptoms (9). Nutritional status was assessed using the Mini Nutritional Assessment–Short Form (MNA-SF), a 6-item tool with scores ranging from 0 to 14 (10). Comorbidity burden was evaluated using the Charlson Comorbidity Index (CCI), where higher scores reflect greater comorbidity. Polypharmacy

was defined as the use of five or more medications daily. Mobility and fall risk were assessed using the Timed Up and Go (TUG) test.

Mobility and fall risk were evaluated using the TUG test. Participants were asked to stand up from a seated position, walk 3 meters, turn around, walk back, and sit down. The total time required to complete the task was recorded in seconds. A TUG time of ≥ 13.5 seconds was considered indicative of high fall risk.

The distribution of continuous variables was assessed using the Shapiro–Wilk test, and non-parametric tests were used for variables that did not follow a normal distribution. The Mann–Whitney U test was used for group comparisons, and the chi-square test was used for categorical variables. Multivariate logistic regression analysis was performed to identify factors independently influencing the risk of falls. A p-value of <0.05 was considered statistically significant.

Results

The mean age of the individuals included in the study was 85.03 ± 3.76 years, and 60% of the participants were women. Cognitive impairment was present in 37% of participants, depression in 20%, and a risk of malnutrition in 32% (Table 1).

Table 1. Baseline demographic and clinical characteristics of the study population

Variable	Category	n (%)
Gender	Female	60 (%60.0)
	Male	40 (%40.0)
Katz	Severe functional impairment	22 (%22.0)
	Moderate functional impairment	40 (%40.0)
	Fully independent	38 (%38.0)
MMT	<25	37 (%37.0)
	≥ 25 normal	63 (%63.0)
GDS	Depression present	20 (%20.0)
	No depression	80 (%80.0)
MNA-SF	At risk of malnutrition	32 (%32.0)
	Normal nutritional status	68 (%68.0)

TUG	≥13.5 sn high risk	50 (%50.0)
	<13.5 sn low risk	50 (%50.0)
Charlson_CCL	≥3 high comorbidity	15 (%15.0)
	0-2 low comorbidity	85 (%85.0)
Polypharmacy	Yes	59 (%59.0)
	No	41 (%41.0)

The mean age in the high fall risk group was significantly higher than in the low risk group (58.30 vs. 42.70 years, $U=860.0$, $Z=-2.702$, $p=0.007$).

The Katz Activities of Daily Living Index, cognitive impairment and the presence of depression were found to be significantly associated with a high risk of falling. Although the risk of malnutrition (MNA-SF) was higher in the high-risk group, the difference was not statistically significant ($p=0.086$) (Table 2).

Table 2. Comparison of demographic and clinical characteristics between high and low fall risk groups

Variable	Category	High risk n (%)	Low risk (%)	p
Gender	Female	31 (62.0)	29 (58.0)	0.683
	Male	19 (38.0)	21 (42.0)	
Katz	Severe functional impairment	19 (38.0)	3 (6.0)	<0.001
	Moderate functional impairment	18 (36.0)	22 (44.0)	
	Fully independent	13 (26.0)	25 (50.0)	
MMT	<25	25 (50.0)	12 (24.0)	0.007
	≥25 normal	25 (50.0)	38 (76.0)	
GDS	Depression present	16 (32.0)	4 (8.0)	0.003
	No depression	34 (68.0)	46 (92.0)	
MNA-SF	At risk	20 (40.0)	12 (24.0)	0.086
	Normal	30 (60.0)	38 (76.0)	
Charlson_CCL	High	10 (20.0)	5 (10.0)	0.161
	Low	40 (80.0)	45 (90.0)	
Polypharmacy	Yes	33 (66.0)	26 (52.0)	0.155
	No	17 (34.0)	24 (48.0)	

In the multivariate logistic regression analysis, the extended model assessed age, functional status (Katz Index of Activities of Daily Living), cognitive status (MMT) and

depression status together. In this model, it was found that the risk of falling increased with age (OR=1.199) and that the risk of falling was significantly lower in individuals without depression (OR=0.213). Functional status and cognitive status did not retain their significance as independent predictors in the multivariate analysis ($p=0.416$).

Discussion

This study demonstrated that TUG performance in individuals aged 80 and over reflects not only physical mobility but also certain geriatric domains. Whilst univariate analyses revealed significant associations with functional status, cognitive impairment and depression, multivariate analysis identified only age and depression as independent predictors.

Age has been identified as an independent predictor of increased fall risk; this finding is consistent with studies in the literature (11).

When examining the relationship between functional status, as measured by the Katz Index, and TUG performance, a significantly higher risk of falling was observed in individuals with higher levels of dependency. This finding is consistent with studies in the literature (12). However, the fact that this relationship loses its significance in multivariate analysis suggests that functional status interacts with other variables. Similarly, the fact that cognitive impairment is not an independent predictor suggests that the effect of cognitive status on mobility may be indirect.

One of the clinically significant findings of our study is the independent relationship between depressive symptoms and a high risk of falling. Consequently, it is thought that the TUG test may reflect not only physical performance but also psychological vulnerability. Whilst Lynds et al. noted that individuals with dementia have a higher risk of falling, Moshtaghi et al. reported in their case-control studies that no association was found between dementia and the risk of falling (13,14).

The absence of a significant association between the burden of comorbidity and polypharmacy and TUG performance in our study suggests that functional and

psychological status, rather than the number of illnesses, is a more decisive factor in determining the risk of falling.

Conclusion

This study demonstrates that TUG performance in individuals aged 80 and over is associated with various components of a multidimensional geriatric assessment, although the number of independent predictors is limited. In particular, age and depression emerge as the most significant independent predictors of poor TUG performance.

The findings suggest that the TUG test may reflect psychological fragility in older adults, going beyond its role as a tool for assessing mobility alone. Therefore, it is recommended that psychosocial factors such as depression be taken into account when evaluating TUG test results in clinical practice.

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Clinical Characteristics and Healthcare Burden of Surgically Treated Geriatric Maxillofacial Trauma Patients

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BACKGROUND

Maxillofacial trauma in elderly patients is encountered more frequently as the population ages [1-3]. Age-related changes such as decreased bone density, impaired balance, and comorbidities increase both the risk of injury and the complexity of treatment [4, 5].

Although the basic principles of trauma management are similar across age groups, geriatric patients form a distinct group in clinical practice. These patients frequently present with additional injuries and require longer hospital stays and intensive care [6, 7].

Falls and traffic-related injuries are among the most common causes of maxillofacial trauma in elderly patients [8]. However, most of the existing literature is based on mixed trauma populations, and data specifically focusing on surgically treated geriatric patients remain limited.

In elderly patients requiring surgical intervention, maxillofacial trauma is often accompanied by additional injuries. In this subgroup, the need for intensive care and prolonged hospital stay may better reflect the overall clinical burden than isolated fracture characteristics. For this reason, ICU admission, length of stay, and associated

injuries are particularly relevant in understanding the severity and healthcare impact of these patients [4, 5, 7].

This study aimed to evaluate the clinical characteristics and healthcare burden of surgically treated geriatric patients with maxillofacial trauma, with a focus on hospital length of stay, intensive care requirements, and associated injuries. Fracture distribution was also included to describe injury patterns.

METHODS

This retrospective descriptive study was conducted at a tertiary referral center and included patients aged ≥ 60 years who underwent surgical treatment for maxillofacial trauma under general anesthesia. The study period covered cases treated between January 1, 2011 and March 31, 2026. This time interval was selected as it represents the earliest period with complete and accessible electronic medical records.

Patient data were obtained from the hospital information system and included age, sex, trauma etiology, fracture distribution, presence of associated injuries, intensive care unit (ICU) admission, ICU length of stay, and total hospital length of stay. Only patients who underwent operative treatment were included; those managed conservatively were excluded.

Fracture characteristics were evaluated using preoperative computed tomography (CT) images. All fracture findings and involved anatomical regions were identified based on CT imaging. Fracture distribution was assessed according to the involved regions, including the mandible, maxilla, zygoma, nasal bones, and orbital walls (roof and floor). Each region, as well as the presence of associated injuries, was recorded as a binary variable (present/absent; 1/0). The number of fractured regions was calculated for each patient by summing these variables, providing a simple measure of overall fracture burden.

In addition to individual fracture sites, composite variables were defined. Orbital involvement was considered present if either the orbital roof or floor was affected. Midfacial involvement was defined as fractures involving the maxilla, zygoma, or orbital

walls. Panfacial fracture was defined as involvement of two or more of the upper, middle, and lower facial thirds.

All variables were summarized descriptively. Continuous variables are presented as median with interquartile range (IQR) and range, while categorical variables are given as numbers and percentages.

RESULTS

A total of 45 geriatric patients were included, with 38 (84.4%) being male (Table 1). The median age was 65 years (IQR, 62–71; range, 60–82). Traffic accidents (35.6%) were the most common mechanism of injury, followed by falls (28.9%) and blunt trauma (33.3%).

Regarding fracture distribution, the most frequently involved regions were the maxilla (55.6%), zygoma (48.9%), and orbital floor (44.4%). Orbital roof and mandibular fractures were observed at similar rates (40.0% each), while nasal bone fractures were less common (17.8%). Panfacial fractures were rare, observed in only 2 patients (4.4%).

The number of fractured anatomical regions ranged from 1 to 6, with a median of 2 (IQR, 1–4). Associated injuries were present in 24 patients (53.3%).

The median hospital length of stay was 9 days (IQR, 5–13; range, 2–85), with a mean of 13.4 days. ICU admission was required in 11 patients (24.4%). Among patients admitted to the intensive care unit, the median length of ICU stay was 7 days (IQR, 4–21; range, 3–61).

Orbital involvement was present in 53.3% of patients. Midface fractures were observed in 71.1% of cases, whereas mandibular involvement was identified in 40.0%. Isolated mandibular fractures were relatively uncommon, occurring in 28.9% of patients.

Table 1. Demographic characteristics, injury profile, and clinical outcomes

Variable	Value
Number of patients (n)	45
Age, median (IQR; range)	65 (62–71; 60–82)
Male sex, n (%)	38 (84.4%)

DISCUSSION

The present study evaluated surgically treated geriatric patients with maxillofacial trauma, focusing on hospital length of stay, intensive care requirements, and associated injuries. Overall, these patients represent a clinically complex group with a considerable burden of care.

One of the main findings is the rate of ICU admission. Nearly one-quarter of patients required intensive care, and ICU stays were not short in this subgroup. Previous studies have shown that geriatric trauma patients tend to have longer hospital stays [9] and more demanding inpatient care, especially in the presence of associated injuries and comorbidities [1]. Studies focusing on elderly facial trauma have also reported relatively high rates of intensive care admission and prolonged hospitalization [10].

Hospital length of stay showed a similar pattern. While the median stay was moderate, the wide range and relatively high mean indicate that some patients required prolonged hospitalization. This likely reflects differences in injury severity, associated trauma, and perioperative course, in line with previous reports [11].

More than half of the patients had associated injuries, suggesting that maxillofacial trauma in this population often occurs as part of a broader injury pattern. The presence of concomitant injuries is likely to increase treatment complexity and contribute to longer hospital-based care. Similar relationships have also been described in previous studies [1].

The median number of fractured regions was two, indicating that isolated fractures were not the typical presentation in this cohort. This likely reflects the inclusion of surgically treated patients, who tend to present with more extensive and multi-regional injury patterns compared to those managed conservatively [12]. Similar associations between injury severity and more complex clinical presentations have been reported in previous studies [13].

Midface involvement was common, and orbital fractures were present in more than half of the patients. Similar findings have been reported in previous studies, in which midfacial and orbital fractures were more frequent in geriatric populations [14]. Nasal fractures were less frequent in our series compared to the literature [10], accounting for 17.8% of cases. This discrepancy likely reflects local practice patterns, as isolated nasal fractures are mainly managed by the otorhinolaryngology service at our institution and are therefore underrepresented in our cohort.

This study has several limitations. As only surgically treated patients were included, the cohort represents a selected group with relatively higher injury severity. Therefore, the findings may not be generalizable to all geriatric maxillofacial trauma patients, particularly those managed conservatively. In addition, local referral patterns may have influenced the distribution of fracture types, especially for isolated nasal fractures.

CONCLUSION

Surgically treated geriatric maxillofacial trauma patients represent a subgroup with substantial clinical burden. Intensive care use, prolonged hospital stay, and frequent associated injuries characterize this population and should be considered in clinical management.

Keywords: Geriatric Trauma, Maxillofacial Fractures, Associated Injuries, ICU Admission

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The Relationship Between Chronotypic Characteristics, Academic Achievement, and Attitudes Toward Absenteeism in Preclinical Medical Students

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ABSTRACT

Aim: Chronotype is a core biological trait that shapes an individual's sleep-wake rhythm and the timing of peak mental performance across the day. In medical education, early schedules and a demanding workload may create a mismatch between biological timing and academic requirements, especially in students with an evening preference. Yet only a limited number of studies have examined chronotype, academic achievement, and attitudes toward absenteeism within the same sample (1). This study investigated the relationship between chronotypic characteristics, academic achievement, and absenteeism attitudes among third-year medical students at Erciyes University Faculty of Medicine.

Materials and Methods: A cross-sectional study was carried out during the spring semester of the 2025–2026 academic year. The study population consisted of 376 students. Data were collected face to face between 12 and 20 February 2026. Of the 341 students who participated, 19 who reported a prior diagnosis of sleep disorder and 3 with

Oral Presentation - OP396

missing scale data were excluded. Analyses were therefore based on 319 students. Data collection instruments included a sociodemographic form, academic performance indicators, questions on class attendance, the 19-item Morningness-Eveningness Questionnaire, and the 19-item Absenteeism Attitude Scale. Chronotype was categorized into five groups according to the original Horne and Ostberg classification (2). Mann-Whitney U test, Kruskal-Wallis test, chi-square test, Spearman correlation analysis, and structural equation modeling were applied.

Results: Participants had a mean age of 21.13 ± 1.05 years, and 56.7% were female. Most students were classified as intermediate type (72.1%). The mean grade point average (GPA) was 2.74 ± 0.44 , the mean last committee score was 68.77 ± 10.97 , and the mean total Absenteeism Attitude Scale score was 48.97 ± 13.61 . GPA and last committee scores did not differ significantly across chronotype groups. In contrast, absenteeism attitude scores varied significantly by chronotype. Intermediate-type students had higher absenteeism attitude scores than evening-leaning students. A weak but significant positive correlation was observed between total absenteeism attitude score and GPA. Students who reported using their absenteeism rights to the full had both lower GPA values and lower absenteeism attitude scores.

Conclusion: Academic achievement indicators did not differ significantly across chronotype groups in this sample. By contrast, attitudes toward absenteeism were more consistently associated with academic performance. These findings suggest that academic performance should be considered not only in relation to biological timing characteristics but also in relation to students' attendance-related attitudes and engagement with education.

Keywords: Chronotype, Academic Achievement, Absenteeism Attitude, Medical Students, Circadian Rhythm

INTRODUCTION

Chronotype refers to the biologically based tendency to feel more alert, productive, and mentally efficient at particular times of day, and it is commonly described in terms of morning, intermediate, and evening preference (2). Because medical training is typically organized around early class hours, sustained cognitive demands, and repeated examinations, students with an evening tendency may be especially vulnerable to a mismatch between biological rhythm and academic structure (1,3). Academic performance, however, is shaped not only by cognitive ability but also by the way students participate in the learning process. Attendance behavior and the attitudes underlying it are important indicators of commitment to education (4). Despite this, studies examining chronotype, absenteeism attitude, and academic achievement together within a single sample remain scarce (1). This study therefore aimed to assess the relationship between chronotypic characteristics, academic achievement, and absenteeism attitude in preclinical medical students.

MATERIALS AND METHODS

This cross-sectional study was conducted among third-year students at Erciyes University Faculty of Medicine during the spring semester of the 2025–2026 academic year. The target population included 376 students. Data were obtained face to face between 12 and 20 February 2026. A total of 341 students participated. Nineteen students who reported a previous diagnosis of sleep disorder and three students with missing scale data or unavailable GPA information were excluded. Final analyses were based on 319 students. Ethical approval was obtained for the study (decision no. 2026/65, dated 18 February 2026), and written informed consent was obtained from all participants.

The data collection form included sociodemographic characteristics, academic performance measures, questions related to class attendance, the Morningness-Eveningness Questionnaire, and the Absenteeism Attitude Scale. Chronotype was assessed using the Turkish version of the Morningness-Eveningness Questionnaire (5).

Based on total scores, students were classified as definitely evening type, evening-leaning, intermediate type, morning-leaning, and definitely morning type. Internal consistency for the questionnaire in the present sample was acceptable (Cronbach's $\alpha=0.770$).

Attitudes toward absenteeism were evaluated with the 19-item Absenteeism Attitude Scale developed by Usta et al. (6). Higher scores indicated a more favorable attitude toward class attendance. In this sample, the total scale showed high internal consistency, with a Cronbach's α of 0.888.

Statistical analyses were conducted using IBM SPSS Statistics 22.0 and IBM SPSS AMOS 24.0. Continuous variables were summarized as mean $\pm$ standard deviation or median with interquartile range, whereas categorical variables were expressed as number and percentage. Mann-Whitney U and Kruskal-Wallis tests were used for group comparisons, chi-square test for categorical associations, and Spearman correlation analysis for associations between continuous variables. Structural equation modeling was used to assess the direct and indirect effects of variables associated with academic achievement. A p value below 0.05 was considered statistically significant.

RESULTS

A total of 319 students were included in the analysis. Their mean age was 21.13 ± 1.05 years; 181 (56.7%) were female and 138 (43.3%) were male. The chronotype profile was dominated by the intermediate type: 230 students (72.1%) were intermediate, 53 (16.6%) were evening-leaning, 28 (8.7%) were morning-leaning, 4 (1.3%) were definitely evening type, and 4 (1.3%) were definitely morning type. Mean GPA was 2.74 ± 0.44 , mean last committee score was 68.77 ± 10.97 , and mean total Absenteeism Attitude Scale score was 48.97 ± 13.61 . Female students had significantly higher GPA scores ($p=0.003$) and absenteeism attitude scores ($p=0.004$) than male students.

No statistically significant difference was found among chronotype groups with respect to GPA ($p=0.065$) or last committee score ($p=0.335$). Even so, the highest GPA median was observed in definitely morning-type students, whereas the lowest was observed in

definitely evening-type students. Total Absenteeism Attitude Scale scores, on the other hand, differed significantly across chronotype groups ($p=0.003$). Post-hoc analysis showed that intermediate-type students had significantly higher absenteeism attitude scores than evening-leaning students (Bonferroni-adjusted $p=0.009$). No significant relationship was found between chronotype and either difficulty with attendance registration or the tendency to use absenteeism rights to the full.

A weak but statistically significant positive correlation was observed between total absenteeism attitude score and GPA ($\rho=0.194$; $p<0.001$). No significant association was found between absenteeism attitude score and last committee score ($\rho=0.031$; $p=0.584$). Students who reported using their absenteeism rights to the full had significantly lower GPA scores ($p=0.006$) and lower absenteeism attitude scores ($p<0.001$). The structural equation model showed acceptable fit ($\chi^2/df=1.844$; RMSEA=0.052). Within this model, total Absenteeism Attitude Scale score had a positive and significant direct effect on GPA ($\beta=0.194$; $p<0.001$). Chronotype also showed a positive and significant effect on absenteeism attitude ($\beta=0.121$; $p=0.027$). By contrast, the direct path from chronotype to GPA did not reach statistical significance ($\beta=0.096$; $p=0.075$).

DISCUSSION

The present study showed that the intermediate chronotype was by far the most common pattern among preclinical medical students. This distribution is in line with previous studies conducted in medical students (1). At the same time, the small number of participants in the definitely morning and definitely evening categories may have limited statistical power for comparisons involving extreme chronotypes.

Although no significant differences were detected among chronotype groups in terms of GPA or last committee score, the direction of the findings remains noteworthy. GPA medians were highest in definitely morning-type students and lowest in definitely evening-type students, which may indicate a potential academic advantage for morning preference. Earlier studies have reported similar findings in favor of morning-oriented

students (7,8), whereas others have not found a meaningful relationship between chronotype and academic performance (1,9). Taken together, these data suggest that academic outcomes are probably shaped not by chronotype alone, but by its interaction with educational timing, examination structure, and individual study behavior.

The most striking result of this study was the more consistent association of absenteeism attitude with academic achievement than that of chronotype. The positive relationship between absenteeism attitude scores and GPA, together with the lower GPA and lower absenteeism attitude scores among students who reported fully using their absenteeism rights, supports the view that regular participation may contribute to academic success. This interpretation is consistent with previous literature linking attendance to better academic performance (4). The persistence of the direct effect of absenteeism attitude on GPA in the structural equation model further strengthens this finding.

By contrast, the effect of chronotype on academic achievement appears to be more indirect. Students with an evening preference may have greater difficulty adjusting to an educational structure dominated by morning activities, which may then influence attendance and daytime functioning (4,10). The single-center design, the small number of students in extreme chronotype groups, and the use of self-reported measures represent important limitations. Nevertheless, the simultaneous assessment of chronotype, absenteeism attitude, and academic achievement within the same cohort is a major strength of the study.

CONCLUSION

Among preclinical medical students, chronotype distribution was concentrated mainly in the intermediate type. Although academic achievement indicators did not differ significantly across chronotype groups, the observation that GPA medians were highest in definitely morning-type students and lowest in definitely evening-type students is notable. In contrast, absenteeism attitude showed a clearer and more consistent association with academic achievement. These findings suggest that academic

achievement may be related not only to chronotype but also to attendance-related attitudes and behaviors. Larger multicenter longitudinal studies are needed to clarify this relationship and its underlying mechanisms more fully.

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Effects of Social and Cognitive Activities on Mental Status and Psychological Well-Being in Community-Dwelling Older Adults: An Intervention Study

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Aim

The progressive increase in the older population has become a significant public health concern worldwide. Aging is commonly associated with a decline in cognitive functions such as memory, attention, and executive processes, as well as an increased risk of social isolation and reduced psychological well-being. These changes not only affect individual quality of life but also impose a growing burden on healthcare systems.

Social engagement and cognitive stimulation have been identified as key components in promoting healthy aging. Activities that combine these two domains are thought to support cognitive reserve, enhance neuroplasticity, and improve emotional well-being. However, there is still a need for structured, practical intervention models that can be implemented in real-life primary care settings and evaluated systematically.

In this context, the present study aimed to investigate the effects of structured social and cognitive performance activities on mental status and psychological well-being among community-dwelling older adults.

Oral Presentation - OP396

Materials and Methods

This study was designed as an interventional study and conducted at a family health center. The study population consisted of individuals aged 65 years and older who applied to primary care services and voluntarily agreed to participate. Ethical approval was obtained from the relevant ethics committee, and informed consent was obtained from all participants prior to data collection. A total of 40 participants who met the inclusion criteria were enrolled in the study.

Inclusion criteria included being 65 years of age or older and being registered at the relevant family health center. Individuals with moderate to severe depressive symptoms, defined as a Beck Depression Inventory (BDI) score of 17 or higher, were excluded from the study and referred for appropriate psychiatric evaluation.

Baseline data were collected through face-to-face interviews conducted by the researcher. A structured questionnaire was used to obtain sociodemographic information, including age, gender, education level, income status, and lifestyle characteristics. Cognitive status was assessed using the Standardized Mini Mental State Examination (SMMSE), while psychological well-being was evaluated using the Psychological Well-Being Scale for the Elderly (YPİÖÖ). The BDI was used only during the screening phase to exclude participants with significant depressive symptoms.

Following the baseline assessment, participants were included in a structured 6-week intervention program. Sessions were conducted once weekly and lasted approximately 60–90 minutes. Participants were organized into small groups of 6–10 individuals in order to promote interaction and active participation. Each session included a combination of social and cognitive activities designed to stimulate different domains of functioning.

The intervention program included activities such as self-introduction and group interaction exercises, memory and recall tasks, word games, storytelling and narrative

completion, group discussions on daily life topics, sharing past experiences, and simple educational sessions related to technology use and health awareness. Attention and concentration exercises, problem-solving tasks, and interactive games were also incorporated. Each session began with a brief warm-up activity and ended with a group reflection, allowing participants to express their experiences and reinforce engagement.

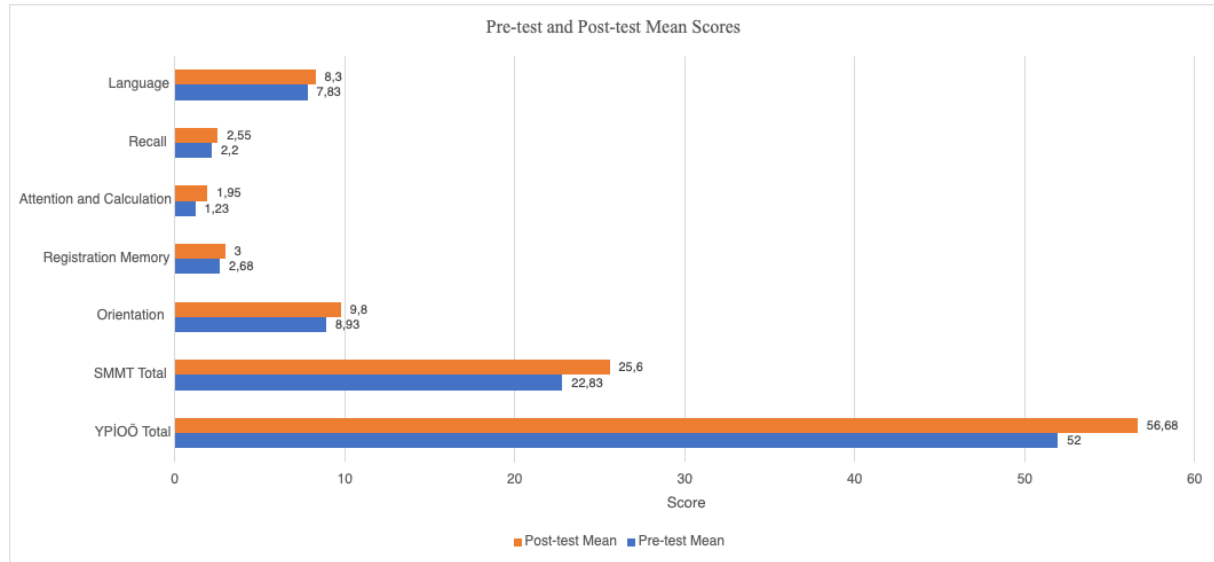
At the end of the 6-week intervention period, participants were reassessed within a two-week interval using the same instruments (SMMSE and YPIÖÖ). Statistical analyses were performed using IBM SPSS Statistics 25.0 and R software. The distribution of variables was evaluated using Kolmogorov-Smirnov and Shapiro-Wilk tests. Depending on the distribution, paired t-tests and Wilcoxon signed-rank tests were used to compare pre- and post-intervention scores. Statistical significance was set at $p < 0.05$. Effect sizes (Cohen's d) were calculated to assess the magnitude of the observed changes

Results

A total of 40 participants completed the study. The mean age of the participants was 71.23 ± 4.06 years, and 75% of the sample consisted of male individuals. The majority of participants had a primary school level of education and reported having regular social interactions and active daily routines.

At baseline, the mean SMMSE total score was 22.83 ± 3.40 , indicating a moderate level of cognitive performance. The mean YPIÖÖ score was 52.00 ± 5.57 , reflecting a moderate level of psychological well-being. Following the 6-week intervention program, both cognitive and psychological outcomes showed noticeable improvement.

The mean SMMSE score increased to 25.60 ± 2.74 , while the mean YPIÖÖ score increased to 56.68 ± 4.11 . As illustrated in Figure 1, there was a clear upward trend in both cognitive performance and psychological well-being scores after the intervention.



SMMSE: Standardized Mini Mental State Examination, YPIÖÖ: Psychological Well-Being Scale for the Elderly

Figure 1. Pre-test and Post-test mean scores of the participants on the research scales

When pre- and post-intervention scores were compared, statistically significant improvements were observed in all SMMSE subdomains, including orientation, registration memory, attention and calculation, recall, and language. Similarly, the increase in YPIÖÖ scores was found to be statistically significant ($p < 0.05$) (**Table 1**).

Table 1. Comparison of Pre-test and Post-test scores

		Mean	n	SD	t or Z	p
SMMSE Subscales	Orientation (Pre-test)	8.93	40	0.97	-4.765	<0.001*
	Orientation (Post-test)	9.80	40	0.69		
	Registration Memory (Pre-test)	2.68	40	0.69	-2.754	0.006*
	Registration Memory (Post-test)	3.00	40	0.00		
	Attention and Calculation (Pre-test)	1.23	40	1.35	-3.497	<0.001*

Pre-test and Post-test Scores	Attention and Calculation (Post-test)	1.95	40	1.81	-2.195	0.028*
	Recall (Pre-test)	2.20	40	0.79		
	Recall (Post-test)	2.55	40	0.71	-3.305	0.001*
	Language (Pre-test)	7.83	40	1.28		
	Language (Post-test)	8.30	40	0.82		
	SMMSE Total (Pre-test)	22.83	40	3.40	-7.655	<0.001*
	SMMSE Total (Post-test)	25.60	40	2.74		
	YPIÖÖ Total (Pre-test)	52.00	40	5.57	-6.887	<0.001*
	YPIÖÖ Total (Post-test)	56.68	40	4.1		

SMMSE: Standardized Mini Mental State Examination, YPIÖÖ: Psychological Well-Being Scale for the Elderly, Mean: Average, SD: Standard Deviation, t: Paired t-value, Z: Wilcoxon Z-value, Paired t-test, Wilcoxon test, *p<0.05

In addition to statistical significance, the magnitude of the observed changes was evaluated using effect size analysis. The increase in SMMSE total scores (Cohen's d=0.81) and YPIÖÖ scores (Cohen's d=0.84) corresponded to a large effect size. Improvements in SMMSE subdomains ranged from moderate to large effect sizes. These findings are summarized in Table 2 and indicate that the intervention had a substantial and clinically meaningful impact.

Table 2. Effect Sizes of Pre-test and Post-test scores

Measurement	Pre-test Mean	Post-test Mean	Cohen's d	Effect Size
Orientation	8.93	9.8	0.9	Large
Registration Memory	2.68	3	0.46	Medium
Attention and Calculation	1.23	1.95	0.53	Medium
Recall	2.2	2.55	0.44	Medium
Language	7.83	8.3	0.37	Medium
SMMSE Total	22.83	25.6	0.81	Large
YPIÖÖ Total	52	56.68	0.84	Large

SMMSE: Standardized Mini Mental State Examination, YPIÖÖ: Psychological Well-Being Scale for the Elderly, Mean: Average, Cohen's d: A Cohen's d value less than 0.2 represents a small effect size, 0.2-0.6 represents a medium effect size, and a value greater than 0.6 represents a large effect size.

Further analyses revealed no statistically significant relationship between age and SMMSE scores. However, a modest positive relationship was observed between age and psychological well-being scores. Variables such as education level, dietary habits, and lifestyle characteristics did not show a statistically significant association with the changes in outcome measures. An additional observation was that participants who did not report using vitamin supplements tended to have higher SMMSE and YPIÖÖ scores, although this finding requires further investigation.

Conclusion

The findings of this study indicate that structured social and cognitive performance activities have a significant and positive effect on both cognitive function and psychological well-being in community-dwelling older adults. The improvements observed after the intervention were not only statistically significant but also of considerable magnitude, suggesting a meaningful clinical impact.

The results support the idea that combining social interaction with cognitive stimulation can play an important role in maintaining mental health and enhancing quality of life in the elderly population. Furthermore, the intervention model used in this study was practical, low-cost, and easily applicable within a primary care setting, highlighting its potential for wider implementation.

Encouraging older individuals to participate in such structured programs may help reduce the risk of cognitive decline, strengthen social connections, and improve overall well-being. Future studies with larger samples, longer follow-up periods, and controlled designs are needed to further examine the long-term effectiveness of these interventions and to validate the present findings.

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***Staphylococcus aureus* in Skin and Soft Tissue Infections: A Four-Year Antimicrobial Resistance Analysis**

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Aims:

Skin and soft tissue infections (SSTIs) are common clinical presentations in both primary care and hospital settings ¹. *Staphylococcus aureus* is a highly significant pathogen worldwide, and methicillin resistance is a key determinant of treatment choice ². The prevalence of methicillin-resistant *S. aureus* (MRSA) strains, in particular, creates significant challenges in treatment approaches and complicates clinical management. MRSA prevalence varies between countries and regions depending on antimicrobial use practices, patient profiles, and the quality of infection control practices, but in many countries it accounts for more than 30% of *S. aureus* isolates ^{3,4}. Treatment options are limited for methicillin-resistant *S. aureus* (MRSA) infections ^{5,6}. Therefore, knowledge of local antibiotic resistance data is critical in determining empirical and targeted therapy. Furthermore, identifying oral antibiotic options allows for the transition to oral sequential therapy in appropriate patients.

The aim of this study is to analyze the changes in antimicrobial resistance patterns in *S. aureus* strains isolated from skin and soft tissue infections over a four-year period, thereby providing data for empirical treatment and infection control strategies.

Materials and methods:

Wound samples sent from hospital clinics were inoculated onto 5% sheep blood agar (Oxoid, Basingstoke, England), eosin methylene blue agar (EMB) (Oxoid), chocolate agar (Oxoid), and SGA (Oxoid) media and incubated aerobically at 35 °C (± 2 °C) for 24–48 hours. The growing microorganisms were identified at the species level using the Microflex LT MALDI-TOF MS system (Bruker Daltonics, Bremen, Germany). Antimicrobial susceptibility testing was performed using the VITEK 2 system (bioMerieux, France), and results were evaluated according to the European Committee on Antimicrobial Susceptibility Testing (EUCAST) criteria. This retrospective study analyzed antimicrobial susceptibility testing of *S. aureus* isolates obtained from wound cultures at a tertiary hospital over a four-year period (2022–2025). Only one isolate per patient was included in the study. In the statistical analysis, the study data were summarized using descriptive statistics. Categorical variables were presented as numbers and percentages.

Results:

Antibiotic susceptibility results of a total of 1541 clinical isolates were analyzed. 57% (879/1541) of the patients were male, and 69% (1065/1541) were ≥ 18 years old. Oxacillin resistance or cefoxitin screen, as an indicator of methicillin resistance, was found to be 63.98%. Resistance rates were 92.8% for penicillin, 41.5% for erythromycin, 39.9% for fusidic acid, 21.4% for mupirocin, 18.2% for clindamycin, 12.4% for tetracycline, and 5.1% for trimethoprim-sulfamethoxazole (Table 1). The MRSA rate was slightly higher in female patients (66.3%) than in male patients (62.2%).

Table 1. Antibiotic resistance rates in *Staphylococcus aureus* isolates

Antibiotics	Resistant (n; %)	Susceptible (n; %)	Total (n; %)
Penicillin	1429 (92.79)	111 (7.21)	1540 (100)
Oxacillin or Cefoxitin screen	986 (63.98)	555 (36.02)	1541 (100)
Erythromycin	640 (41.50)	902 (58.50)	1542 (100)
Fusidic acid	615 (39.91)	926 (60.09)	1541 (100)
Mupirocin	330 (21.40)	1212 (78.60)	1542 (100)

Clindamycin	280 (18.17)	1261 (81.83)	1541 (100)
Tetracycline	191 (12.39)	1350 (87.61)	1541 (100)
Trimethoprim-sulfamethoxazole	78 (5.06)	1463 (94.94)	1541 (100)
Tigecycline	1 (0.06)	1540 (99.94)	1541 (100)
Teicoplanin	0 (0)	1541 (100)	1541 (100)
Vancomycin	0 (0)	1541 (100)	1541 (100)
Daptomycin	0 (0)	1542 (100)	1542 (100)
Linezolid	0 (0)	1541 (100)	1541 (100)

Penicillin resistance was found to be similar to the global level at 92.8%. Analysis over the years revealed a notable increase in fusidic acid resistance, while resistance to clindamycin, trimethoprim-sulfamethoxazole, and tetracycline showed more limited increases. Among oral treatment options, trimethoprim-sulfamethoxazole (TMP-SMZ) had only a 5.1% resistance rate. Furthermore, there was a significant increase in resistance to mupirocin, a topical agent (Figure 1).

Figure 1. Changes in Antibiotic Resistance by Year

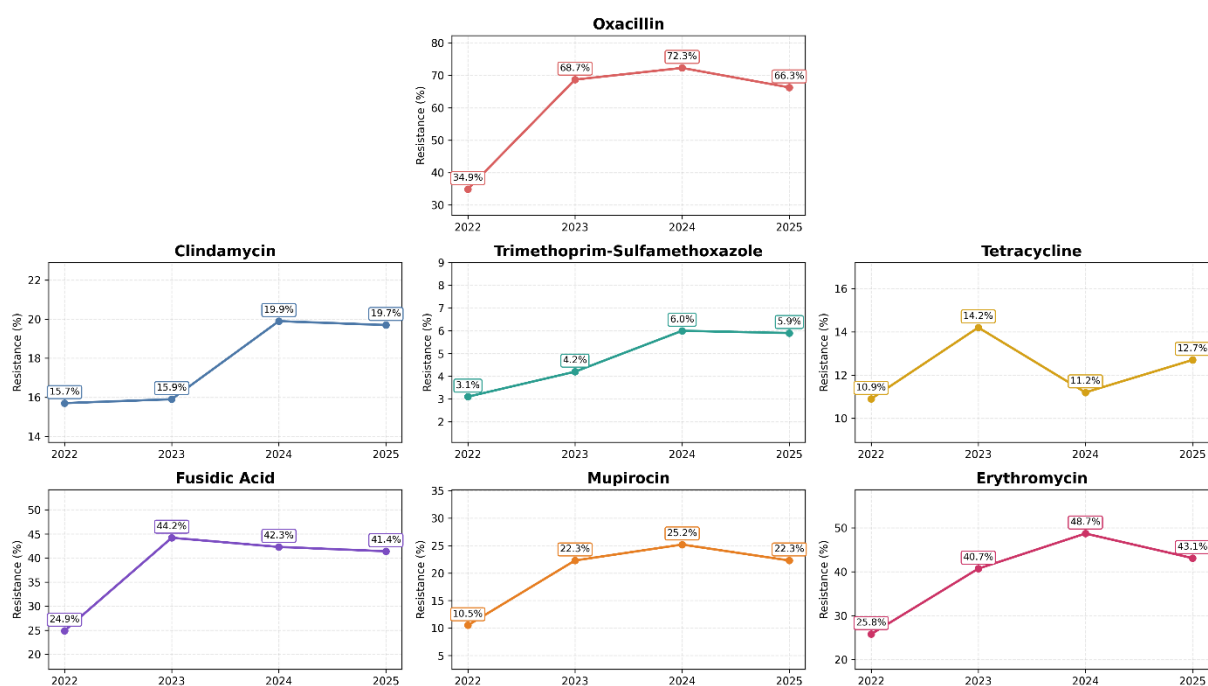


Figure 1. Changes in antibiotic resistance by year

No resistance was detected to vancomycin, daptomycin, and linezolid, which are first-line treatments for MRSA infections.

Discussion:

The results of this four-year analysis highlight a high burden of resistance in *S. aureus* SSTIs in Southern Türkiye. The MRSA prevalence of 63.98% observed in Adana is significantly higher than rates reported in other regional studies. For instance, a study in Kahramanmaraş (2021–2023) reported a rate of 48.2% ⁷, while a pediatric SSTI study in Istanbul (2014–2019) found a much lower prevalence of 22.7% ⁸. This disparity may be attributed to our study being conducted in a tertiary training hospital that manages more complex, healthcare-associated cases, whereas earlier pediatric studies often reflect community-acquired patterns. Penicillin resistance (92.8%) is consistent with data from other regions of Türkiye and neighboring regions such as Saudi Arabia (91-98%) ³. This supports the data that penicillin no longer has a place in the empirical treatment of SSTIs in children or adults. One of the most concerning findings in the study is the high incidence (39.9%) and increasing trend of fusidic acid resistance. This rate is significantly higher than the 8.1% reported in Istanbul pediatric data ⁸ and the 14.2% reported in Kahramanmaraş data ⁷. The high rates of resistance to both fusidic acid (39.9%) and mupirocin (21.4%) suggest selective pressure resulting from the widespread and uncontrolled use of these topical agents in the region. These data indicate that topical agents, particularly fusidic acid, are no longer a reliable option for empirical treatment in our hospital. In contrast, TMP-SMZ remains a highly effective oral option with a resistance rate of 5.1%. This result is consistent with global surveillance data, where susceptibility is generally above 90%. Although a statistically significant increase in TMP-SMZ resistance was reported in Istanbul as of 2019 ⁸, our findings indicate that this agent remains a strong option for oral sequential therapy in Southern Türkiye. The 100% susceptibility found to vancomycin, linezolid, and teicoplanin is consistent with current literature ⁷⁻⁹. Although "vancomycin MIC creep" (increased MIC values within the

susceptible range) is a theoretical concern in the literature ¹⁰, glycopeptides and oxazolidinones maintain their efficacy, especially for critically ill patients.

Conclusion:

In conclusion, the rate of MRSA in *S. aureus* isolates growing in wound cultures is quite high. This situation limits treatment options. Trimethoprim-sulfamethoxazole remains effective among oral treatment options. However, the increase in fusidic acid resistance suggests that this antibiotic is not suitable for empirical treatment. Our findings highlight the importance of continuous surveillance of regional resistance patterns.

Keywords: *Staphylococcus aureus*, Soft tissue Infections, Resistance

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The Effect of Cancer Information Overload on Attitudes Toward Cancer Screening

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Objective

Cancer is a critical disease in terms of public health because it is preventable and treatable when diagnosed early. Early diagnosis and screening programs increase treatment effectiveness by enabling the detection of the disease before clinical symptoms appear (1). Cancer information overload is defined as confusion and distress experienced by individuals who are unable to organize information due to insufficient resources (2). The aim of this study was to investigate the effect of cancer information overload on attitudes toward cancer screening among relatives of cancer patients.

Materials and Methods

This cross-sectional and descriptive study is ongoing, and data obtained from 66 participants are presented. The study was planned to be conducted over a 6-month period among relatives of cancer patients admitted to the Family Medicine Outpatient Clinic of Sivas Cumhuriyet University Health Services Practice and Research Hospital. Data were collected using a 12-item demographic form, the 8-item Cancer Information Overload Scale (CIOS), and the 15-item Attitude Scale for Cancer Screening-Short Form (ASCS-SF). The data were analyzed using SPSS version 23.0, and $p < 0.05$ was considered statistically significant.

Oral Presentation – OP399

Results

The mean age of the participants was 37 ± 13 years (range: 18–81), and 80.3% were female. Of the participants, 69.7% were married and 93.9% had health insurance. When the degree of relationship to the individual diagnosed with cancer was examined, 25.8% reported that the patient was their child, 6.1% their spouse, and 68.2% their sibling. A total of 75.8% of the participants had received information about cancer, and most of this information was obtained from healthcare professionals (69.7%). Among those who received information, 71.4% found it useful. While 84.2% of the participants stated that the concept of cancer frightened them, only 36.4% had undergone cancer screening.

The mean CIOS score was 18 ± 3.5 (range: 8–26), and the mean ASCS-SF score was 50 ± 8 (range: 23–75). No significant difference was found according to sex, education level, marital status, health insurance status, or degree of relationship to the cancer patient ($p > 0.05$). However, women and participants whose child had a history of cancer had higher CIOS and ASCS-SF scores.

Participants who had previously received information about cancer had significantly higher ASCS-SF scores ($p = 0.004$). Although no significant difference was found according to the source of information, those who obtained information from their social environment and other sources had higher ASCS-SF scores. A significant difference was found in information overload levels according to the perceived usefulness of the information ($p = 0.029$), whereas no significant difference was found in attitude scores. Although no significant difference was found according to cancer fear or cancer screening status, participants who were not afraid of cancer and those who had undergone cancer screening had higher attitude scores.

Conclusion

In this study, although participants' attitudes toward cancer screening were positive, their screening behavior appeared to be low. It was concluded that receiving information about cancer may positively influence screening attitudes; however, information alone may not

be sufficient to increase screening behavior. Despite the high level of cancer fear, the low screening rate suggests possible avoidance behavior. Therefore, in addition to providing information, behavior-oriented interventions aimed at reducing fear and anxiety may be needed to increase participation in cancer screening.

Keywords: Cancer Information Overload, Cancer Screening, Screening Attitude, Patient Relatives, Early Diagnosis

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The Impact of Graft Platelet Content on Transplantation Outcomes in Multiple Myeloma Patients Undergoing Autologous Peripheral Stem Cell Transplantation

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Objective: Autologous stem cell transplantation remains a standard component of treatment for Multiple Myeloma (MM). This study aimed to evaluate the impact of graft platelet content on transplantation outcomes, including relapse, survival, engraftment in MM patients who underwent autologous peripheral stem cell transplantation (APBSCT) at our clinic.

Methods: This study included 36 patients diagnosed with MM who underwent APBSCT at our clinic within the last year. Demographic and clinical data, pre-collection complete blood count parameters, autograft composition (platelet count, leukocyte count, hemoglobin level, CD34+ cell dose, etc.), and post-transplant outcomes (relapse, engraftment, survival) were analyzed retrospectively. Data were analyzed using IBM SPSS Statistics version 27.

Results: A total of 36 MM patients with a median age of 60 years (range: 38–73) were included, consisting of 18 females (50%) and 18 males (50%). For mobilization, 8 patients (22.2%) received a combination of granulocyte colony-stimulating factor (G-CSF), chemotherapy, and plerixafor; 21 patients (58.3%) received G-CSF alone; and 7 patients (19.4%) received G-CSF plus plerixafor. The clinical features of the patients and the product's components are presented in Table 1. Overall, 6 patients (16.7%) experienced disease relapse, and 6 patients (16.7%) died. Neutrophil engraftment was achieved in all patients; only one patient failed to achieve platelet engraftment. No significant association

Oral Presentation - OP401

was found between graft platelet content and overall survival ($p=0.3$) or platelet engraftment ($p=0.7$). Pre-procedural CD34+ cell count was correlated with follow-up duration ($p=0.009$). Pre-procedural white blood cell count ($p<0.001$) and pre-procedural hemoglobin level ($p=0.021$) were significantly associated with overall survival. Post-procedural hemoglobin level was positively correlated with overall survival ($p=0.035$) and time from transplantation to relapse ($p=0.02$). Post-procedural leukocyte count was also positively correlated with overall survival ($p<0.001$). Graft CD34+ cell dose showed a negative correlation with mortality ($p=0.01$). A significant association was observed between graft leukocyte count and platelet engraftment ($p=0.012$). The 2-year overall survival rate was approximately 89%. Figure 1 displays the overall survival curve for all patients.

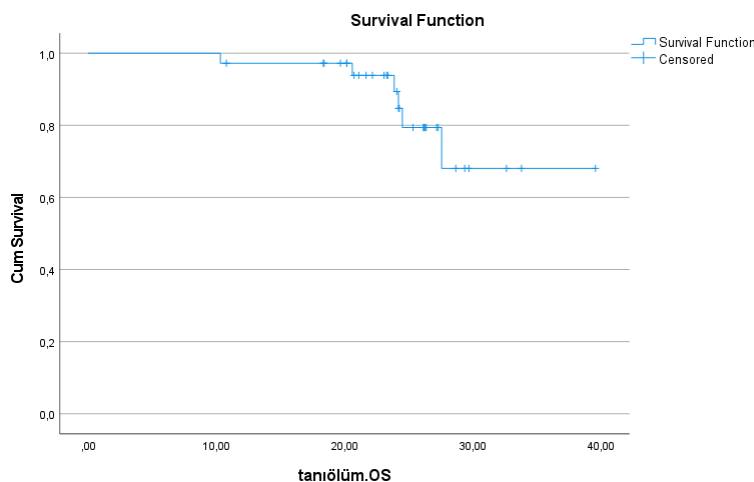


Figure 1: Overall Survival Curve of the Patients

Table 1: The clinical features of the patients and the product's components

	Median (minimum-maximum)
Pre-procedure hemoglobin level (g/dl)	12.1 (8-14.9)
Pre-procedure leukocyte count (10 ⁹ /l)	37.3 (19.3-81.7)
Pre-procedure platelet count (10 ⁹ /l)	201 (77-407)
Product CD34 (10 ⁶ /kg)	6.1 (0.99-13.23)
Post-procedure hemoglobin level (g/dl)	10.2 (6.9-13.5)

Post-procedure leukocyte count (10 ⁹ /l)	32.5 (12.3-57.9)
Post-procedure platelet count (10 ⁹ /l)	124 (49-225)
Product hemoglobin (g/dl)	2.8 (0.6-5.1)
Product leukocyte (10 ⁶ /ml)	292.4 (152-389)
Product platelet (10 ¹⁰ /L)	558 (267-2434)
Viabilite (%)	%89 (%65-%98)
Infused CD34+ cell count (10 ⁶ /Kg)	4.9 (4.19-10.9)
Neutrophil engraftment (day)	12 (9-19)
Platelet engraftment (day)	13 (6-22)
Time from transplant to relapse (months)	9.7 (0.87-10.6)
Time from diagnosis to transplant (months)	7.8 (4-25.8)
Overall survival (months)	24 (10.3-39.5)
Follow-up period (months)	15.8 (1.7-26)
Time from CD34 + cell collection to transplantation (months)	1.57 (0.6-3.53)

Conclusion: Studies in the literature have investigated the impact of autograft composition—including CD34+ cell dose, CD3+ cell dose, lymphocyte subset counts, and their ratios—on transplantation outcomes (1,2,3). In our study, we found that graft platelet content did not affect transplantation outcomes such as relapse, survival, or engraftment in MM patients undergoing autologous stem cell transplantation.

Keywords: Autologous Peripheral Stem-cell Transplantation, Multiple Myeloma, Product Platelet

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Screening for Peripheral Artery Disease Using the Edinburgh Claudication Questionnaire and Investigation of Associated Factors

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Abstract

Peripheral artery disease (PAD) is a condition characterized by atherosclerotic narrowing or occlusion of the lower extremity arteries and represents an important clinical manifestation of systemic atherosclerosis. Although intermittent claudication is the most typical symptom of PAD, a considerable proportion of patients remain asymptomatic, making early diagnosis difficult. Therefore, the use of easily applicable screening methods in primary healthcare settings is of great importance. This study was designed to determine the frequency of intermittent claudication using the Edinburgh Claudication Questionnaire among individuals presenting to primary healthcare institutions and to evaluate demographic and clinical risk factors associated with claudication. A total of 526 participants were included in the study, including 304 women and 222 men. Leg pain or discomfort while walking was reported in 190 participants (36.2%), whereas 336 participants (63.8%) had no such complaints. Overall, claudication was identified in 54 participants (10.3%). According to sex-based analyses, the prevalence of claudication was higher in men (13.5%) than in women (7.9%), and this difference was considered statistically/significantly borderline

significant ($p < 0.05$). Age-group analysis demonstrated claudication rates of 3.1% in participants aged ≤ 50 years, 7.7% in those aged 51–60 years, and 20.7% in those aged ≥ 61 years, revealing a significant association between age and claudication ($p < 0.05$). Regarding pain localization, among 351 reported pain sites, the calf was the most frequently affected region (31.1%), followed by the thigh (26.5%), foot/ankle/joints (23.1%), and buttock (19.4%). Among participants with claudication, 62.9% had typical and 37.1% had atypical claudication. In addition, 70.3% of claudication cases were classified as grade 1 and 29.7% as grade 2. These findings indicate that intermittent claudication is relatively common in the community and is significantly associated with advanced age and male sex. Furthermore, the heterogeneous distribution of symptoms and the presence of atypical cases suggest that diagnosis may be missed when based solely on clinical evaluation. This highlights the importance of standardized screening tools such as the Edinburgh Claudication Questionnaire in primary care settings. In conclusion, primary healthcare services play a critical role in the early diagnosis of PAD. Early identification and appropriate referral of high-risk individuals may contribute to reducing PAD-related morbidity and mortality. Therefore, systematic screening approaches should be expanded, particularly in older populations and individuals with multiple cardiovascular risk factors.

Keywords: Peripheral Artery Disease, Claudication, Edinburgh Claudication Questionnaire

Introduction

Peripheral artery disease (PAD) is a common vascular disorder characterized by progressive atherosclerotic narrowing or occlusion of the lower extremity arteries and is associated with significant cardiovascular consequences. PAD is not merely a localized circulatory disorder affecting the lower extremities but is considered a clinical manifestation of systemic atherosclerosis within the peripheral vascular bed (1,2).

Consequently, individuals with PAD have an increased prevalence of coronary artery disease and cerebrovascular disease. In advanced stages, PAD is associated with substantially increased cardiovascular morbidity and mortality (3).

Intermittent claudication is the most characteristic clinical manifestation of PAD and is defined by pain or cramping in the lower extremities induced by exercise and relieved by rest (1,4). Although pain is most commonly localized in the calf muscles, it may also occur in the buttocks, thighs, or feet depending on the location of arterial obstruction. However, a substantial proportion of patients with PAD remain asymptomatic or present with atypical symptoms (3). This makes early diagnosis challenging and often leads to delayed recognition of the disease. Particularly in diabetic patients, concomitant neuropathy may diminish pain perception, resulting in a clinically silent disease course.

Risk factors involved in the development of PAD are largely similar to those associated with other atherosclerotic diseases. Smoking, diabetes mellitus, hypertension, hyperlipidemia, and advanced age are among the most important risk factors (5). Smoking is considered the strongest modifiable risk factor for PAD. The risk of developing PAD has been reported to be 2–6 times higher in smokers compared with non-smokers (6). The Edinburgh Artery Study demonstrated that intermittent claudication was approximately four times more common among smokers (7). Both the duration and intensity of smoking are associated with increased disease severity and risk. Continued smoking is also associated with graft occlusion, amputation, and increased mortality rates (1). Conversely, smoking cessation has been shown to improve symptoms, increase walking capacity, and reduce cardiovascular events.

Diabetes mellitus is another major risk factor for PAD. The risk of PAD is reported to increase approximately 2–4 fold among diabetic individuals (8). Chronic hyperglycemia accelerates the atherosclerotic process through oxidative stress, inflammation, and endothelial injury. In diabetic patients, PAD tends to occur at younger ages and follows a more aggressive clinical course. Furthermore, severe complications such as ulceration, infection, and amputation are more common in diabetic individuals. Poor glycemic

control further increases PAD risk, and each 1% increase in HbA1c has been associated with a significant increase in disease risk (8,9).

Hypertension and hyperlipidemia also contribute to the development of PAD by accelerating the atherosclerotic process. In hypertensive individuals, endothelial injury and vascular wall stress facilitate atherosclerotic progression. The Framingham Heart Study demonstrated a significant association between elevated blood pressure and intermittent claudication (10). Similarly, high total cholesterol and low HDL cholesterol levels have been associated with the development of PAD (11). Individuals with an atherogenic lipid profile are particularly susceptible to peripheral artery disease.

In this context, the Edinburgh Claudication Questionnaire has emerged as an important tool for the assessment of intermittent claudication and screening for PAD. The questionnaire is a standardized and practical screening method designed to systematically evaluate exercise-related lower extremity pain in primary care settings. The use of this questionnaire may facilitate early identification of asymptomatic or atypically symptomatic individuals. Early diagnosis enables timely control of risk factors, implementation of lifestyle modifications, and initiation of appropriate therapeutic interventions aimed at reducing cardiovascular complications.

PAD should not be regarded solely as a localized lower extremity disorder but rather as a clinical indicator of widespread atherosclerotic burden. Therefore, early recognition of PAD is important not only for preserving limb health but also for reducing the risk of coronary and cerebrovascular events. Particularly in primary healthcare settings, identifying high-risk individuals and implementing appropriate screening strategies may contribute substantially to reducing disease-related morbidity and mortality. Accordingly, screening for PAD using the Edinburgh Claudication Questionnaire and evaluating associated risk factors may provide important clinical benefits for population-based cardiovascular risk management.

Materials and Methods

This descriptive cross-sectional study was designed to identify individuals with claudication using the Edinburgh Claudication Questionnaire, investigate factors potentially associated with claudication, and interpret and discuss the findings within the context of peripheral artery disease. Ethical approval for the study was obtained from the Mersin University Clinical Research Ethics Committee (Decision No: 196, Date: 21.02.2024). Data collection was conducted between 01.05.2024 and 01.12.2025 in the central districts and peripheral regions of Mersin province. Individuals who voluntarily agreed to participate were informed about the study, and informed consent was obtained from all participants. Participants meeting the inclusion criteria were enrolled in the study. Inclusion criteria were: age ≥ 40 years, absence of communication difficulties, and absence of dementia or impaired consciousness. Individuals with altered consciousness, acute circulatory disorders, amputation, or severe vascular deformities were excluded. In addition, individuals with a history of lower extremity bypass surgery, particularly those involving saphenous vein grafts, were excluded because pseudo-claudication symptoms could interfere with symptom-based evaluation. Sample size calculation was performed using a 95% confidence level and a 5% margin of error, yielding a minimum target sample size of 460 participants. Ultimately, data from 618 participants were collected, and complete datasets from 526 participants were included in the final analyses. Collected data were transferred to a computerized database and analyzed statistically. The normality of continuous variables was assessed using the Kolmogorov-Smirnov test. Descriptive statistics were presented as mean $\pm$ standard deviation, median (min-max), and percentages (%). Independent samples t-test or Mann-Whitney U test was used for comparisons between groups, while categorical variables were analyzed using the chi-square test. Multivariate logistic regression analysis was performed to determine factors independently associated with claudication. Statistical significance was accepted as $p < 0.05$. All participants completed the Edinburgh Claudication Questionnaire. In addition, peripheral pulse examination and ankle-brachial index (ABI) measurements were

performed as part of the clinical evaluation. Suspected cases were referred to higher-level healthcare institutions for further diagnostic evaluation and management.

Results

Data from a total of 618 participants were collected for the study. Complete datasets from 526 participants were included in the final analyses. Of the participants, 304 were female (57.7%) and 222 were male (42.3%). The mean age of the participants was 56.9 ± 11.2 years (range: 40–94 years).

The prevalence of claudication was 7.9% in women and 13.5% in men. Claudication prevalence was higher in men than in women, and a statistically/significantly borderline significant association was identified between sex and the presence of claudication. Male sex was associated with an increased risk of claudication.

According to age-group analyses, claudication rates were 3.1% in participants aged ≤ 50 years, 7.7% in those aged 51–60 years, and 20.7% in those aged ≥ 61 years. A statistically significant association was observed between age groups and claudication. Claudication prevalence increased markedly with advancing age, with the highest prevalence detected in the ≥ 61 -year age group (20.7%).

When claudication frequency was evaluated according to body mass index (BMI) categories, claudication prevalence increased significantly with increasing BMI. Claudication frequency was 5.9% in normal-weight individuals, 8.6% in overweight individuals, and 17.1% in obese individuals. Chi-square analysis demonstrated that this difference was statistically significant ($p < 0.05$). These findings suggest a strong positive association between increased BMI and the presence of claudication and indicate that symptoms related to peripheral artery disease may occur more frequently in obese individuals.

When claudication frequency was evaluated according to diabetes status, claudication prevalence was found to be higher among individuals with diabetes mellitus. Claudication prevalence was 9.0% in non-diabetic individuals and 17.5% in diabetic individuals. Chi-

square analysis revealed that this difference was statistically significant ($p < 0.05$). These findings suggest a significant association between diabetes mellitus and claudication and indicate that diabetes may be an important risk factor for symptoms associated with peripheral artery disease.

Evaluation of the relationship between coronary artery disease (CAD) and claudication demonstrated that claudication prevalence was significantly higher among individuals with CAD. Claudication prevalence was 8.6% in participants without CAD and 18.8% in those with CAD. Chi-square analysis demonstrated that this difference was statistically significant ($p < 0.05$). These findings suggest a significant association between CAD and symptoms of peripheral artery disease and indicate that systemic atherosclerotic processes may simultaneously affect different vascular beds.

Among the 526 participants, 75 individuals (14.3%) were receiving anticoagulant therapy, while claudication was detected in 54 participants (10.3%). Claudication prevalence was 10.0% (45/451) among participants not using anticoagulants and 12.0% (9/75) among those using anticoagulants. Although claudication prevalence appeared slightly higher in the anticoagulant group, the difference was small. Moreover, participants without claudication constituted the majority in both groups: 90.0% among non-users and 88.0% among users. No statistically significant association was identified between anticoagulant use and claudication.

Alcohol consumption was reported in 109 participants (20.7%), while claudication was detected in 54 participants (10.3%). Claudication prevalence was 9.8% (41/417) among non-drinkers and 11.9% (13/109) among alcohol users. Although claudication prevalence appeared slightly higher among alcohol users, the difference between groups was limited, and the overall distribution was similar. No statistically significant association was found between alcohol consumption and claudication ($p > 0.05$).

Smoking was reported in 155 participants (29.5%), while claudication was identified in 54 participants (10.3%). Claudication prevalence was 7.8% (29/371) among non-

smokers and 16.1% (25/155) among smokers. Accordingly, claudication prevalence was approximately twofold higher among smokers compared with non-smokers. Claudication was more frequently observed in smokers, suggesting a possible association between smoking and claudication. A statistically significant association was identified between smoking and the presence of claudication.

Table 1. Multivariate Logistic Regression Analysis of Variables Found to Be Significantly Associated with Claudication in Univariate Analyses

Parameter	Adjusted OR (Odds Ratio)	%95 CI (Confidence Interval)	p value
Age	1.06	1.03 – 1.09	<0.001
Sex (Male)	1.28	0.71 – 2.29	0.40
BMI	1.02	0.97 – 1.06	0.42
Diabetes Mellitus	1.41	0.72 – 2.76	0.31
Coronary Artery Disease	2.08	1.12 – 3.85	0.02
Smoking	2.01	1.14 – 3.55	0.01

Multivariate logistic regression analysis was performed including variables significantly associated with claudication in univariate analyses, namely age, sex, body mass index (BMI), diabetes mellitus, coronary artery disease (CAD), and smoking. Age (OR=1.06, $p<0.001$), coronary artery disease (OR=2.08, $p=0.02$), and smoking (OR=2.01, $p=0.01$) were independently associated with claudication. These findings indicate that the effects of sex, BMI, and diabetes mellitus diminished or lost statistical significance after regression analysis. The strongest independent associations with claudication were observed for CAD and smoking, both of which were associated with approximately a twofold increased risk.

Among the 526 participants included in the study, a total of 351 different pain sites were reported. Pain was most frequently localized in the calf region (31.1%), followed by the thigh (26.5%), foot/ankle/joints (23.1%), and buttock (19.4%).

Discussion

In the present study, data from a total of 618 participants were collected, and complete datasets from 526 individuals were included in the final analyses. Of the participants, 57.7% were female and 42.3% were male, with a mean age of 56.9 ± 11.2 years. This age distribution indicates that the study population represented a relatively younger group, although still close to the age range in which the prevalence of peripheral artery disease (PAD) increases substantially. Previous studies have demonstrated that the prevalence of PAD rises markedly with advancing age, particularly after the age of 65 years (1,12). In our study, the significant increase in claudication prevalence with age was consistent with these findings. While the prevalence of claudication was 3.1% in participants aged ≤ 50 years, it increased to 20.7% in those aged ≥ 61 years. This finding supports the role of age as a strong determinant of peripheral artery disease.

With respect to sex differences, claudication prevalence was found to be higher in men than in women (13.5% vs. 7.9%). The Framingham Study reported that the frequency of intermittent claudication increased markedly with age in men, whereas lower rates were observed in women (10). Similarly, Fowkes et al. demonstrated that although PAD prevalence may be comparable between sexes, the disease tends to be more symptomatic in men (13). Our findings support the notion that PAD follows a more clinically symptomatic course in male individuals. On the other hand, the more frequent asymptomatic presentation in women may lead to delayed diagnosis. Therefore, elderly male individuals should be evaluated more carefully in terms of peripheral artery disease risk.

An increase in body mass index (BMI) was associated with a corresponding increase in claudication prevalence. Claudication frequency was 5.9% among normal-weight individuals, whereas it reached 17.1% among obese individuals. Obesity is known to accelerate the atherosclerotic process through mechanisms including insulin resistance, inflammation, and endothelial dysfunction (3). Therefore, a higher frequency of PAD-related symptoms among obese individuals is an expected finding. However, the loss of

statistical significance of BMI in multivariate analysis suggests that the effect of obesity may be mediated through other cardiovascular risk factors. Nevertheless, obese individuals should still be carefully evaluated for peripheral artery disease in primary healthcare settings.

A significant association was identified between diabetes mellitus and claudication. Claudication prevalence was 9.0% in non-diabetic individuals and 17.5% in diabetic individuals. Diabetes mellitus is a well-established risk factor for peripheral artery disease, and chronic hyperglycemia is known to accelerate atherosclerotic progression (1,3). Furthermore, complications such as ulceration, gangrene, and amputation are more common in diabetic patients (14). However, concomitant neuropathy in diabetic individuals may mask or attenuate symptoms, resulting in delayed recognition of PAD. In our study, the loss of statistical significance of diabetes mellitus after multivariate analysis suggests that its effect may largely be related to age, smoking, and concomitant cardiovascular disease burden. Therefore, symptom-based evaluation alone may be insufficient in diabetic individuals, and objective screening methods should also be utilized.

Participants with coronary artery disease (CAD) demonstrated a significantly higher prevalence of claudication compared with those without CAD (18.8% vs. 8.6%). This finding supports the concept that PAD represents a manifestation of systemic atherosclerosis. Previous studies have shown that coronary artery disease and cerebrovascular disease frequently coexist in individuals with PAD (15). Data from the REACH registry also demonstrated that a substantial proportion of patients with PAD had concomitant coronary artery disease. Our findings indicate that the prevalence of claudication increases with increasing systemic atherosclerotic burden. Therefore, individuals with coronary artery disease should also be evaluated for peripheral artery disease in order to facilitate early diagnosis and appropriate cardiovascular risk management.

Smoking was identified as one of the strongest factors associated with claudication in our study. Claudication prevalence was 7.8% among non-smokers and 16.1% among smokers. In addition, multivariate logistic regression analysis demonstrated that smoking was an independent risk factor for claudication (OR=2.01). Smoking is known to accelerate atherosclerosis through endothelial dysfunction, inflammation, and oxidative stress (5). The Framingham Study and other epidemiological investigations have similarly demonstrated that smoking is a major risk factor for intermittent claudication (10). Our findings are consistent with the existing literature and support the significant role of smoking in both the development and symptomatic progression of peripheral artery disease. Consequently, smoking cessation should be considered one of the most important modifiable interventions for preventing PAD progression.

Multivariate logistic regression analysis revealed that age, smoking, and coronary artery disease were independently associated with claudication. The odds ratio for age indicated that each additional year increased the risk of claudication by approximately 6%. Coronary artery disease and smoking were both associated with an approximately twofold increased risk. In contrast, the loss of significance of sex, BMI, and diabetes mellitus suggests that their effects are largely mediated through systemic atherosclerotic burden and associated cardiovascular risk factors. These findings indicate that the most important determinants of claudication development in PAD are advanced age, smoking, and concomitant atherosclerotic disease burden.

Evaluation of pain localization among individuals reporting leg pain while walking revealed that the calf region was the most commonly affected site (31.1%). This finding is consistent with previous reports indicating that typical intermittent claudication in PAD is most frequently localized to the calf muscles (1). However, the presence of pain in the thigh, buttock, and foot regions in a considerable proportion of participants indicates that exercise-related pain is not always vascular in origin. Indeed, only 28.5% of individuals reporting pain were diagnosed with claudication. This finding suggests that relying solely on symptom presence is insufficient for the diagnosis of PAD and highlights the

importance of careful differential diagnosis. Furthermore, the presence of atypical symptoms in approximately one-third of claudication cases supports the heterogeneous clinical presentation of peripheral artery disease (3).

The fact that the majority of claudication cases in our study were classified as Grade 1 (70.3%) suggests that PAD may be detected at earlier and milder stages in primary healthcare settings. Referral of more advanced symptomatic cases to secondary or tertiary healthcare institutions may also explain this distribution. These findings demonstrate that simple symptom-based screening tools and standardized screening methods used in primary care may provide important clinical benefits. Nevertheless, symptom-based evaluation alone appears insufficient, and the combined use of objective methods such as the Edinburgh Claudication Questionnaire and ankle-brachial index measurements may provide more accurate diagnostic results (16).

Conclusion

In this study, the frequency of intermittent claudication, the most important clinical manifestation of peripheral artery disease (PAD), and its associated risk factors were evaluated using the Edinburgh Claudication Questionnaire among individuals presenting to primary healthcare institutions. The prevalence of claudication was found to be 10.3%, indicating that PAD represents a significant health problem encountered at a considerable frequency in primary healthcare settings.

One of the principal findings of the study was the strong association between age and claudication. Claudication prevalence increased markedly with advancing age and reached its highest level in individuals aged ≥ 61 years. This finding supports the relationship between peripheral artery disease and progressive atherosclerotic processes. The higher prevalence of claudication observed in men is also consistent with the existing literature and suggests that male sex may be associated with an increased risk of PAD. Nevertheless, the increased risk among elderly women should also be taken into consideration.

Significant associations were identified between claudication and obesity, diabetes mellitus, and coronary artery disease. The increase in claudication prevalence with higher body mass index indicates the adverse effects of obesity on peripheral circulation. Similarly, the higher prevalence of claudication among diabetic individuals is likely related to the accelerating effect of diabetes on atherosclerotic progression. The association between coronary artery disease and claudication further supports the concept that peripheral artery disease represents part of the systemic atherosclerotic disease spectrum. These findings indicate that PAD should not be regarded merely as a localized vascular disorder but rather as a clinical marker of widespread cardiovascular risk.

Another notable finding of the study was the heterogeneous distribution of symptoms. Although pain was most frequently localized to the calf region, consistent with the classical definition of intermittent claudication, substantial proportions of participants also reported pain in the thigh, buttock, and foot regions. This finding indicates that PAD does not always present with typical symptoms. Furthermore, the presence of atypical claudication in a considerable proportion of cases suggests that approaches based solely on classical clinical evaluation may be insufficient. This highlights the importance of standardized screening tools.

The findings of this study demonstrate the critical role of primary healthcare services in the early diagnosis of peripheral artery disease. Since family medicine clinics are often the first point of contact for patients, high-risk individuals may be identified and appropriately referred at earlier stages. However, the frequent asymptomatic or atypical presentation of PAD may lead to missed diagnoses during routine clinical evaluation. Therefore, the use of simple, low-cost, and standardized tools such as the Edinburgh Claudication Questionnaire in primary care may provide substantial clinical benefits. In particular, risk-based screening strategies targeting elderly individuals and those with diabetes mellitus, obesity, smoking history, or known cardiovascular disease may facilitate the early identification of high-risk patients.

In conclusion, this study demonstrates that peripheral artery disease is a common but frequently overlooked health problem in primary healthcare settings. Early diagnosis, effective management of risk factors, and implementation of appropriate screening strategies are essential not only for reducing PAD-related morbidity but also for decreasing associated cardiovascular events. Therefore, systematic and proactive approaches toward PAD should be adopted in family medicine practice. Furthermore, larger multicenter studies are needed to develop more effective population-based screening and management strategies.

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Investigation of Adult Women's Knowledge, Awareness, Concerns, and Attitudes Regarding HPV (Human Papillomavirus)-Related Diseases and HPV Vaccination

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Abstract

Human papillomavirus (HPV) infection is one of the most common sexually transmitted infections worldwide and is recognized as a major etiological factor in the development of various genital and oropharyngeal cancers, particularly cervical cancer. Although HPV vaccines are considered effective and safe preventive interventions against HPV-related malignancies, vaccine acceptance and vaccination rates remain below the desired levels in our country, as in many other countries worldwide. This study aimed to evaluate women's levels of knowledge, attitudes, and behaviors regarding HPV infection and HPV vaccination based on face-to-face interviews conducted with 452 female participants. In addition, participants' willingness to receive HPV vaccination, reasons for vaccine hesitancy or refusal, concerns regarding vaccine safety and necessity, and their general opinions about vaccine hesitancy and vaccine rejection were investigated. It was found that 27% of the participants had no knowledge about HPV and HPV-related cancers, while 32% reported having no knowledge about the HPV vaccine. Furthermore, 88% of the participants had not received HPV vaccination. Among unvaccinated participants, the most commonly reported reasons for not receiving the vaccine were "the vaccine being expensive/paid"

Oral Presentation - OP403

(36%) and “insufficient knowledge about the disease/vaccine” (32%). Regarding the administration of the HPV vaccine to women and girls older than 9 years of age, 56% of the participants stated that “it is appropriate for women and girls,” 25% stated that “it should be administered to women, but I have concerns about vaccination in young girls,” 8% stated that “I have concerns about the effectiveness and side effects of vaccines in general and oppose vaccines other than routine Ministry of Health immunizations,” and 7% stated that “I have concerns regarding its effectiveness and side effects and do not want anyone to receive it.” Additionally, 3.3% of participants reported that “I have concerns regarding the effectiveness and side effects of all vaccines in general and oppose all vaccination practices.” With its evidence-based efficacy and high level of protection, HPV vaccination represents one of the most effective components of preventive healthcare services at both individual and societal levels. Regular implementation of HPV vaccination is of vital importance in reducing HPV-related infections and the associated disease burden. Ensuring easy access to HPV vaccination for adult women and girls older than 9 years of age is critical for increasing vaccination coverage within the community. In this context, providing the vaccine free of charge and incorporating it into the national immunization schedule would offer a sustainable public health solution. Inclusion of the HPV vaccine in routine immunization programs would substantially reduce the long-term incidence of cervical cancer, decrease the economic burden on healthcare systems, and contribute to increased public awareness.

Keywords: HPV (Human Papillomavirus), HPV Vaccine, Knowledge, Awareness, Concern, Attitude

Introduction

Human papillomavirus (HPV) is a non-enveloped double-stranded DNA virus belonging to the Papillomaviridae family and is known to infect only humans (1,2). More than 200 HPV genotypes have been identified to date, approximately 40 of which infect the genital epithelium (3). HPV infection is considered one of the most common sexually transmitted

infections worldwide, and the majority of sexually active individuals are believed to encounter HPV at some point during their lifetime (4). Most infections remain asymptomatic and are cleared spontaneously by the immune system within one to two years (5). However, persistent infection with high-risk HPV types may result in malignant transformation.

The clinical significance of HPV has increased primarily because of its strong association with cervical cancer. Studies have demonstrated that approximately 99% of cervical cancer cases are associated with HPV infection (3). In particular, HPV types 16 and 18 play a major role in the development of cervical cancer and are also associated with anal, vulvar, vaginal, penile, and oropharyngeal cancers (6). According to the World Health Organization and the International Agency for Research on Cancer, cervical cancer remains one of the most common cancers among women and continues to be a major cause of cancer-related mortality worldwide (7). GLOBOCAN 2020 data indicated that approximately 604,000 women were diagnosed with cervical cancer globally and nearly 342,000 women died from the disease. Although the incidence of cervical cancer is relatively lower in Türkiye, it is still considered an important public health problem (3). Viral oncoproteins play a central role in the malignant transformation associated with HPV infection. In particular, E6 and E7 proteins inhibit tumor suppressor genes such as p53 and retinoblastoma (Rb), thereby promoting cellular proliferation and carcinogenesis. Persistent localization of the virus within the basal epithelial cells of the cervical transformation zone is critically important in the development of cervical intraepithelial neoplasia. While low-risk HPV types are generally associated with benign warts and papillomas, high-risk types are associated with precancerous lesions and invasive cancers (6).

The epidemiology of HPV infection varies according to geographic regions and populations. The global prevalence of HPV infection has been reported to be approximately 11.7%, with particularly high rates observed in Sub-Saharan Africa, Latin America, and Eastern Europe (8). Studies conducted in Türkiye have demonstrated that the prevalence of HPV types 16 and 18 increases with the severity of cervical lesions. In

addition, HPV infection is more frequently observed among immunocompromised individuals, HIV-positive patients, individuals with multiple sexual partners, and men who have sex with men.

The primary route of HPV transmission is sexual contact. However, not only penetrative sexual intercourse but also genital skin-to-skin contact may be sufficient for transmission (9). In addition, transmission through contaminated surfaces, shared personal items, vertical transmission during childbirth, and rarely inhalation has also been reported. Early onset of sexual activity, multiple sexual partners, smoking, immunosuppression, and low socioeconomic status are among the major risk factors for HPV infection. Smoking has been shown to facilitate persistent HPV infection and increase the risk of malignant transformation (10).

Although HPV infections are frequently asymptomatic, they may present with a broad clinical spectrum ranging from genital warts to invasive cancer. One of the most common clinical manifestations is anogenital warts, most of which are caused by HPV types 6 and 11. In addition, cervical intraepithelial lesions, anal cancer, vulvar and vaginal cancers, penile cancer, and oropharyngeal cancers are important HPV-related diseases. Since cervical cancer generally develops over many years, early detection of precancerous lesions is crucial for timely intervention.

Screening programs and vaccination constitute the primary strategies for preventing HPV-related diseases. The Pap smear test has long been used as a low-cost and effective screening method for cervical cancer (11). Today, HPV-DNA tests are also widely used for the detection of high-risk HPV types. Within the framework of the national screening program in Türkiye, women between 30 and 65 years of age are recommended to undergo HPV-DNA testing every five years. Expanding screening programs is expected to facilitate early diagnosis of cervical cancer and reduce disease-related mortality.

Prophylactic vaccination is one of the most effective methods for preventing HPV infection. Currently, bivalent (Cervarix), quadrivalent (Gardasil), and 9-valent (Gardasil-9) HPV vaccines are available. These vaccines have been shown to provide strong immunity against high-risk HPV types and significantly reduce HPV-related malignancies,

particularly cervical cancer (12). The World Health Organization recommends widespread HPV vaccination among girls as part of the global strategy for cervical cancer elimination. However, the HPV vaccine has not yet been included in the national immunization program in Türkiye, and individuals can access the vaccine only through personal financial means. Studies conducted in Türkiye indicate that HPV vaccination rates remain considerably low.

In recent years, vaccine hesitancy and vaccine refusal have also emerged as major barriers to the widespread implementation of HPV vaccination. Misinformation regarding vaccine safety, social media-based disinformation, religious and cultural concerns, and financial barriers may negatively affect individuals' attitudes toward vaccination. Therefore, accurate public education regarding HPV infection, cervical cancer, and HPV vaccines is of great importance.

The aim of this study was to evaluate adult women's knowledge, attitudes, and behaviors regarding HPV infection, HPV vaccination, and cervical cancer screening, to identify factors influencing these perspectives, and to contribute to public awareness on this issue.

Materials and Methods

This study included women aged 18 years and older who voluntarily agreed to participate and presented to the Mersin University Faculty of Medicine Department of Family Medicine outpatient clinic between 01.03.2025 and 01.07.2025. Data from 452 women whose information was collected completely and appropriately were included in the analyses.

The following data were collected through face-to-face interviews: age, number of children, educational status, marital status, monthly family income, level of knowledge regarding HPV infection, level of knowledge regarding the HPV vaccine, history of cervical cancer screening/check-up, sources from which participants had heard or learned about HPV, HPV vaccination status, reasons for not receiving the vaccine if unvaccinated, and opinions regarding administration of the HPV vaccine to adult women and girls older than 9 years of age. Ethical approval for the study was obtained from the Mersin University Clinical Research Ethics Committee (Decision No: 097, Date: 22.01.2025).

Data were collected using an electronic data collection form developed within the “Data Collection and Analysis Module” of the Mini Tıp Akademisi Education and Research Platform (minitipakademisi.com). Preliminary analyses, data control procedures, coding processes, and generation of tables were also performed using this module. Advanced statistical analyses were conducted and verified using different artificial intelligence platforms and IBM Statistics software.

In statistical analyses, descriptive characteristics were presented as numbers and percentages (%) for categorical variables, and as mean $\pm$ standard deviation values for continuous variables where appropriate according to distribution characteristics. Fisher’s exact test was used for comparisons of categorical variables. Distribution of continuous variables was evaluated using the Kolmogorov–Smirnov and Shapiro–Wilk tests. For comparisons of non-normally distributed continuous variables, the Mann–Whitney U test and Kruskal–Wallis test were used where appropriate. For normally distributed continuous variables, one-way ANOVA was used for comparisons between independent groups. A p-value of <0.05 was accepted as statistically significant.

Results

This study was conducted between 01.03.2025 and 01.07.2025 with 452 female participants aged 18 years and older who presented to the Family Medicine outpatient clinic of Mersin University Faculty of Medicine.

Regarding educational status, 48.5% (n=219) of the participants reported being university graduates, while 13.7% (n=62) stated that they had completed primary school education. In addition, 27.4% (n=124) were high school graduates and 10.4% (n=47) had completed middle school education. Younger participants were found to have higher educational levels. Concerning marital status, 62.4% (n=282) of the participants were married, 27.9% (n=126) were single, and 9.7% (n=44) were divorced or widowed. Regarding monthly household income, 34.3% (n=155) reported income above the poverty threshold, 16.2% (n=73) reported income below the minimum wage, and 49.6% (n=224) stated that their monthly income was between the minimum wage and the poverty threshold.

A statistically significant association was identified between age groups and knowledge regarding HPV ($p<0.001$). The proportion of participants reporting “yes, I have knowledge” was higher among younger age groups, whereas the proportion reporting “no, I do not have knowledge” increased markedly in older age groups, particularly among individuals aged 61 years and older. These findings indicate that HPV awareness decreases with advancing age.

Similarly, a statistically significant association was found between age groups and knowledge regarding the HPV vaccine ($p<0.001$). The highest proportion of participants reporting knowledge about the HPV vaccine was observed in younger age groups, particularly among individuals aged 31–40 years, whereas the proportion reporting lack of knowledge increased substantially in participants aged 61 years and older. This finding also suggests that awareness regarding HPV vaccination decreases with age.

Among the 452 participants, 40.9% ($n=185$) reported undergoing regular cervical cancer screening/check-ups, while 59.1% ($n=267$) stated that they did not undergo regular screening.

Regarding knowledge about the target population and dosage schedule of the HPV vaccine, 37.6% ($n=170$) of the participants reported having knowledge, whereas 62.4% ($n=282$) stated that they had no knowledge. Only 11.7% ($n=53$) of the participants reported having received HPV vaccination, while 88.3% ($n=399$) stated that they had not been vaccinated.

When participants were asked about reasons for not receiving the HPV vaccine, 32.6% ($n=130$) stated that they lacked sufficient knowledge regarding the disease and/or the vaccine, while 37.3% ($n=149$) reported that they wanted to receive the vaccine but could not because it was expensive or required payment. In addition, 30.1% ($n=120$) reported concerns regarding the effectiveness and safety of the vaccine and stated that they did not consider themselves to be at risk.

In our study, 55.8% ($n=252$) of the participants supported administration of the HPV vaccine to both adult women and girls. The proportion of participants stating “I am unsure about vaccinating girls” was highest in the 31–40-year age group (28.3%, $n=36$). Vaccine

hesitancy and opposition were relatively more common among participants aged 41–60 years, whereas among individuals aged 61 years and older, the response “I am generally against vaccination” became markedly more prominent (26.3%, n=10).

Since the p-values obtained in the analyses were below 0.05, the associations were considered statistically significant. As age increased, there was a mild increase in negative attitudes toward HPV vaccination. Lower code values (1–2) represented more positive and accepting opinions, whereas higher code values (3–5) represented increased concerns and opposition. Therefore, advancing age was associated with more negative and hesitant attitudes toward HPV vaccination. Overall, a weak but statistically significant relationship was identified between age and attitudes toward HPV vaccination.

Among university graduates, the rate of having knowledge about HPV was very high at 91.8% (n=201), whereas among primary school graduates this rate was considerably lower at 35.5% (n=22). Since the p-value was far below 0.05, a very strong statistically significant association was identified between educational status and knowledge regarding HPV. These findings indicate that HPV awareness increases as educational level rises.

Similarly, knowledge regarding the HPV vaccine was substantially higher among university graduates (86.3%, n=189) compared with primary school graduates (30.6%, n=19). Since the p-value was significantly below 0.05, a statistically significant association was found between educational level and knowledge regarding the HPV vaccine. Overall, the proportion of individuals with knowledge about HPV vaccination increased significantly with increasing educational level.

Among university graduates, support for administration of the HPV vaccine to both adult women and girls was highest at 67.6% (n=148). In contrast, among middle school graduates, opposition to vaccination was more common, with a combined rate of 44.6% (17% HPV-specific opposition, 17% general vaccine opposition, and 10.6% opposition to all vaccines). Among primary school graduates, the dominant opinion remained “the vaccine should be administered to women and girls” (53.2%, n=33), although complete vaccine opposition (6.5%, n=4) was higher than in other educational groups. High school

graduates demonstrated a more heterogeneous distribution, with 45.2% supporting vaccination and 29.8% reporting uncertainty regarding vaccination of girls. Since $p < 0.05$, a statistically significant association was identified between educational status and attitudes toward HPV vaccination. These findings indicate that increasing educational level significantly influences attitudes toward HPV vaccination.

A statistically highly significant association was also identified between marital status and knowledge regarding HPV ($p < 0.001$). The proportion of participants with knowledge regarding HPV was highest among single individuals (81.7%), lower among married participants (72.7%), and lowest among divorced/widowed individuals, among whom the proportion lacking knowledge regarding HPV (52.3%) exceeded the proportion reporting knowledge (47.7%). Thus, marital status appeared to significantly affect HPV-related knowledge levels.

Similarly, marital status was significantly associated with knowledge regarding the HPV vaccine ($p = 0.0076$). Divorced/widowed participants demonstrated lower levels of knowledge and higher proportions of “no knowledge” responses, whereas single and married participants more frequently reported having knowledge about the HPV vaccine. Across all marital status groups, the most common opinion was that “the vaccine should be administered to women and girls,” particularly among single participants (65.1%) and married participants (54.3%). General vaccine opposition remained at low levels, accounting for 3.9% among married participants and 2.4% among single participants. Participants reporting concerns such as “I have concerns and do not want anyone to receive it” were slightly more common among married women (8.5%), whereas divorced/widowed individuals more frequently selected responses such as “I am unsure” (34.1%) or “I have concerns.” Since $p < 0.05$, a statistically significant association was identified between marital status and attitudes toward HPV vaccination.

In response to the question “Where did you hear or learn about HPV-related diseases or HPV vaccination?”, a total of 641 responses were obtained. Of these, 19.7% stated that they had never heard anything about these issues from any source. Among the remaining responses, 35.4% indicated doctors/healthcare personnel/pharmacists as their source of

information, 17.9% cited the internet, 10.9% family or friends, 7.3% television/radio, 7.2% school, and 1.6% other sources.

Discussion

Human papillomavirus (HPV) is one of the most common sexually transmitted infectious agents worldwide and is strongly associated with cervical cancer as well as anal, vulvar, vaginal, penile, and oropharyngeal cancers. Despite this well-established relationship, numerous studies have demonstrated that public awareness regarding HPV infection and HPV vaccination remains insufficient. In the present study, adult women's knowledge, attitudes, and behaviors regarding HPV infection, HPV vaccination, and cervical cancer screening were evaluated.

Our findings demonstrated that younger women had significantly higher levels of knowledge regarding HPV compared with older age groups. Similarly, previous studies have reported that HPV awareness decreases with advancing age (13). Greater access of younger individuals to information sources such as the internet and social media, higher health literacy levels, and greater interest in contemporary health-related topics may explain this finding. However, some studies have also reported associations between older age, higher educational status, and greater HPV-related knowledge (14). These discrepancies may be related to sociocultural differences and variations in study populations.

Likewise, knowledge regarding the HPV vaccine was also higher among younger age groups. The particularly high awareness level observed in women aged 31–40 years is noteworthy. Younger women may have greater awareness because they undergo regular health check-ups more frequently and make more active use of media and digital information platforms. Nevertheless, studies reporting associations between older age, higher educational level, and HPV vaccine knowledge are also available in the literature (14). Therefore, targeted educational programs addressing different age groups within the community are important for increasing awareness regarding HPV vaccination.

In our study, healthcare professionals were identified as the primary source of information regarding HPV and HPV vaccination. A substantial proportion of participants

stated that they obtained information from physicians, healthcare personnel, or pharmacists. In addition, the internet and social media were also identified as important information sources. Similarly, studies conducted in different countries have reported healthcare professionals, the internet, and social media as the major sources of HPV-related information (15). In today's digital era, online platforms have become increasingly important tools for accessing health information. However, considering the widespread misinformation and misleading content available online, ensuring public access to reliable health information is critically important. In particular, active counseling roles undertaken by healthcare professionals regarding HPV and vaccination may substantially contribute to increasing public awareness.

Although a considerable proportion of participants in our study supported HPV vaccination for women and girls, vaccine hesitancy and opposition were found to increase in older age groups. Previous studies have reported that the most common reasons for negative attitudes toward HPV vaccination include concerns regarding vaccine safety, fear of side effects, lack of knowledge, and the belief that vaccination may encourage early sexual activity. In contrast, younger women have generally been reported to hold more positive attitudes toward HPV vaccination and to be more willing to receive the vaccine (16). Our findings are consistent with these reports. Increasing public educational activities aimed at eliminating misinformation and misconceptions regarding HPV vaccination appears essential.

A strong positive association was identified between educational level and both HPV-related knowledge and HPV vaccine awareness. As educational status increased, the rates of knowledge regarding HPV, recognition of the HPV vaccine, and positive attitudes toward vaccination also increased. Numerous studies in the literature support this relationship between educational level and HPV awareness. Higher health literacy, better access to scientific information, and more effective utilization of healthcare services among highly educated individuals may explain this association.

Similarly, positive attitudes toward HPV vaccination increased with higher educational levels. Support for HPV vaccination was highest among university graduates, whereas

vaccine opposition was more common among individuals with lower educational levels. Previous studies have also reported that higher educational attainment positively affects HPV vaccine acceptance. However, some studies have failed to demonstrate a direct relationship between educational status and vaccine acceptance. This finding suggests that individuals' vaccination attitudes may be influenced not only by educational level but also by cultural structure, religious beliefs, trust in healthcare systems, and the quality of information sources.

Regarding marital status, single women in our study demonstrated higher levels of knowledge regarding HPV and HPV vaccination. While some previous studies have reported higher knowledge levels among married individuals, others found no significant differences. In our study, this finding may be explained by the fact that single participants were generally younger and had higher educational levels. In addition, single individuals may use social media and digital information resources more actively, thereby increasing their awareness levels.

The rate of regular cervical cancer screening in our study was lower than desired. A considerable proportion of participants reported that they had never undergone a Pap smear test. Although Pap smear testing is a low-cost and effective screening method, screening participation rates remain insufficient in many countries. Particularly in developing countries, low health literacy, difficulties in accessing screening programs, and inadequate public awareness may negatively affect participation rates. In our study, lack of knowledge also appeared to be one of the major factors influencing screening behaviors.

Evaluation of HPV vaccination rates revealed that only a small proportion of participants had received the HPV vaccine. Similar studies conducted in Türkiye have also reported very low HPV vaccination rates. In contrast, vaccination rates are significantly higher in countries where HPV vaccination has been incorporated into national immunization programs (17). In our study, the most common reasons for not receiving the vaccine were high cost, insufficient knowledge, and the perception of not being at risk. Similar findings have also been reported in studies conducted in other countries.

The absence of HPV vaccination from the national immunization program in Türkiye and the lack of reimbursement by the Social Security Institution appear to play major roles in the low vaccination rates observed in our study. In addition, insufficient public knowledge, concerns regarding vaccine safety, and parental hesitancy constitute important barriers to vaccination. Therefore, increasing public awareness regarding HPV infection, cervical cancer, and HPV vaccination; encouraging healthcare professionals to take more active roles in education and counseling; and incorporating the HPV vaccine into the national immunization schedule may provide substantial benefits for public health.

Conclusion

This study demonstrated that the level of public knowledge regarding HPV infection, HPV vaccination, and cervical cancer screening remains insufficient. A considerable proportion of participants lacked adequate knowledge about HPV and HPV-related diseases, and awareness regarding HPV vaccination was similarly found to be low. These findings indicate the need for more comprehensive educational and informational programs aimed at improving preventive health behaviors within the community.

One of the most remarkable findings of the study was the very low rate of HPV vaccination. The fact that the majority of participants had not received the HPV vaccine indicates significant deficiencies in vaccine awareness and acceptance. In particular, the high cost of the vaccine and insufficient knowledge about HPV and the vaccine were identified as the most common reasons for not being vaccinated. These findings demonstrate that economic barriers and inadequate health literacy directly affect the utilization of preventive healthcare services.

A proportion of participants also reported concerns regarding the safety, side effects, and effectiveness of the HPV vaccine. This finding suggests the presence of a multidimensional public health problem associated not only with HPV vaccination specifically but also with general vaccine hesitancy. Misinformation, social media-based disinformation, and lack of trust may significantly influence individuals' vaccination decisions. Therefore, family physicians and other healthcare professionals should develop evidence-based and

reassuring communication strategies that address individuals' concerns in an empathetic and scientifically accurate manner.

The study further demonstrated that a substantial proportion of women did not participate regularly in cervical cancer screening programs. Although Pap smear and HPV-DNA tests are effective methods for the early detection of cervical cancer, screening rates remain inadequate because of limited public awareness, fear, embarrassment, and difficulties in accessing healthcare services. Expanding screening programs targeting appropriate age groups and supporting women in undergoing gynecological evaluation are therefore of great importance.

Incorporation of the HPV vaccine into the national immunization program represents one of the most important recommendations arising from this study. Providing the vaccine free of charge and ensuring widespread accessibility may substantially increase vaccination rates, particularly among socioeconomically disadvantaged populations. Countries that have incorporated HPV vaccination into national immunization schedules have reported marked reductions in HPV-related diseases and cervical cancer incidence. Therefore, increasing access to HPV vaccination across the community may provide significant long-term benefits at both individual and societal levels.

The development of community-based educational and awareness programs is also critically important. Sustainable educational initiatives carried out through collaboration among the Ministry of Health, local authorities, educational institutions, and non-governmental organizations may improve public knowledge regarding HPV infection, transmission routes, cervical cancer, and the effectiveness of HPV vaccines. In particular, school-based educational programs and awareness activities conducted through primary healthcare services may contribute substantially to the development of protective behaviors against HPV infection.

In conclusion, this study demonstrates that multidimensional problems such as insufficient knowledge regarding HPV and HPV vaccination, economic barriers to access, and vaccine hesitancy persist within the community. Addressing these issues requires strengthening national health policies, expanding free vaccination programs, and

supporting sustainable preventive healthcare practices. Widespread implementation of HPV vaccination represents an important public health strategy that may not only provide individual protection but also strengthen community immunity and reduce the burden of HPV-related cancers in future generations.

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The Clinical Significance of Preoperative Paranasal Sinus CT in Rhinoplasty Planning: A Comprehensive Analysis of 62 Cases

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ABSTRACT

Aim: This study aimed to evaluate the impact of preoperative paranasal sinus computed tomography (CT) on surgical planning and safety in patients scheduled for rhinoplasty.

Materials and Methods: We retrospectively analyzed 62 patients (17 males, 45 females; mean age 26.29 ± 9.17 years) who underwent primary rhinoplasty or septorhinoplasty between January 2024 and December 2025. Septal deviations were classified using the Janardhan-modified Mladina classification. Additionally, Keros types and associated sinonasal pathologies were recorded.

Results: The most frequent septal deviation was Type 3 (35.48%), followed by Type 2 (22.58%). Type 5 horizontal spurs, which are often difficult to detect during physical examination, were identified in 16.13% of cases. CT revealed concha bullosa in 30.6%, inferior turbinate hypertrophy in 69.4%, and incidental sinus pathologies in 22.6% of patients. According to the Keros classification, 80.6% were Type II and 4.8% were high-risk Type III. These radiological findings directly influenced surgical modifications, such as targeted spur resection, conchoplasty, and cautious osteotomies in high-risk Keros cases.

Conclusion: Preoperative CT is a vital "surgical roadmap" that bridges the gap between clinical expectations and anatomical reality. It enhances functional success by identifying

Oral Presentation - OP404

hidden pathologies and maximizes surgical safety by quantifying the risk of skull base injury.

Keywords: Rhinoplasty, Paranasal CT, Mladina Classification, Keros Type, Surgical Safety.

Introduction and Objective

Rhinoplasty is a complex surgical procedure that demands the simultaneous optimization of aesthetic form and nasal function (1). Achieving a harmonious aesthetic result while preserving or enhancing the nasal airway is the hallmark of a successful outcome. While standard physical examination and anterior rhinoscopy provide crucial information regarding the nasal valve and the anterior septum, they often remain insufficient in evaluating the complete anatomical landscape of the nose. The "hidden" anatomy of the mid-to-posterior nasal structures, complex bony variations, and the intimate relationship between the ethmoid roof and the skull base are frequently beyond the reach of a standard clinical exam. Undetected septal deviations in the deeper osseocartilaginous regions or subtle anatomical variations such as concha bullosa can significantly compromise the functional success of a rhinoplasty if not addressed concurrently (2,3). This study aims to analyze the critical radiological findings in paranasal sinus computed tomography (CT) that influence surgical strategy in a series of 62 rhinoplasty patients.

Materials and Methods

This retrospective clinical study was conducted at our tertiary care center between January 2024 and December 2025. A total of 62 consecutive patients scheduled for primary rhinoplasty or septorhinoplasty were included in the study. Exclusion criteria included patients under the age of 18, those with a history of previous nasal or paranasal sinus surgery (revision cases), and patients with sinonasal malignancies or severe craniofacial anomalies.

Classification of Septal Deviations Nasal septal deviations were analyzed and categorized using the Mladina classification modified by Janardhan (4). This standardized

system allowed for a precise morphological assessment of the septum in seven distinct types:

- **Type 1:** Mild unilateral vertical displacement in the valve region.
- **Type 2:** Vertical deviation in the valve region reaching the nasal floor.
- **Type 3:** Vertical deviation located deeper at the osseocartilaginous junction.
- **Type 4:** S-shaped deviation (bilateral vertical).
- **Type 5:** Horizontal deviation (spur) on one side with a straight septum on the other.
- **Type 6:** Horizontal deviation with a sulcus on the contralateral side.
- **Type 7:** A combination of the above types (crumpled septum).

Statistical Analysis

Statistical analysis was performed using SPSS software (Version 26.0, IBM Corp.). Descriptive statistics, including frequencies and percentages, were calculated for all anatomical variations and Keros types. The correlation between CT findings and preoperative physical examination results was analyzed to determine the impact of radiological data on surgical planning.

Patient Demographics

The study included a total of 62 patients (17 males, 45 females) with a mean age of 26,29 $\pm$ 9,17 years (range: 18–60 years). All patients underwent preoperative CT evaluation and subsequent rhinoplasty or septorhinoplasty between 2024 and 2025.

Septal Deviation Analysis (Modified Mladina Classification)

According to the Janardhan modification of the Mladina classification, the distribution of septal deviation types was as follows:

- **Type 3** (vertical deviation at the osseocartilaginous junction) was the most frequent finding, observed in 35,48 % of cases.
- **Type 2** (vertical deviation in the valve region) was the second most common, identified in 22,58 % of patients.

- **Type 5** (horizontal spurs) was identified in 16,13 % of cases, often located in the posterior regions of the septum that were difficult to visualize during standard physical examination.
- **Type 1, Type 6 and Type 7** (mild/complex/crumpled) deviations were present in 3,23% , 6,45% and 3,23 % of the cohort, respectively.

The comprehensive distribution of all seven types is summarized in Table 1 and Figure 1.

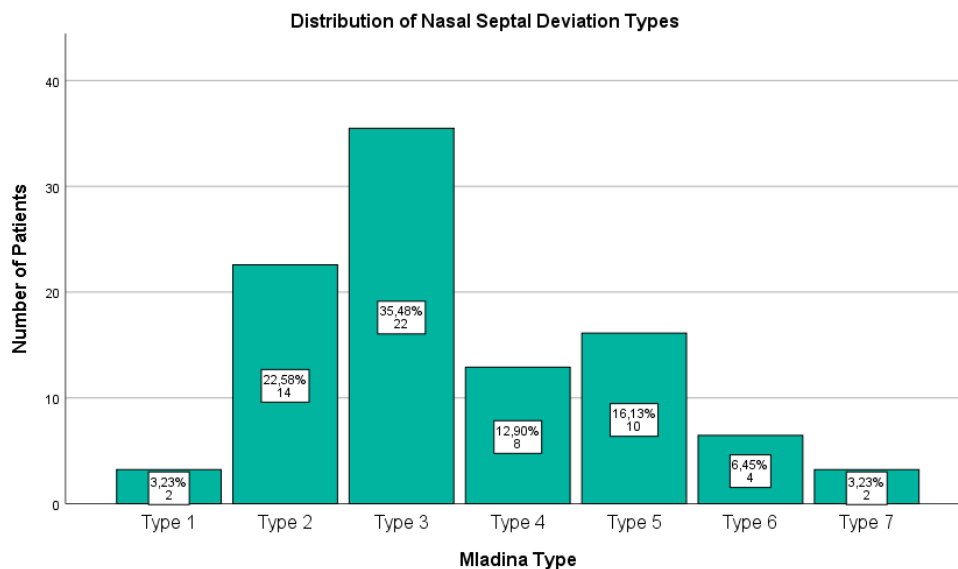


Figure 1: Distribution of Nasal Septal Deviations According to Janardhan-Modified Mladina Classification (n=62)

Table 1: Distribution of Nasal Septal Deviations According to Janardhan-Modified Mladina Classification (n=62)

Mladina Type	Description	Frequency (n)	Percentage (%)
Type 1	Mild anterior vertical displacement	2	%3,23
Type 2	Anterior vertical (valve region)	14	%22,58
Type 3	Mid-septal vertical (osseocartilaginous)	22	%35,48
Type 4	S-shaped bilateral deviation	8	%12,9
Type 5	Horizontal spur (unilateral)	10	%16,13
Type 6	Horizontal deviation with sulcus	4	%6,45
Type 7	Complex/Crumpled septum	2	%3,23
Total		62	100.00

Associated Sinonasal Findings on CT Beyond septal morphology, preoperative CT scans provided critical data regarding associated sinonasal pathologies and anatomical variations:

- **Concha Bullosa (Middle Turbinate Pneumatization):** Middle turbinate pneumatization, or concha bullosa, was identified in **30,6 % (n = 19)** of the patients. The presence of a significant concha bullosa was found to potentially compromise the middle meatus and contribute to nasal airway resistance.
- **Inferior Turbinate Hypertrophy:** Significant inferior turbinate hypertrophy was observed in **69,4 % (n = 43)** of the cases. CT imaging allowed for the differentiation between mucosal swelling and bony hypertrophy, which guided the choice between radiofrequency ablation and partial turbinoplasty.
- **Sinus Pathologies:** Incidental or chronic inflammatory findings in the paranasal sinuses were detected in **22,6 % (n = 14)** of the cohort. The most common finding was maxillary sinus mucosal thickening (>2 mm), followed by ethmoid cell opacification. These findings necessitated preoperative medical treatment or, in selected cases, minor endoscopic interventions combined with rhinoplasty.

Surgical Safety and Keros Classification To evaluate the risk of iatrogenic injury to the skull base—specifically during medial and lateral osteotomies—the depth of the olfactory fossa was measured and categorized according to the Keros classification (5).

The distribution among the 62 patients was as follows:

- **Keros Type I (1–3 mm depth):** Identified in **14,5% (n = 9)** of the patients. This group represented the lowest risk for intracranial entry.
- **Keros Type II (4–7 mm depth):** Identified in **80,6 % (n = 50)** of the patients. This was the most common anatomical variant in our series.
- **Keros Type III (8–12 mm depth):** Identified in **4,8 % (n = 3)** of the cohort.

Patients with **Keros Type III** anatomy were flagged as "high-risk" for potential cribriform plate or ethmoid roof injury. In these specific cases, surgical techniques were modified; osteotomies were performed with increased caution, and higher-level

septal resections were avoided to maintain the structural integrity of the skull base. The detailed distribution of these categories and their associated risk levels are presented in Table 2.

Table 2: Keros Classification and Risk Assessment of the Study Population (n=62)

Keros Category	Olfactory Fossa Depth	Frequency (n)	Percentage (%)	Risk Level
Type 1	1-3 mm	9	%14,5	Low
Type 2	4-7 mm	50	%80,6	Moderate
Type 3	8-12 mm	3	%4,8	High

Discussion

The integration of paranasal sinus CT into the preoperative workup of rhinoplasty has been a subject of ongoing debate. However, our study of 62 patients underscores that a detailed radiological evaluation is not merely an adjunct but a fundamental component of a safe and successful surgical plan. By utilizing the Janardhan-modified Mladina classification, we were able to objectify septal pathologies that are frequently underestimated during physical examination.

The Superiority of CT in Septal Analysis

Traditional anterior rhinoscopy and endoscopic evaluations are often limited in visualizing the posterior segments of the nasal septum. In our cohort, the high prevalence of Mladina Type 3 (%35,48) and Type 5 (%16,13) deviations highlights this clinical gap. Type 5 deviations (horizontal spurs), in particular, are frequently located at the vomer-ethmoid junction. As supported by the literature, these "hidden" spurs can significantly increase nasal airway resistance and, if left unaddressed, may lead to persistent functional dissatisfaction post-rhinoplasty (4). The use of CT allowed us to identify these bony spurs preoperatively, enabling a more targeted and conservative resection during the surgery.

Addressing Anatomical Variations

The identification of concha bullosa (%30,6) and inferior turbinate hypertrophy on CT provides a distinct advantage in functional rhinoplasty. Differentiation between mucosal

hypertrophy and bony enlargement of the inferior turbinates is crucial; CT imaging guides the surgeon in choosing between mucosal reduction (e.g., radiofrequency) and bony turbinoplasty. Furthermore, the presence of concha bullosa often necessitates a conchoplasty to ensure an adequate airway once the nasal pyramid is narrowed during aesthetic reshaping.

Surgical Safety and the Keros Classification

Perhaps the most critical contribution of preoperative CT is the enhancement of surgical safety. The Keros classification remains the gold standard for assessing the depth of the olfactory fossa. In our series, the detection of Keros Type III anatomy in 4,8 % of patients was a vital finding.

A deep olfactory fossa (Type III) significantly increases the risk of iatrogenic injury to the cribriform plate during medial osteotomies or high septal resections. Knowing this risk beforehand allowed us to modify our surgical maneuvers, thereby preventing catastrophic complications such as cerebrospinal fluid (CSF) leaks or intracranial entry (5). This "preventive" aspect of CT imaging is a cornerstone of modern, medicolegal-conscious surgical practice.

Limitations

While our study provides significant insights into the 62-patient cohort from 2024-2025, it is limited by its retrospective nature and the focus on a single-center experience. Future prospective studies with larger sample sizes and long-term functional outcome assessments (such as NOSE scores) would further validate the routine use of preoperative CT in all rhinoplasty cases.

Conclusion

In conclusion, while not mandatory for every simple case, we strongly recommend the routine use of paranasal CT in rhinoplasty candidates with functional complaints or complex nasal deviations. It significantly bridges the gap between what the surgeon "expects" and what is "anatomically present," leading to higher patient satisfaction and enhanced surgical safety.

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Pregnant Women's Experiences of Antenatal Care and Family Medicine Application in Şanlıurfa: A Qualitative Study

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Objective: Antenatal care, in general terms, is defined as medical care provided for the health of the mother and baby before birth. To strengthen antenatal care, the Ministry of Health regularly publishes guidelines. Many international publications investigate the behaviors associated with seeking antenatal care. These publications identify several factors influencing this behavior, one of which is socioeconomic level. Reports published in Turkey show that Şanlıurfa ranks among the lowest in terms of socioeconomic level. Although studies on antenatal care exist in our country, there has never been a qualitative study that evaluates both the seeking of antenatal care and the visits to family physicians by pregnant women. This study aims to address this gap in the literature by examining the behaviors of pregnant women in Şanlıurfa regarding seeking antenatal care.

Materials and Method: Face-to-face interviews using a semi-structured questionnaire were conducted with 12 pregnant women who applied to the Obstetrics and Gynecology outpatient clinic of Harran University Hospital. Thematic analysis, a qualitative analysis method, was used to analyze the data obtained from the interviews.

Findings: Participants' sociodemographic and health status information was tabulated. Following the thematic analysis of the raw data, participants' experiences were categorized under four main themes:

Oral Presentation - OP405

Perceived Importance of Antenatal Care (ANC): Participants emphasized that ANC is vital for maternal and infant health, routine check-ups, and the management of high-risk situations. Furthermore, ANC was identified as a means of psychological relief and the alleviation of fears. Notably, some participants considered pre-pregnancy preparations as a component of ANC.

Experiences Regarding Antenatal Care Applications: Experiences were categorized into clinical processes—such as screening tests, ultrasonography, and vitamin supplementation—and interactions with the healthcare system. The attitudes of healthcare workers were frequently highlighted by participants. Moreover, difficulties in obtaining appointments at state hospitals drive patients to seek care in private or university hospitals.

Factors Affecting Access to ANC Services: While health concerns and spousal support act as "facilitators" in accessing care, the burden of childcare, fear of examinations, and concerns regarding radiation (misconceptions about ultrasound) emerge as "barriers." In particular, traditional and negative attitudes within the extended family may restrict the use of services.

The Role of Family Physicians: Family medicine practices are regarded as an accessible primary level for follow-up, vaccination, testing, and medication supply. However, participants identified the lack of imaging devices, such as ultrasonography, and limitations in specialization as significant weaknesses.

Conclusion: Based on the results obtained, priority should be given to implementing policies that improve accessibility at the primary care level and developing educational strategies to overcome cultural barriers. These steps are essential to align maternal health services with the specific needs of the population.

Keywords: Antenatal Care, Preventive Health Services, Family Medicine, Socioeconomic Status, Pregnancy, Qualitative Study



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POSTER PRESENTATIONS

A Rare Diagnosis in A Child: Linear Dermatositis Lichen Striatus

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Abstract

Lichen striatus is a rare, self-limiting, usually unilateral, linear inflammatory dermatosis. Clinically, it is characterized by light pink, erythematous papules extending linearly along Blaschko lines. It should be considered in the differential diagnosis of linear dermatoses. This article presents a 3.5-year-old child patient with clinically diagnosed lichen striatus, who presented with thin, linear, light pink, slightly scaly, erythematous papules extending from the lower part of the right breast to the axillary area.

Introduction: Lichen striatus is a rare, asymptomatic dermatological disease usually seen in children. Its etiology is not fully known. It typically consists of light pink, erythematous papules following Blascko lines on a single extremity. It is most commonly seen on the arms and legs. Treatment may include topical corticosteroids if there is severe itching. If there is no itching, clinical observation is sufficient. This case report presents a 3.5-year-old child patient who presented with

thin, light pink, slightly scaly, erythematous papules extending from the lower part of the right breast to the armpit area and was clinically diagnosed with lichen striatus.

Case Report: A 3.5-year-old girl with known mastocytoma cutis, not taking any medication, was admitted to our hospital. Her mother noticed a lesion extending from under her right breast to her armpit while bathing her. Upon presentation, she was in good general condition, had no fever, was gaining weight well, and had a normal appetite. She had no other complaints. Physical examination revealed thin, linear, light pink, slightly scaly, erythematous papules extending from under her right breast to her armpit (**Figure 1**). She reported no itching. Organomegaly and lymphadenopathy were not detected. The patient had no recent history of vaccination, trauma, or infection. Complete blood count and biochemical tests were normal. Hepatitis, Human Immunodeficiency Virus, and syphilis tests were negative. Lichen striatus was considered as a preliminary diagnosis, and the Dermatology and Venereal Diseases department was consulted. The patient was clinically diagnosed with lichen striatus. At 1.5 months of follow-up, regression of the lesion was observed (**Figure 2**). Written and verbal consent was obtained from the patient's mother regarding the sharing of case information and photographs.



Figure 1. Thin, linear, light pink, slightly scaly, erythematous papules extending from below the right breast to the armpit



Figure 2. Regression of the lesion after a follow-up period of 1.5 months

Discussion and Conclusion: In pediatric patients, lichen striatus should be considered in the differential diagnosis of linear skin lesions that are light pink, slightly scaly, and erythematous papules. Diagnosis is generally made clinically; a biopsy may be performed to confirm the diagnosis.

Keywords: Lichen Striatus, Dermatitis, Child

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Cardiovascular Effects of Functional Nutrition

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Cardiovascular diseases (CVDs) are the leading cause of mortality worldwide and constitute a major global public health and economic burden (Alissa & Ferns, 2012). In 2017, an estimated 17.8 million people died due to CVD globally, and this number is projected to exceed 22.2 million by 2030 (Al-Dashti et al., 2021). Lifestyle-related conditions such as obesity, hyperlipidemia, type 2 diabetes, and hypertension are also increasing globally and further elevate the risk of CVD (Alissa & Ferns, 2012).

Dietary factors play a crucial role in the pathogenesis of CVD and can substantially influence cardiovascular risk (Alissa & Ferns, 2012). Although traditional cardiovascular risk factors have been extensively studied, dietary determinants have received comparatively less attention (Alissa & Ferns, 2012). In recent years, interest in functional foods—foods that provide health benefits beyond basic nutrition and help reduce the risk of chronic diseases—has increased considerably (Ma et al., 2026; Temple, 2022).

This paper comprehensively examines the cardiovascular effects of functional nutrition, including the definition and classification of functional foods, the mechanisms of action of bioactive compounds, evidence derived from clinical studies, and future perspectives.

Poster Presentation - PP102

Definition and Classification of Functional Foods

There is no universally accepted definition of functional foods; therefore, various definitions have been proposed by different authorities and researchers (Baker et al., 2022; Temple, 2022). The Food and Agriculture Organization of the United Nations (FAO) defines functional foods as “foods that contain components that may provide health benefits beyond basic nutrients” (Temple, 2022). The Mayo Clinic describes these foods as “foods that may have potentially beneficial effects on health beyond basic nutrition” (Temple, 2022). A more comprehensive definition was proposed in 2014 by the Functional Food Center (FFC): functional foods are “natural or processed foods containing biologically active compounds in defined, effective, and non-toxic amounts that provide clinically proven and documented health benefits for the prevention, management, or treatment of chronic diseases or their symptoms using specific biomarkers” (Martirosyan et al., 2021).

Temple (2022) suggested a rational definition of functional foods as: “new foods formulated to contain substances or live microorganisms that may have health-promoting or disease-preventing properties, present in sufficiently high concentrations to achieve the intended benefit and safe for consumption. Added ingredients may include nutrients, dietary fiber, phytochemicals, other bioactive substances, or probiotics.”

Functional foods are generally classified into three categories (Bhat et al., 2023; Ma et al., 2026):

Conventional foods: Whole foods that have not undergone modification, such as vegetables, fruits, fish, dairy products, legumes, and grains.

Modified foods: Foods fortified or enriched with specific nutrients, such as beverages enriched with calcium, antioxidants, or vitamins; bread fortified with calcium and folate; and products enriched with plant sterols or omega-3 fatty acids.

Food ingredients: Isolated bioactive components, such as dietary fiber, catechins, lycopene, and probiotics, which are added to other food products.

The Protective Role of Diet in Cardiovascular Disease

Understanding the contribution of functional foods to cardiovascular health requires evaluating the overall impact of diet on the CVD risk profile. Diet influences numerous cardiovascular risk factors, including blood lipid levels, blood pressure, glucose metabolism, and body weight. Adoption of a healthy diet—characterized by reduced intake of saturated fats and increased consumption of fiber-rich and antioxidant-rich foods—can contribute to lowering CVD risk. For example, plant-based dietary patterns such as the Mediterranean diet have been shown to reduce the incidence of cardiovascular disease.

Beyond traditional dietary strategies, functional foods may exert additional protective effects on cardiovascular health through specific bioactive components. This section reviews the cardioprotective effects of functional foods, the underlying mechanisms, and supporting evidence.

Cardioprotective Effects of Functional Foods

The cardioprotective effects of functional foods are primarily mediated through lipid-lowering effects, antioxidant activity, and reductions in homocysteine levels (Alissa & Ferns, 2012). Table 1 summarizes the potential cardiovascular protective effects of several functional foods.

Table 1. Potential Cardiovascular Protective Effects of Functional Foods

Functional Food	Bioactive Components	Potential Mechanism
Fish	Omega-3 fatty acids (EPA, DHA)	Triglyceride reduction, anti-inflammatory, antithrombotic, antiarrhythmic
Nuts	Tocopherols, omega-3 fatty acids, polyphenols	LDL reduction, improved endothelial function

Fruits and vegetables	Fiber (pectin), polyphenols, vitamins	Inhibition of LDL oxidation, blood pressure reduction
Whole grains	Fiber, phytochemicals	Improved insulin sensitivity, reduced inflammation
Soy protein	Isoflavones (genistein, daidzein)	LDL reduction, antioxidant effects
Dark chocolate	Flavonoids	Blood pressure reduction, improved endothelial function
Margarine	Phytosterols, phytosteranols	Reduced cholesterol absorption
Tomatoes	Lycopene	Inhibition of LDL oxidation, anti-inflammatory effects
Green tea	Catechins	Antioxidant effects, improved endothelial function
Pomegranate	Polyphenols (ellagitannins)	Antioxidant, anti-inflammatory, anti-atherogenic

Omega-3 Fatty Acids and Fish

Omega-3 fatty acids, particularly eicosapentaenoic acid (EPA) and docosahexaenoic acid (DHA), provide significant cardiovascular benefits. Increased fish consumption, which provides omega-3 fatty acids, has been shown to reduce triglyceride levels, slightly lower blood pressure, and exert antiarrhythmic effects that may reduce the risk of sudden cardiac death. Additionally, their anti-inflammatory properties may slow the development and progression of arterial plaque.

Nuts and Legumes

Nuts (such as walnuts, almonds, and hazelnuts) and certain legumes contain bioactive compounds including unsaturated fatty acids, tocopherols (vitamin E), plant sterols, dietary fiber, and polyphenols. These components improve lipid profiles—particularly by lowering LDL cholesterol—and enhance antioxidant capacity while reducing inflammation, thereby preserving endothelial function. Regular nut consumption has been associated with reduced CVD risk in prospective cohort studies.

Fruits and Vegetables

Fruits and vegetables are rich sources of dietary fiber, vitamins (e.g., vitamin C and folate), and antioxidant compounds such as polyphenols. These nutrients contribute to cardiovascular protection by inhibiting LDL oxidation, lowering blood pressure, and reducing inflammation. Diets rich in flavonoid-containing fruits and vegetables have been associated with improved endothelial function and reduced systemic inflammation.

Whole Grains

Whole grains such as oats, whole wheat, and rye contain substantial amounts of soluble and insoluble fiber, phytochemicals (e.g., lignans), and essential vitamins and minerals. Increased intake of soluble fiber reduces LDL cholesterol by decreasing intestinal bile acid absorption and lowering hepatic cholesterol synthesis. Whole grains generally have a lower glycemic index and may improve insulin sensitivity and weight control, thereby positively influencing cardiovascular risk factors.

Soy Protein

Soy protein contains isoflavones such as genistein and daidzein, which contribute to cardiovascular health. Soy consumption has been reported to modestly reduce LDL cholesterol levels. Isoflavones may exert estrogen-like effects that support vascular health and provide antioxidant activity. Diets incorporating soy protein—especially when replacing animal proteins high in saturated fats—may improve cardiovascular risk profiles.

Phytosterols and Phytostanols

Phytosterols and phytostanols are plant-derived sterol compounds that reduce intestinal cholesterol absorption and can significantly lower serum LDL cholesterol levels. When consumed at approximately 2–3 grams per day, plant sterols added to foods such as

margarine may reduce LDL cholesterol by 5–15%. These compounds are thought to indirectly reduce cardiovascular disease risk, although adequate intake through natural dietary sources alone may be difficult.

Dark Chocolate

Dark chocolate is rich in flavonoids due to its high cocoa content. These flavonoids exhibit antioxidant properties that may improve endothelial function, reduce blood pressure, and inhibit platelet aggregation. Moderate consumption of dark chocolate (approximately 30 g per day) has been associated with short-term reductions in blood pressure and increased nitric oxide availability. However, due to its caloric and sugar content, high-cocoa (>70%) and low-sugar varieties should be preferred.

Coffee and Tea

Coffee and particularly green tea contain antioxidant polyphenols—chlorogenic acids in coffee and catechins in green tea. Regular green tea consumption has been associated with modest reductions in blood pressure and LDL cholesterol and increases in HDL cholesterol. Coffee consumption has long been debated; however, recent studies suggest that moderate intake (up to 3–4 cups of filtered coffee per day) does not increase CVD risk and may even reduce the risk of type 2 diabetes. It should be noted that diterpenes present in unfiltered coffee may increase LDL cholesterol levels.

Mechanisms of Action of Bioactive Compounds

Bioactive compounds in functional foods exert cardioprotective effects through multiple molecular pathways, including antioxidant activity, modulation of inflammatory responses, improvement of endothelial function, reduction of lipid levels, and lowering of blood pressure.

Phytochemicals

Phytochemicals are a diverse group of bioactive compounds found in plant-based foods that exert pharmacologically relevant health effects. Subgroups include polyphenols, carotenoids, and glucosinolates. These compounds may protect the cardiovascular system by reducing oxidative stress and modulating inflammatory signaling pathways. For instance, polyphenols such as resveratrol can enhance nitric oxide production in endothelial cells, while compounds such as curcumin suppress inflammatory pathways including NF- κ B signaling.

Antioxidant Vitamins

Antioxidant vitamins such as vitamins A, C, and E may slow the development of atherosclerosis by preventing LDL oxidation. Although early studies suggested potential cardiovascular protection from high-dose vitamin E supplementation, clinical trials have not consistently demonstrated significant benefits. Nevertheless, vitamins obtained through natural food sources—particularly fruits and vegetables—may act synergistically with other phytochemicals to confer protective effects.

Dietary Patterns and Reduced Risk of Chronic Disease

Beyond individual functional foods, overall dietary patterns play a crucial role in determining cardiovascular disease risk.

Mediterranean Diet

The Mediterranean diet is characterized by high consumption of olive oil, fish, fresh fruits and vegetables, whole grains, legumes, and nuts, with low consumption of red and processed meats. This diet is rich in functional components and has been consistently associated with reductions in cardiovascular events in long-term cohort studies and clinical trials. Its benefits are attributed to anti-inflammatory and antioxidant effects,

improved endothelial function, favorable lipid profiles, and improvements in metabolic syndrome components.

DASH Diet

The Dietary Approaches to Stop Hypertension (DASH) diet was developed to control hypertension. It emphasizes fruits, vegetables, low-fat dairy products, whole grains, fish, poultry, nuts, and legumes, while limiting sodium, red meat, sweets, and sugar-sweetened beverages. The diet is rich in potassium, calcium, magnesium, and fiber—nutrients with functional properties that support cardiovascular health and help lower blood pressure.

Portfolio Diet

The Portfolio diet includes four key cholesterol-lowering components: plant sterols, soy protein, nuts (such as almonds), and soluble fiber. Clinical studies have demonstrated that this dietary pattern can reduce LDL cholesterol by up to 20%, particularly in individuals with hypercholesterolemia. Each component contributes through different mechanisms affecting cholesterol metabolism.

Vegetarian Diet

Vegetarian diets—especially vegan diets—exclude red meat and animal fats and emphasize plant-based foods. These diets are typically low in saturated fats and cholesterol but rich in fiber, magnesium, folate, antioxidant vitamins, and phytochemicals. Observational studies have linked vegetarian diets to lower body mass index, blood pressure, and cholesterol levels, as well as reduced risk of cardiovascular disease. However, certain nutrient deficiencies, particularly vitamin B12, should be monitored.

Clinical Studies and Meta-Analyses

Clinical studies and meta-analyses investigating the cardiovascular benefits of functional foods have generally produced promising but sometimes inconsistent findings. For

example, large randomized trials examining omega-3 supplementation have not consistently demonstrated reductions in cardiovascular events, whereas epidemiological evidence linking fish consumption with reduced cardiovascular risk appears more consistent.

Similarly, clinical trials investigating antioxidant vitamin supplementation have not shown significant reductions in cardiovascular disease risk. In some cases, such as high-dose beta-carotene supplementation among smokers, an increased risk of lung cancer has been reported.

Conversely, interventions that modify overall dietary patterns—such as the Mediterranean diet—have demonstrated clear clinical benefits. The PREDIMED study reported approximately a 30% reduction in cardiovascular events among individuals adhering to a Mediterranean dietary pattern.

Meta-analyses indicate that daily intake of approximately 2 g of phytosterols significantly reduces LDL cholesterol, soy protein consumption results in roughly a 3–5% reduction in LDL cholesterol, and increasing soluble fiber intake by 5–10 g per day leads to measurable reductions in total cholesterol (Hadjimbei et al., 2022; Javanmardi, 2025).

Bioavailability and Effectiveness

The real-world effectiveness of bioactive compounds in functional foods depends largely on their bioavailability—how efficiently they are absorbed and utilized by the body. For example, lycopene from cooked tomatoes is more bioavailable than from raw tomatoes, and the absorption of catechins from green tea may vary among individuals.

Furthermore, consuming bioactive compounds within the food matrix rather than in isolated supplement form may influence their efficacy. For instance, probiotics in fermented foods such as kefir may colonize the gastrointestinal tract more effectively than isolated probiotic supplements.

Safety and Regulatory Framework

As the consumption of functional foods increases, concerns regarding safety and regulatory oversight have become more prominent. Because these products are typically categorized as foods rather than pharmaceuticals, regulatory approval processes differ from those applied to medications.

United States

In the United States, there is no specific legal definition of functional foods. These products may be marketed either as conventional foods or as dietary supplements under the Dietary Supplement Health and Education Act (DSHEA). Health claims must comply with regulations established by the Food and Drug Administration (FDA).

European Union

In the European Union, functional foods may fall under the categories of “foods for specific nutritional purposes” or “novel foods.” The European Food Safety Authority (EFSA) evaluates scientific evidence supporting health claims associated with functional foods.

Japan

Japan is considered a pioneer in the regulation of functional foods. Products approved under the Food for Specified Health Uses (FOSHU) system may display a special label indicating validated health benefits.

China

In China, functional foods are categorized as “health foods” and regulated by the China Food and Drug Administration (CFDA). Products must provide scientific evidence supporting claimed health benefits.

Consumer Perception and Acceptance

The success of functional foods largely depends on consumer acceptance. Factors influencing consumer attitudes include taste, price, product presentation, credibility, and perceived health benefits.

Research suggests that three major factors influence consumer acceptance:

Product characteristics: taste, price, brand, and the compatibility between the carrier food and the functional ingredient.

Sociodemographic factors: age, gender, education level, and income.

Psychological factors: health consciousness, openness to innovation, and attitudes toward food.

Clear labeling, transparent communication of health claims, and recommendations from healthcare professionals are important in improving consumer trust.

Future Perspectives

The field of functional nutrition continues to evolve alongside advances in science and technology. Future developments may involve the design of functional foods tailored to individual health needs.

Artificial Intelligence and Big Data

The integration of artificial intelligence into the functional food industry offers strategic solutions to current methodological challenges. Advances in big data analytics allow researchers to analyze metabolomic and genomic datasets to identify potential health benefits of bioactive compounds. Machine learning algorithms may help identify which functional components are most beneficial for specific population groups.

Metabolic Profiling

Metabolomic and other “omics” technologies allow detailed analysis of individual metabolic profiles. These approaches may help determine how individuals respond to specific dietary components, enabling more precise dietary recommendations.

Personalized Nutrition

Genetic variations, gut microbiota composition, and lifestyle factors influence individual responses to dietary components. Personalized nutrition aims to replace the “one-size-fits-all” dietary approach with individualized dietary recommendations. In the future, functional foods may be specifically designed for individuals with particular genetic or metabolic profiles.

Keywords: Nutrition, Cardiac Risk Factors, Mediterranean Diet

Incidental Glucosuria in Primary Care: A Case-Based Evaluation of a Patient Without Known Diabetes

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Background

Glucosuria is commonly associated with diabetes mellitus, but it may also occur in non-diabetic individuals due to renal or physiological causes. In primary care settings, incidental glucosuria detected in routine urinalysis should prompt further metabolic evaluation.

Case Presentation

A patient presented to a primary care setting after glucosuria was incidentally detected on routine urinalysis. The patient had no known history of diabetes mellitus. Following this finding, further laboratory evaluation including fasting plasma glucose and HbA1c was requested. Laboratory results revealed fasting plasma glucose of 213 mg/dL and HbA1c of 6.8%. Urinalysis showed glucose +2 while other parameters were within normal limits.

Discussion

Although glucosuria is most frequently associated with diabetes mellitus, other conditions such as renal glucosuria, pregnancy, or renal tubular disorders may also lead to glucosuria in the absence of hyperglycemia. Therefore, incidental glucosuria detected in primary care should prompt further metabolic and renal evaluation. In this case, glucosuria detected in routine urinalysis led to further metabolic evaluation, which subsequently revealed diagnostic criteria for diabetes mellitus.

Conclusion



Incidental glucosuria detected in primary care should prompt further metabolic evaluation, as it may represent an early indicator of undiagnosed diabetes mellitus.

Keywords: Primary Care, Family Medicine, Glucosuria, Diabetes Mellitus, Screening

Reframing Longevity: The Central Role of Primary Care in Healthy Ageing Trajectories

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Abstract:

The global increase in life expectancy has been accompanied by a growing recognition that extended lifespan does not necessarily equate to prolonged health. *Healthspan*, defined as the duration of life spent in good health and functional independence, is increasingly prioritized over mere longevity. Primary care, particularly family medicine, is uniquely positioned to shape healthy ageing trajectories through continuous, person-centered care. This paper explores the pivotal role of primary care in promoting longevity by addressing modifiable risk factors, managing multimorbidity, preventing functional decline, and fostering lifestyle and social interventions. Furthermore, emerging digital health tools and artificial intelligence offer opportunities for personalized risk assessment and targeted preventive strategies. Barriers such as time constraints, fragmented care, and limited geriatric training are acknowledged, alongside actionable recommendations, including curriculum enhancement, interprofessional collaboration, and policy-level support. Recognizing primary care as the cornerstone of longevity medicine is essential for sustainable health systems capable of optimizing both lifespan and healthspan.

Keywords: Longevity, Healthy Ageing, Primary Care, Family Medicine, Healthspan, Preventive Medicine

Introduction:

Population ageing is one of the most profound demographic shifts of the 21st century, presenting both opportunities and challenges for healthcare systems worldwide. While advances in medicine have dramatically increased life expectancy, many older adults experience years burdened by chronic disease, frailty, and functional limitations. Consequently, the focus has shifted from merely extending lifespan to enhancing *healthspan* - ensuring that added years are lived in good health, autonomy, and quality of life. Family physicians, situated at the frontline of primary care, offer longitudinal, comprehensive, and person-centered interventions that are essential for fostering healthy ageing trajectories.

Discussion and Recommendations:

Primary care provides an unparalleled platform for implementing longevity-focused interventions. Continuous patient engagement facilitates early detection of chronic conditions, personalized counseling on nutrition, physical activity, and cognitive stimulation, and proactive management of multimorbidity. Moreover, family physicians can leverage social determinants of health, including community support and patient networks, to address factors influencing functional health outcomes.

Emerging digital health technologies, including telemedicine platforms, wearable monitoring devices, and artificial intelligence-driven predictive models, enhance the capacity for individualized risk assessment, frailty detection, and targeted preventive strategies. By integrating these innovations into routine care, primary care teams can proactively mitigate age-related decline, optimize functional capacity, and promote sustained well-being.

Despite these opportunities, barriers remain. Time constraints, fragmented care systems, and limited training in geriatric and longevity medicine can hinder comprehensive care delivery. Addressing these challenges requires multifaceted solutions: embedding healthy

ageing frameworks into primary care curricula, incentivizing preventive care, fostering interprofessional collaboration, and strengthening primary care infrastructure. Policy-level support is critical to ensure adequate resources and recognition of the central role primary care plays in shaping healthy ageing outcomes.

Conclusion:

Reframing longevity to encompass both lifespan and healthspan underscores the essential role of primary care in modern healthcare. Through continuous engagement, preventive interventions, and individualized care strategies, family physicians can reduce age-related morbidity, enhance quality of life, and extend functional independence among older adults. Recognizing and empowering primary care as the cornerstone of longevity medicine is not only imperative for individual patients but also crucial for the sustainability of health systems facing the realities of global population ageing.

From Screening to Diagnosis: Breast Cancer in Primary Care

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Introduction:

Breast cancer is the most common cancer diagnosed in women worldwide. In 2022, about 2.3 million women received this diagnosis, and approximately 670,000 died from it globally. Men can also get breast cancer, their cases make up only about 0.5-1% of all diagnoses. In Türkiye, breast cancer is still the most common cancer among women, accounting for nearly one in four female cancer cases. The national screening program recommends monthly breast self-examination, annual clinical breast examination, and mammograms every two years for women aged 40-69. Primary care services are crucial for raising awareness, identifying those at high risk, and helping with the early assessment of any concerning findings.

Case:

A woman aged 50 years, a midwife and long-term employee at the Cancer Early Diagnosis, Screening and Training Center (KETEM), underwent routine breast cancer screening as part of the national breast cancer screening program. The patient was married with two children, both delivered by cesarean section, and had a history of breastfeeding for 11 and 23 months. She reported menarche at the age of 13. Her medical history includes former smoking (10 pack-years, quit 7 years ago), with no alcohol use. She had no known chronic medical conditions and was not taking any regular medications. Family history shows

breast cancer in two paternal cousins. Physical examination of the breasts and axillae was unremarkable, and the patient was asymptomatic at the time of screening.

At age 40, her mammography was classified as BI-RADS 0, and close follow-up with ultrasound and mammography surveillance was initiated. In September 2025, screening mammography identified a suspicious lesion classified as BI-RADS 4. A week later, further evaluation with breast ultrasound and contrast-enhanced breast MRI demonstrated findings highly suggestive of malignancy (BI-RADS 5). Ultrasound-guided core needle biopsy confirmed invasive ductal carcinoma. In October 2025, at her request, she underwent bilateral total mastectomy with immediate implant-based reconstruction and right axillary lymph node dissection. Histopathology revealed invasive ductal carcinoma measuring 1.5x0.7x0.5 cm, estrogen receptor-positive, progesterone receptor-positive, HER2-negative, with a Ki-67 index of approximately 5%. Genetic testing for BRCA1 and BRCA2 mutations was negative. Staging showed no distant metastasis; however, one of eight axillary lymph nodes was positive, indicating stage II breast cancer. She received chemotherapy, and radiotherapy and hormonal therapy are ongoing. The patient continues to report fatigue, weakness, memory difficulties, nausea, and edema.

Conclusion:

This case highlights the critical role of screening programs in detecting breast cancer in asymptomatic individuals, even among healthcare professionals with high awareness. In this context, primary care plays a central role in ensuring the effectiveness of these screening programs. Family physicians are essential in the comprehensive management of breast cancer. They contribute significantly to promoting participation in screening programs, recognizing early signs, and assessing individual risk factors such as family history and genetic predisposition. In addition, they coordinate care across primary care centers, ensuring continuity and appropriate follow-up.

Keywords: Breast Cancer Screening; Primary Care; Family Medicine; Early Detection

Ethical Challenges of Artificial Intelligence in Medicine: Implications for Clinical Practice and Scientific Writing

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Background:

Artificial intelligence (AI) is rapidly reshaping healthcare by enhancing diagnostic accuracy, informing clinical decision-making, and improving system-level efficiency. In family medicine—where continuity, comprehensiveness, and patient-centeredness are foundational—AI-driven tools offer considerable potential. However, these advances are accompanied by complex ethical challenges. Beyond clinical applications, the growing use of AI in scientific writing introduces additional concerns related to authorship, transparency, and academic integrity.

Objective:

To critically examine the ethical implications of AI use in both clinical practice and medical scientific writing, from the perspective of family medicine.

Methods:

This study adopts a narrative review and conceptual analysis approach. Contemporary literature on AI ethics in healthcare and scientific publishing was critically appraised, and key ethical issues were interpreted through the lens of primary care values, including equity, continuity of care, and patient-centeredness.

Poster Presentation - PP109

Results and Discussion:

The ethical challenges associated with AI in medicine are not merely operational but reflect deeper tensions between technological innovation and the core principles of medical practice. These challenges span two interrelated domains: clinical care and scientific knowledge production.

In clinical practice, the opacity of many AI systems fundamentally challenges patient autonomy. The “black box” nature of algorithmic decision-making constrains explainability and complicates the process of obtaining truly informed consent. This limitation is not only technical but epistemological, as it shifts elements of clinical authority from physician reasoning to probabilistic computational outputs. Clinicians are thus required to navigate a dual responsibility: integrating AI-generated recommendations into care while maintaining accountability for decisions that may not be fully interpretable.

Data governance constitutes another major ethical concern. The development and deployment of AI systems depend on large, often heterogeneous datasets, raising critical issues related to privacy, consent, and secondary data use. In primary care settings—where longitudinal, sensitive, and context-rich patient data are routinely managed—any compromise in data security or confidentiality may have far-reaching consequences. Moreover, inequities in data representation across populations risk embedding structural biases into AI systems, thereby perpetuating or even amplifying existing health disparities. Algorithmic bias, therefore, should be understood as both a technical and a socio-structural issue.

Accountability in AI-assisted care remains insufficiently defined. The distributed nature of AI systems—encompassing developers, healthcare institutions, and clinicians—blurs traditional boundaries of responsibility. This ambiguity may foster defensive clinical practices or, conversely, excessive reliance on algorithmic outputs. The latter raises

concerns regarding automation bias and the potential erosion of clinical reasoning skills, particularly among less experienced practitioners.

Equally important is the impact of AI on the physician–patient relationship. Family medicine is grounded in relational continuity, empathy, and a nuanced understanding of patients’ lived experiences. If inadequately integrated, AI risks privileging efficiency and standardization over individualized care. Preserving the primacy of the therapeutic relationship requires that AI be positioned as a supportive adjunct, rather than a substitute for human judgment, within the biopsychosocial model of care.

In the domain of scientific writing, AI introduces parallel ethical challenges that directly affect the integrity of knowledge production. The use of AI-assisted tools in manuscript preparation raises fundamental questions regarding authorship and intellectual accountability. While such tools can enhance clarity and efficiency, they lack the capacity for critical reasoning, ethical judgment, and responsibility—criteria essential for authorship. Failure to clearly define and disclose their role risks undermining trust in scientific communication.

Transparency is therefore paramount. The absence of standardized reporting practices for AI use in manuscript preparation introduces variability and potential opacity into the publication process. In addition, concerns regarding accuracy are substantial. AI-generated content may contain fabricated references, misinterpretations, or subtle factual inaccuracies, thereby posing risks to scientific validity and reproducibility. These risks are particularly consequential in high-impact journals, where published evidence informs clinical guidelines and health policy.

Furthermore, the increasing standardization of AI-generated academic language may inadvertently homogenize scientific discourse, potentially limiting intellectual diversity and innovation. From an editorial standpoint, the difficulty of reliably identifying AI-

assisted content complicates peer review and challenges established norms of academic evaluation.

Taken together, these considerations underscore that the ethical challenges of AI are systemic, interconnected, and demand coordinated responses. Family medicine, with its enduring commitment to equity, continuity, and holistic care, offers a critical framework for guiding the responsible integration of AI into both clinical and academic domains.

Recommendations / Implications:

The responsible integration of artificial intelligence into medicine requires a comprehensive and anticipatory approach that aligns technological innovation with ethical and professional standards. Central to this effort is the development of robust regulatory and ethical frameworks that provide clear guidance on the appropriate use of AI in both clinical decision-making and scientific authorship. Such frameworks should define accountability, establish boundaries for acceptable use, and promote transparency across all stages of implementation.

Mandatory and standardized disclosure of AI use in scientific writing is essential to safeguard the integrity of the academic record. Authors should explicitly report the extent and nature of AI assistance, thereby enabling editors and reviewers to accurately assess intellectual contributions and methodological rigor.

Strengthening data governance must be prioritized to ensure that AI systems are developed using secure, high-quality, and representative datasets. This includes not only protecting patient privacy and confidentiality but also addressing inequities in data representation that may lead to biased outcomes. In primary care, where diversity and continuity are defining characteristics, equitable data practices are particularly critical.

Medical education should be restructured to incorporate AI literacy and ethics as core competencies. Physicians must be equipped not only with the technical skills to use AI

tools but also with the critical capacity to question, interpret, and appropriately challenge AI-generated outputs. Such competencies are essential to mitigate automation bias and to preserve clinical judgment.

Equally important is the preservation of human-centered care. AI should be integrated in a manner that reinforces, rather than diminishes, the physician–patient relationship. Clinical systems must be designed to ensure that patient values, preferences, and narratives remain central to care processes.

From a scholarly perspective, academic journals must adapt to the evolving landscape of AI-assisted writing. This includes revising authorship criteria, establishing clear editorial policies, and developing mechanisms to ensure transparency and accountability. Peer-review processes may also require adaptation to address the unique challenges posed by AI-generated content.

Finally, the ethical governance of AI in medicine necessitates sustained multidisciplinary collaboration. Clinicians, ethicists, data scientists, legal scholars, and policymakers must work in concert to develop balanced, context-sensitive, and forward-looking solutions. Only through such collaborative efforts can the medical community ensure that AI serves as a tool to enhance—rather than compromise—the quality, equity, and humanity of healthcare.

Conclusion:

Artificial intelligence represents a transformative force in both healthcare delivery and scientific communication. However, its successful integration depends on a careful alignment with the ethical foundations of medicine. By fostering transparency, accountability, and human-centered values, the medical community can harness the benefits of AI while safeguarding the integrity of clinical practice and scientific knowledge.

Keywords: Artificial Intelligence, Medical Ethics, Family Medicine, Scientific Writing, Authorship, Bias, Data Privacy

Interventions for Osteonecrosis in Patients with Sickle Cell Disease: A Five-Case Series Involving Femoral and Humeral Heads

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Introduction:

Sickle cell disease (SCD) is a hereditary hemoglobin disorder characterized by rigid, sickle-shaped erythrocytes that obstruct blood flow and lead to multiple acute and chronic complications, including avascular necrosis (AVN), which results from impaired blood supply to bone tissue. The hip joint is the most frequently affected site, while involvement of the shoulder and other joints is less common. SCD is a significant health issue in Turkey, particularly in the Southern Mediterranean region, where the prevalence reaches up to 10% to 13.6%.

Methods:

We conducted a retrospective analysis of five patients with SCD who developed AVN of the femoral or humeral head and underwent surgical decompression. All patients were registered in the Hematology Department of the Dr. Feyyaz Etiz Oncology and Hematology Service at Balcalı Hospital, Adana. Our database included demographic data, imaging findings, and surgical reports.

Poster Presentation - PP112

Results:

Five patients (one male, four females; mean age 21 years) were included. Three patients had bilateral avascular necrosis of the femoral head, with one of them also presenting bilateral humeral head involvement. Two additional patients presented with unilateral femoral head avascular necrosis. MRI confirmed osteonecrosis in all cases. All patients underwent surgical decompression due to persistent pain and functional limitation.

Discussion:

Early diagnosis is crucial to identify osteonecrosis before structural collapse occurs, especially with MRI. Severe stages with femoral head collapse may necessitate complete hip arthroplasty, while early stages can be treated conservatively or with joint-preserving techniques such as core decompression.

Conclusion:

Avascular necrosis is a serious complication of sickle cell disease that often affects multiple joints and can begin at a young age. This pathology requires a multidisciplinary approach and early detection to improve the patient's prognosis and halt disease progression.

Keywords: Sickle Cell Disease, Avascular Necrosis, Surgical Decompression

Gut Microbiota, Probiotics, Prebiotics, and Synbiotics: Mechanisms, Clinical Implications, and Future Perspectives

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1. Gut Microbiota

The human gastrointestinal tract harbors a highly complex ecosystem consisting of trillions of microorganisms collectively referred to as the **gut microbiota**. This microbial community includes bacteria, viruses, fungi, and archaea (1). It has been reported that the number of microbial cells in the human body is approximately equal to the number of human cells, and these microorganisms exert profound effects on host physiology (2).

The gut microbiota begins to develop at birth and undergoes dynamic changes throughout life, influenced by multiple factors such as diet, environmental exposures, antibiotic use, and host genetics (3). The early-life establishment of microbiota composition is particularly critical for the maturation of the immune system.

In healthy individuals, the gut microbiota is predominantly composed of bacteria belonging to the phyla Firmicutes and Bacteroidetes (4), with smaller proportions of Actinobacteria and Proteobacteria. A balanced microbial state is referred to as *eubiosis*, whereas disruption of this balance is termed *dysbiosis*.

The gut microbiota exerts multifaceted effects on host health. Metabolically, it ferments indigestible carbohydrates to produce short-chain fatty acids (SCFAs), which play key roles in energy metabolism, maintenance of intestinal epithelial integrity, and regulation of inflammation (5). Among these, butyrate serves as a primary energy source for colonocytes.

From an immunological perspective, the microbiota plays a critical role in the development and regulation of the host immune system. Interactions between the microbiota and gut-associated lymphoid tissue (GALT) are essential for immune tolerance and defense against pathogens (6). Furthermore, the microbiota modulates systemic immune responses by influencing the balance between pro-inflammatory and anti-inflammatory cytokines.

In recent years, increasing attention has been directed toward the bidirectional relationship between the gut microbiota and the central nervous system, known as the gut-brain axis. This communication network operates through mechanisms including neurotransmitter production, vagal signaling, and immune modulation (7). Accordingly, alterations in the gut microbiota have been implicated in conditions such as depression, anxiety, and neurodegenerative diseases.

Dysbiosis has been associated with the pathogenesis of numerous diseases, including obesity, type 2 diabetes mellitus, inflammatory bowel disease, and certain autoimmune disorders (8). Consequently, modulation of the gut microbiota has emerged as a promising therapeutic target in modern medicine.

2. Probiotics

Probiotics are defined as *live microorganisms that, when administered in adequate amounts, confer a health benefit on the host* (9). This definition was initially proposed by

FAO/WHO and subsequently refined by the International Scientific Association for Probiotics and Prebiotics (10).

Probiotic microorganisms are predominantly of bacterial origin, with commonly used genera including **Lactobacillus** and **Bifidobacterium**. In addition, the yeast **Saccharomyces boulardii** is widely utilized in clinical practice (10,11).

2.1 Classification

Probiotics can be classified based on their taxonomic characteristics:

- **Gram-positive bacteria**
 - *Lactobacillus* spp.
 - *Bifidobacterium* spp.
- **Yeasts**
 - *Saccharomyces boulardii*

The effects of probiotics vary at the species and strain levels; therefore, clinical efficacy must be evaluated based on specific strains (11).

2.2 Mechanisms of Action

The effects of probiotics on the host are multifactorial and include the following mechanisms:

2.2.1 Inhibition of Pathogenic Microorganisms

Probiotics compete with pathogenic bacteria for nutrients and adhesion sites, thereby limiting their proliferation. They also exert antimicrobial effects through the production of bacteriocins and organic acids (11).

2.2.2 Enhancement of Intestinal Barrier Function

Probiotics strengthen tight junctions between epithelial cells, reducing intestinal permeability and preventing the condition commonly referred to as “leaky gut” (12).

2.2.3 Immunomodulatory Effects

Probiotics regulate cytokine production, promoting anti-inflammatory responses while suppressing pro-inflammatory pathways (13).

2.2.4 Metabolic Effects

Probiotics enhance SCFA production, contributing to energy metabolism and supporting intestinal epithelial cell function (14).

2.3 Clinical Applications

2.3.1 Antibiotic-Associated Diarrhea

Multiple randomized controlled trials and meta-analyses have demonstrated the effectiveness of probiotics in preventing antibiotic-associated diarrhea (15).

2.3.2 Irritable Bowel Syndrome (IBS)

Moderate evidence suggests that probiotics may alleviate IBS symptoms; however, efficacy is strain-dependent (16).

2.3.3 Inflammatory Bowel Disease (IBD)

Certain probiotic combinations have been shown to help maintain remission in ulcerative colitis (17).

2.3.4 Infections and Immunity

Probiotics may reduce the incidence of upper respiratory tract infections and enhance immune function (13).

2.4 Safety

Probiotics are generally considered safe; however, caution is advised in immunocompromised individuals, neonates, and critically ill patients. Rare cases of bacteremia and fungemia have been reported (18).

3. Prebiotics

Prebiotics are defined as *substrates that are selectively utilized by host microorganisms conferring a health benefit* (19). This definition, updated by the International Scientific Association for Probiotics and Prebiotics, emphasizes that prebiotics may exert effects beyond the gut (20).

Prebiotics are typically complex carbohydrates that resist digestion in the small intestine and reach the colon, where they are fermented by the gut microbiota, leading to the production of SCFAs and other metabolites (21).

3.1 Major Types of Prebiotics

Common prebiotic compounds include:

- Inulin
- Fructooligosaccharides (FOS)
- Galactooligosaccharides (GOS)
- Lactulose
- Resistant starch

These compounds preferentially promote the growth of **Bifidobacterium** and **Lactobacillus** species (22).

3.2 Mechanisms of Action

3.2.1 Selective Stimulation of Beneficial Microbes

Prebiotics serve as substrates for beneficial bacteria, promoting their proliferation and indirectly suppressing pathogenic microorganisms (23).

3.2.2 SCFA Production

Fermentation of prebiotics results in SCFAs such as acetate, propionate, and butyrate, which:

- Provide energy for colonocytes
- Support intestinal barrier integrity
- Reduce inflammation (21)

3.2.3 Regulation of Intestinal pH

SCFA production lowers intestinal pH, inhibiting the growth of pathogenic bacteria (23).

3.2.4 Immunomodulation

Prebiotics indirectly modulate immune responses via alterations in the gut microbiota (24).

3.3 Clinical Effects

3.3.1 Gastrointestinal Health

Prebiotics improve bowel function and may reduce constipation (25).

3.3.2 Metabolic Disorders

They have been associated with improvements in glucose metabolism and lipid profiles (26).

3.3.3 Immune Function

Prebiotics may enhance immune responses and provide protection against infections (24).

3.3.4 Obesity and Energy Balance

Prebiotics may influence satiety hormones such as GLP-1 and PYY, potentially reducing energy intake (27).

3.4 Safety and Adverse Effects

Prebiotics are generally safe; however, high doses may cause gastrointestinal symptoms such as bloating, gas, and abdominal discomfort. These effects are typically dose-dependent and diminish over time (28).

4. Synbiotics

Synbiotics are defined as combinations of probiotics and prebiotics that exert synergistic effects when administered together (29). This approach aims to both introduce beneficial microorganisms and support their growth through selective substrates.

According to the International Scientific Association for Probiotics and Prebiotics, synbiotics are “a mixture comprising live microorganisms and substrates selectively utilized by host microorganisms that confers a health benefit” (30).

4.1 Mechanisms of Action

4.1.1 Synergistic Effects

The prebiotic component enhances the survival, colonization, and activity of probiotic microorganisms, thereby amplifying their beneficial effects (31).

4.1.2 Modulation of Gut Microbiota

Synbiotics more effectively restore microbial balance and promote eubiosis (32).

4.1.3 Enhanced Metabolic Activity

The combined effects of SCFA production and probiotic metabolism support intestinal health (33).

4.1.4 Immunomodulatory Effects

Synbiotics modulate immune responses through both direct (probiotic) and indirect (prebiotic) mechanisms, reducing inflammation (34).

4.2 Classification

Synbiotics are categorized into two main types:

- **Complementary synbiotics:** Probiotic and prebiotic components act independently.
- **Synergistic synbiotics:** The prebiotic specifically enhances the growth of the co-administered probiotic strain.

4.3 Clinical Applications

4.3.1 Gastrointestinal Diseases

Synbiotics may reduce symptoms in IBS and inflammatory bowel diseases (35).

4.3.2 Metabolic Disorders

They have been shown to improve insulin resistance, lipid profiles, and inflammatory markers (36).

4.3.3 Critical Illness and Intensive Care

Some studies suggest that synbiotics may reduce infection rates and improve clinical outcomes (37).

4.3.4 Liver Diseases

Potential benefits have been reported in non-alcoholic fatty liver disease (NAFLD) (38).

4.4 Safety

Synbiotics are generally safe; however, due to their probiotic components, caution is warranted in immunocompromised patients. Standardization of formulation and dosage remains crucial for clinical efficacy (34).

4.5 Future Perspectives

Synbiotics are increasingly considered a key component of personalized medicine. Tailoring specific probiotic–prebiotic combinations based on an individual’s microbiota profile may enable more targeted and effective therapeutic strategies in the future.

Keywords: Gut Microbiota, Probiotics, Prebiotics, Synbiotics

Cefdinir-Induced Pseudobleeding in a 1-Year-Old Male: A Case Report

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Introduction and Aim: Cefdinir is a widely used broad-spectrum cephalosporin in the pediatric population. A rare adverse effect is the development of red-colored stool (pseudobleeding), particularly when interacting with iron-containing products. This phenomenon may cause significant concern among families and clinicians, potentially leading to unnecessary investigations and hospital admissions. Here, we present a case of a 1-year-old male who developed red stool following cefdinir therapy initiated for acute aphthous stomatitis and fever.

Methods (Case Presentation): A 1-year-old boy was brought to the emergency department due to red-colored stool persisting for 2 days. The history revealed that he had been receiving one scoop of oral cefdinir daily for 4 days to treat oral aphthae and fever. There was no known chronic disease or drug allergy. His diet included formula feeding with additional homemade foods, and the family denied iron supplementation. On examination, vital signs were stable, abdominal and systemic examinations were unremarkable, and digital rectal examination revealed no blood.

Results: Laboratory tests showed a hemoglobin level of 11.1 g/dL, within the normal range for age, with no leukocytosis or thrombocytopenia. Stool occult blood test was

negative, and coagulation parameters were within normal limits (Table 1). Abdominal ultrasonography was normal. The patient was observed in the emergency department for 8 hours without a decrease in hemoglobin. Given the clinical stability, normal physical and laboratory findings, and history of iron-fortified formula feeding, the red stool was attributed to cefdinir-iron interaction pseudobleeding. Cefdinir was discontinued, and an alternative antibiotic was prescribed. The family was counseled, and outpatient follow-up was recommended in 2 days. At follow-up, the stool color had completely normalized.

Discussion: Cefdinir-induced pseudobleeding is a rare but benign condition that should be considered in clinically stable infants presenting with red-colored stool, especially those receiving cefdinir. Recognition of this phenomenon prevents unnecessary medical interventions and allows for appropriate family counseling.

Keywords: Cefdinir, Pseudobleeding, Children

Duchenne Muscular Dystrophy Diagnosed Through Elevated Transaminases in a 2-Year-Old Male: A Case Report

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Introduction: Muscular dystrophies are a group of disorders characterized by progressive loss of muscle mass and associated weakness. The most common form is Duchenne muscular dystrophy (DMD), an X-linked recessive myopathy with an incidence of approximately 1 in 3,500 live male births. Although the clinical features of DMD are well described, diagnosis may be delayed, particularly in children presenting with asymptomatic hypertransaminasemia, which can be mistakenly attributed to liver disease. We present a case of DMD diagnosed after persistent transaminase elevation prompted evaluation of creatine kinase (CK), highlighting the importance of considering muscle disorders in the differential diagnosis of elevated liver enzymes.

Case Presentation: A 2-year-old male was referred to our clinic for elevated AST and ALT. Physical examination and anthropometric measurements were normal. Family history revealed a second-degree parental consanguinity; past medical history was unremarkable. Elevated transaminases had been first noted approximately one year prior (AST 143 U/L, ALT 280 U/L) and were initially attributed to potential drug effects, with follow-up in pediatrics. Persistent elevation led to referral to our gastroenterology clinic, where AST was 204 U/L, ALT 286 U/L, and CK 25,649 U/L; abdominal ultrasonography was normal. Markedly elevated CK

Poster Presentation - PP117

prompted consideration of muscular dystrophy. Genetic analysis revealed a hemizygous deletion in exons 8–11 of the DMD gene. The patient was diagnosed with DMD and referred to pediatric neurology.

Discussion: Etiologies of abnormal liver function tests vary by age group, and elevated transaminases in children should prompt consideration of both hepatic and muscular causes. Family history, including consanguinity and neuromuscular disorders, is crucial. Physical signs of muscular dystrophy may include gastrocnemius hypertrophy, proximal muscle weakness, Gowers' sign, and delayed gross motor development; however, these may be absent in early disease. Importantly, elevated CK in conjunction with transaminase elevation should raise suspicion for muscular dystrophies even in the absence of overt clinical findings.

Conclusion: Muscular dystrophies, including DMD, are important causes of persistent transaminase elevation in children. Early consideration of neuromuscular evaluation and CK measurement can facilitate timely diagnosis and prevent unnecessary hepatic investigations.

Keywords: Muscular Dystrophy, Duchenne, Transaminase

Persistent Vomiting in Infancy: A Diagnostic Challenge Revealing an Underlying Cranial Fracture

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Objective:

In cases of persistent vomiting, even when standard diagnostic evaluations are unremarkable, a comprehensive physical examination and, when indicated, advanced imaging are of critical importance. In infants, persistent vomiting is commonly attributed to frequent causes such as gastroesophageal reflux (GER), food allergies, or metabolic disorders. In this case, we aimed to emphasize that refractory vomiting may not always originate from the gastrointestinal system and that rare but serious neurological or traumatic etiologies can be overlooked.

Methods:

A five-month-old male infant presented with persistent vomiting since birth, typically occurring after breastfeeding or formula feeding. His medical history revealed preterm birth at 34 weeks of gestation with a birth weight of 2000 g and a 12-day stay in the neonatal intensive care unit. During a prior pediatric surgery outpatient visit, an upper gastrointestinal contrast study suggested reflux, and prokinetic agents (domperidone, Gastrotuss Baby) were prescribed without clinical improvement. The patient was further evaluated for cow's milk protein allergy; although

Poster Presentation - PP1189

specific IgE levels were borderline elevated, an amino acid-based formula was initiated without significant response, and the patient was subsequently referred to our clinic.

Results:

The patient, who had been diagnosed with cow's milk protein allergy and started on an amino acid-based formula, demonstrated normal laboratory findings, including complete blood count, biochemical parameters, stool reducing substances, stool adenovirus/rotavirus antigen tests, and urinalysis. Abdominal ultrasonography and transfontanelle ultrasonography were unremarkable. As the etiology of vomiting remained unexplained, neurological causes were considered. Following a pediatric neurology consultation, cranial computed tomography (CT) was performed, revealing a finding suggestive of a linear fissure fracture in the right parietal bone. Upon reassessment of the medical history, it was discovered that the infant had experienced a fall during the neonatal period. Vomiting following head trauma is a common manifestation in infants and may result from increased intracranial pressure or stimulation of the vestibular system.

Conclusion:

Patients presenting with persistent vomiting should be evaluated systematically, and in cases resistant to standard treatment, intracranial causes must be excluded. Even when symptoms partially respond to dietary modifications, if the underlying cause remains unexplained, the diagnostic approach should be broadened to include neurological and traumatic etiologies. It should be kept in mind that an apparently simple symptom such as vomiting may be the initial sign of an unexpected and serious condition, such as a cranial fracture.

Keywords: Persistent Vomiting, Infancy, Gastroesophageal Reflux, Cow's Milk Protein Allergy, Refractory Symptoms, Cranial Fracture

Celiac Disease in a Turner Syndrome Patient with Inadequate Growth Response to Growth Hormone Therapy: A Case Report

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Introduction and Objective:

Turner Syndrome (TS) is a chromosomal disorder characterized by short stature and gonadal dysgenesis. Patients with TS have an increased prevalence of autoimmune diseases; while Hashimoto's Thyroiditis is the most common, the risk of Celiac Disease (CD) is reported to be 4–8 times higher than in the general population. The prevalence of CD in TS patients ranges between 4% and 8%.

Although short stature in TS patients receiving growth hormone (GH) therapy is often attributed to the syndrome itself, coexisting malabsorptive conditions such as CD may negatively affect treatment response. Previous studies have demonstrated that the coexistence of CD and GH deficiency is not uncommon and that combined management improves outcomes. This report aims to highlight the importance of considering CD in TS patients presenting with malnutrition and inadequate growth despite GH therapy.

Case Presentation:

A 14-year-old female patient with a diagnosis of Turner Syndrome, followed by pediatric endocrinology and receiving recombinant GH therapy for growth promotion, was referred to our clinic due to persistent malnutrition despite ongoing treatment.

Physical Examination:

- Height: 134 cm (−3.97 SDS)
- Weight: 28.7 kg

Laboratory Findings:

- Tissue Transglutaminase Antibody (tTG) IgA: >200 U/mL (strongly positive)

Due to markedly elevated tTG levels, upper gastrointestinal endoscopy was performed. A total of six biopsies were obtained—four from the second part of the duodenum and two from the duodenal bulb. Histopathological evaluation revealed Marsh-Oberhuber classification Type 3c (total villous atrophy). Based on these findings, the patient was diagnosed with Celiac Disease, and a strict gluten-free diet was initiated.

Discussion and Conclusion:

The coexistence of Turner Syndrome and Celiac Disease is well established. Therefore, short stature and malnutrition in TS patients should not be attributed solely to the primary condition; routine serological screening for CD is essential. As demonstrated in this case, CD must be excluded in TS patients who fail to achieve expected growth despite GH therapy or who present with signs of malnutrition.

The literature emphasizes that in patients who do not exhibit adequate catch-up growth following a gluten-free diet, evaluation for GH deficiency should also be considered. Delayed diagnosis may reduce the effectiveness of GH therapy and result in irreversible short stature.

In this case, the diagnosis was confirmed by endoscopic biopsy following strongly positive serology. The presence of Marsh Type 3c histopathology indicates severe malabsorption and underscores the urgency of strict dietary adherence. Histological recovery may take time, making long-term compliance with a gluten-free diet critical.

This case highlights that even in syndromic conditions such as TS, short stature should not be solely attributed to the primary disease. In treatment-resistant cases—particularly those under GH therapy—secondary causes such as CD must be thoroughly investigated.

Keywords: Turner Syndrome, Celiac Disease, Growth Hormone Therapy, Short Stature, Malnutrition, Autoimmune Diseases, Villous Atrophy, Pediatric Endocrinology

Anti-Aging Nutrition and Functional Foods

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Aging is not merely a chronological phenomenon defined by the passage of time; rather, it represents a complex interplay of molecular, cellular, tissue, and systemic changes. The World Health Organization (WHO) defines aging as a natural process characterized by the accumulation of molecular and cellular damage, leading to a gradual decline in functional capacity. Consequently, differences in biological age among individuals of the same chronological age reflect the inherently heterogeneous nature of aging.

The concept of healthy aging extends beyond structural deterioration and focuses on maintaining functional capacity that enables physical, cognitive, and social well-being in later life. According to WHO (2015), healthy aging is defined as the process of developing and maintaining functional ability that enables well-being in older age. This scientific perspective differs significantly from popular “anti-aging” narratives that primarily focus on cosmetic outcomes. Instead, evidence-based anti-aging interventions aim to enhance biological resilience by targeting fundamental physiological pathways.

The biological basis of aging has been comprehensively described by Carlos López-Otín and colleagues through the “hallmarks of aging” framework. This model initially included genomic instability, telomere attrition, epigenetic alterations, loss of proteostasis, mitochondrial dysfunction, deregulated nutrient sensing, cellular senescence, and stem

cell exhaustion. Recent updates have expanded this framework to include altered intercellular communication, chronic inflammation, dysbiosis, and impaired autophagy, further emphasizing the complexity and non-linear nature of aging.

Nutrition is one of the most influential modifiable environmental factors affecting aging biology. Emerging evidence indicates that specific nutrients can modulate aging processes at the molecular level. For instance, vitamin D and omega-3 fatty acids have been shown to influence DNA methylation-based epigenetic clocks, potentially modulating biological aging rates. In contrast, high consumption of ultra-processed foods is associated with increased inflammatory burden, oxidative stress, and metabolic dysregulation, thereby accelerating biological aging. These findings highlight that nutrition is not merely a source of energy but also a powerful regulator of aging-related molecular mechanisms.

Functional foods play a particularly important role in this context due to their bioactive components. Polyphenols, prebiotic fibers, probiotics, omega-3 fatty acids, and other bioactive molecules can support healthy aging through mechanisms such as reducing oxidative stress, suppressing inflammation, modulating gut microbiota, and regulating cellular signaling pathways.

Mechanisms of Anti-Aging Nutrition

Aging results from the interaction of genetic, environmental, and lifestyle factors. Nutrition, as a modifiable determinant, has a profound impact on these processes. Modern biogerontology demonstrates that specific nutrients and dietary patterns can regulate key biological pathways involved in aging.

Reduction of Oxidative Stress

Oxidative stress is a central driver of aging. An imbalance between reactive oxygen species and antioxidant defenses leads to cumulative damage to DNA, proteins, and lipids, ultimately accelerating functional decline. The concept of mitohormesis suggests that low

levels of oxidative stress may activate adaptive cellular defense mechanisms, enhancing resilience. Interventions such as caloric restriction, physical activity, and polyphenol intake may promote these beneficial adaptive responses.

Suppression of Chronic Inflammation (Inflammaging)

Aging is associated with chronic low-grade inflammation, commonly referred to as “inflammaging.” This condition negatively affects vascular, metabolic, neurological, and immune functions. Omega-3 fatty acids (EPA and DHA) contribute to the resolution of inflammation through specialized pro-resolving mediators such as resolvins and protectins. Additionally, plant-derived polyphenols can inhibit inflammatory signaling pathways, including NF- κ B.

Enhancement of Autophagy

Autophagy is a critical cellular process responsible for the removal and recycling of damaged cellular components. Age-related decline in autophagy leads to accumulation of cellular waste and metabolic dysfunction. Caloric restriction, intermittent fasting, and compounds such as resveratrol can activate autophagy, thereby supporting cellular renewal.

Maintenance of Mitochondrial Function

Mitochondria are central to energy production, and their dysfunction is a hallmark of aging. Nutrients such as coenzyme Q10, L-carnitine, riboflavin, and niacin support mitochondrial function and reduce oxidative stress, thereby preserving cellular energy metabolism.

Preservation of Telomere Length

Telomeres shorten with each cell division and are considered markers of biological aging. Oxidative stress and inflammation accelerate telomere shortening. Nutrients such as

omega-3 fatty acids and antioxidants may slow this process, contributing to cellular longevity.

Energy-Sensing Pathways: AMPK–mTOR–Sirtuin Axis

Cellular energy homeostasis is regulated by key signaling pathways, including AMPK, mTOR, and sirtuins. AMPK activation enhances catabolic pathways, promotes mitochondrial biogenesis, and stimulates autophagy, thereby improving metabolic flexibility and resilience.

NAD⁺ Metabolism

Nicotinamide adenine dinucleotide (NAD⁺) is a crucial coenzyme involved in energy metabolism, DNA repair, and stress responses. Age-related decline in NAD⁺ levels contributes to mitochondrial dysfunction and metabolic imbalance. Lifestyle interventions such as caloric restriction and physical activity may enhance NAD⁺ biosynthesis and support cellular homeostasis.

Functional Foods: Definition and Health Effects

Functional foods are defined as foods that provide health benefits beyond basic nutrition due to their bioactive components. These include vitamins, minerals, polyphenols, flavonoids, and other phytochemicals that exert protective physiological effects.

Their key benefits include reducing oxidative stress, modulating gut microbiota, improving metabolic health, and supporting immune function. Probiotic foods such as yogurt and kefir enhance beneficial gut bacteria, while prebiotic fibers promote their growth. Omega-3 fatty acids contribute to cardiovascular health, and plant-based polyphenols support cellular protection and anti-inflammatory responses.

Evidence-Based Functional Food Groups with Anti-Aging Effects

- **Polyphenols:** Powerful antioxidants that protect against oxidative damage and regulate cellular signaling
- **Omega-3 Fatty Acids:** Anti-inflammatory and cardioprotective effects
- **Probiotics and Prebiotics:** Gut microbiota modulation and immune support
- **Carotenoids:** Protective effects on vision, skin, and immune function
- **Coenzyme Q10:** Supports mitochondrial energy production
- **Vitamins D and K2:** Essential for bone and cardiovascular health
- **Olive Oil and Mediterranean Diet:** Rich in phenolic compounds with anti-inflammatory properties
- **Senolytic Compounds:** Bioactive molecules such as fisetin and quercetin that may target senescent cells

Current Dietary Approaches in Anti-Aging Nutrition

- **Caloric Restriction (CR):** Strongest evidence for lifespan extension in experimental models
- **Intermittent Fasting (IF):** Enhances metabolic flexibility and reduces inflammation
- **Mediterranean Diet:** Associated with reduced mortality and cardiovascular risk
- **Ketogenic Diet:** Potential metabolic and neuroprotective benefits, though long-term safety remains debated
- **MIND Diet:** Supports cognitive function and reduces neurodegenerative risk

Practical Applications for Daily Life

- Increase intake of antioxidant-rich fruits and vegetables
- Consume omega-3 sources regularly (fatty fish, walnuts, flaxseeds)
- Include probiotic and prebiotic foods in daily diet
- Ensure adequate intake of vitamins and minerals
- Limit advanced glycation end products (AGEs) by reducing processed foods

- Maintain sufficient protein intake to prevent sarcopenia

Safety, Drug Interactions, and Expectation Management

Despite their benefits, functional foods are not inherently risk-free. Issues such as lack of standardization, contamination, excessive supplementation, and altered pharmacokinetics in older adults must be considered.

Potential interactions include:

- Omega-3 fatty acids increasing bleeding risk with anticoagulants
- Polyphenols affecting cytochrome P450 enzyme activity
- Probiotics interacting with antibiotics
- Herbal products altering drug metabolism

Importantly, functional foods do not reverse aging but may modulate its biological processes. Their effects vary among individuals and should be considered as part of a comprehensive lifestyle approach.

Conclusion

Aging is a complex, multifactorial process influenced by molecular and environmental factors. Nutrition plays a critical role in modulating key biological mechanisms of aging, including oxidative stress, inflammation, mitochondrial function, and cellular repair systems.

Functional foods, through their bioactive components, represent a scientifically grounded strategy to support healthy aging. When integrated into a balanced and sustainable dietary pattern, they can reduce chronic disease risk, preserve cognitive and metabolic function, and improve quality of life.



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*The Conundrum of Disasters and Technological Change:
A Health Care System with Qualified Family Physicians to Unravel the Enigmatic Uncertainty*

Future advances in nutrigenomics, microbiome research, and personalized nutrition will further refine our understanding of how functional foods can be optimized for individual aging trajectories.

Keywords: Anti-Aging, Nutrition, Functional Foods

A Hidden Cause of Hip Pain: Osteoid Osteoma Presenting with Synovial Inflammation

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Introduction: Osteoid osteoma is a common benign tumor usually located in the metaphyseal and diaphyseal regions of long bones. Night pain, which responds markedly to nonsteroidal anti-inflammatory drugs, is a well-known classic symptom. It accounts for 10% to 15% of all benign bone tumors. It is more common in men, mostly in young individuals, especially between the ages of 5 and 25. The pain is thought to be caused by increased pressure stimulating nerve fibers due to abnormally high prostaglandin concentrations (30 times or more) in the lesion. The goal of treatment is to remove the socket by surgical resection or radiofrequency ablation, but the tumor sometimes regresses spontaneously with NSAIDs alone.

Case Report:

A 6-year-old girl who was followed up with allergic rhinitis and had been using montelukast for 2 years presented with pain in the right hip and difficulty in walking when she woke up in the morning for 2 weeks. It was learned that he had a similar short-term complaint two months before his history and regressed without treatment. The patient has no history of fever, weight loss, trauma. There is no swelling, redness and temperature

increase in his joints. There was no animal contact. He consumes milk and dairy products pasteurized. On physical examination, internal rotation and Faber test were found to be painful in the right hip. Organomegaly and lymphadenopathy were not detected. Complete blood count and biochemical tests were normal. Brucella, Borelia, Tularemia, VDRL, HIV, Hepatitis tests are negative. Rheumatology and orthopedics consultation was requested. Contrast-enhanced right hip MRI shows synovial swelling with high signal intensity and osteoid osteoma focus in the femoral neck. With the recommendation of orthopedics and rheumatology, the patient was started on NSAIDs and was followed up clinically.

Discussion and Conclusion: For hip osteoid osteomas, a limping gait caused by reduced range of motion due to joint fluid may be the first symptom. Clinical diagnosis is often difficult due to its deep and intra-articular location. The treatment approach has evolved from surgical resection to percutaneous treatments, and the option of medical treatment is still being debated for some specific cases.

Keywords: Osteoid Osteoma, Night Pain, Synovial Inflammation

Periorbital Eczema Herpeticum: A Case Developing on the Basis of Atopic Dermatitis

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Introduction: It is a common secondary infection of the herpes simplex virus that develops in cases with impaired skin integrity such as eczema herpeticum and atopic dermatitis. It occurs in approximately 3% of patients with atopic dermatitis. Although it can be seen at any age, it is most common in infants. It is the most feared and life-threatening complication of atopic dermatitis. This disease, initially local, can progress to a systemic infection. Early diagnosis is important to prevent complications. The main treatment for the disease is acyclovir. The pathogenesis of eczema herpeticum is not clear; However, low levels of interferon gamma, interleukin 18 and interferon gamma inducing factors and filaggrin gene mutation are thought to play a role in the pathogenesis.

Case Report: A 12-year-old male patient presented with redness, itching and crusty lesions around both eyes for five days. The patient's history included a diagnosis of atopic dermatitis and a history of follow-up. There was no medication he used regularly. Physical examination revealed widespread, monomorphic-looking, crusted erosional lesions in both periorbital regions. (Picture 1, permission was obtained from the family for the photo.) Other system examinations were natural. Complete blood count, viral (HIV, HBV, HCV, EBV, CMV, HSV) serologies and samples (blood and swab culture from the lesion) were taken for further microbiological

examinations. The patient was hospitalized with a preliminary diagnosis of Eczema Herpeticum and intravenous acyclovir and clindamycin treatment was initiated. On the 3rd day of treatment, antibiotic treatment was replaced with teicoplanin after clindamycin-resistant *Staphylococcus aureus* growth was detected in swab culture. Dermatology took a sample from the lesion and performed the Tzanck test, and no acantholytic and multinuclear cells were observed under the microscope. Due to periorbital location, ophthalmology consultation was performed and no ocular involvement was detected, and moxifloxacin eye drops were added to the treatment. During the treatment process, regression of the lesions was observed.

Discussion and Conclusion: Eczema herpeticum develops as a result of disruption of the epidermal barrier and weakening of the local immune response, especially in patients with atopic dermatitis. The most important approach in periorbital involvement is to exclude ocular spread, as complications such as blindness and keratitis may occur. The confusion of eczema herpeticum with bacterial impetigo can delay diagnosis and treatment and lead to the progression of complications. Eczema herpeticum should be kept in mind in vesiculocrut lesions that develop on the basis of atopic dermatitis and are located periorbitally.

Keywords: Eczema Herpeticum, Herpes Simplex

The Importance of Family Physicians in the Early Recognition of Metabolic Syndrome Components and Possible Non-Alcoholic Fatty Liver Disease in Adolescence: A Case Report

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Abstract

Obesity is one of the most prevalent health problems of our time, with an increasing incidence particularly in childhood and adolescence. It is strongly associated with the development of metabolic syndrome and non-alcoholic fatty liver disease (NAFLD), both of which contribute to long-term cardiovascular and metabolic complications. In this case report, we present a 12-year-old male patient who presented with excessive eating behavior and was found to have multiple components of metabolic syndrome along with elevated liver enzymes suggestive of NAFLD. This case highlights the critical role of family physicians in the early recognition of metabolic risk factors during adolescence.

Introduction

Obesity has become one of the most common chronic conditions affecting children and adolescents worldwide. Disordered eating behaviors, high-calorie diets, and reduced physical activity are major contributing factors. Childhood obesity significantly

increases the risk of metabolic syndrome, type 2 diabetes mellitus, and cardiovascular diseases later in life. In addition, it may lead to hepatic involvement in the form of non-alcoholic fatty liver disease (NAFLD). Since these conditions are often asymptomatic during adolescence, early detection in primary care settings is essential. Family physicians play a crucial role in identifying at-risk individuals and initiating appropriate lifestyle interventions.

Case Presentation

A 12-year-old male presented to a family medicine outpatient clinic with complaints of excessive appetite and overeating behavior. His history revealed irregular dietary habits and high caloric intake.

Height 162 cm

Weight 66 kg

Body mass index (BMI) 25.1 kg/m² (borderline obese for age)

Blood pressure 127/63 mmHg and 126/71 mmHg (borderline elevated for age)

Fasting plasma glucose 90 mg/dL

HbA1c 5.4%

Insulin 28 µU/mL (elevated)

HOMA-IR 6.2 (elevated)

Triglycerides 344 mg/dL (elevated)

Total cholesterol 229 mg/dL (elevated)

HDL cholesterol 44.8 mg/dL (low-normal)

LDL cholesterol 115 mg/dL (borderline elevated)

ALT 168 U/L (elevated)

AST 102 U/L (elevated)

Complete blood count revealed leukocytosis, consistent with a concurrent infection. Based on these findings, the patient was considered to have insulin resistance,

atherogenic dyslipidemia, and components of metabolic syndrome, with elevated liver enzymes suggestive of NAFLD.

Discussion

This case demonstrates the multisystem impact of obesity in adolescence. The coexistence of obesity, insulin resistance, dyslipidemia, and borderline elevated blood pressure indicates clustering of metabolic syndrome components.

According to the International Diabetes Federation (IDF) criteria, the presence of obesity accompanied by hypertriglyceridemia and borderline elevated blood pressure supports the diagnosis of metabolic syndrome components. These findings are also consistent with the Adult Treatment Panel III (ATP III) definition of metabolic syndrome. Additionally, markedly elevated liver enzymes suggest hepatic involvement, most likely non-alcoholic fatty liver disease (NAFLD), which is considered the hepatic manifestation of metabolic syndrome. Since adolescents are often asymptomatic, metabolic risks may remain undetected. Therefore, family physicians play a critical role in early identification by evaluating lifestyle factors and eating behaviors.

Conclusion

Metabolic syndrome components and possible NAFLD can be detected early during adolescence, even in the absence of overt hyperglycemia. Family physicians play a key role in early diagnosis and intervention. Early lifestyle modifications are essential in preventing long-term cardiometabolic complications.

Keywords: Metabolic Syndrome, Adolescence, Obesity, Insulin Resistance, Early Detection, Family Medicine

Acute Kidney Function Deterioration and Hyperkalemia Associated with Ramadan Intermittent Fasting in Patient with Metabolic Risk Factors: A Case Report from Primary Care

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Background

Ramadan intermittent fasting (RIF) is widely practiced among Muslims and is generally considered safe in healthy individuals. However, its safety in patients with metabolic risk factors but without overt diabetes remains insufficiently explored. Primary care physicians play a pivotal role in identifying individuals at risk and guiding safe fasting practices.

Case Presentation

A 52-year-old premenopausal woman with a 5-year history of hypertension was followed in primary care. She had fluctuating dyslipidemia, overweight status, and documented insulin resistance (HOMA-IR: 4.32). Laboratory findings also revealed mildly elevated liver enzymes and hyperuricemia. Although lifestyle modifications had been recommended, including regular exercise, adherence was limited due to gonalgia.

The patient expressed a strong desire to observe RIF. Despite medical advice against fasting due to borderline renal function (suggestive of reduced glomerular filtration rate), she insisted on fasting with close monitoring.

On the fifth day of fasting, laboratory evaluation demonstrated a 33% increase in serum creatinine compared to baseline, accompanied by hyperkalemia. The patient was immediately advised to discontinue fasting and increase fluid intake. Her antihypertensive regimen included a renin-angiotensin-aldosterone system (RAAS) blocker, which may have contributed to potassium retention.

Following cessation of fasting, renal function and electrolyte levels returned to baseline within a few days.

Discussion

This case illustrates that the risks of RIF are not confined to patients with diabetes. Individuals with metabolic risk factors—including insulin resistance, hypertension, overweight, and possible metabolic dysfunction-associated liver disease—may exhibit increased renal vulnerability, particularly under conditions of dehydration.

The disproportionate rise in serum potassium relative to the decline in renal function suggests a contributory role of RAAS blockade. Although hyporeninemic hypoaldosteronism is a known mechanism in diabetic patients, it was not evident in this case.

Conclusion

RIF may precipitate acute kidney function deterioration and electrolyte imbalance even in non-diabetic individuals with metabolic risk factors. This case underscores the necessity of individualized pre-fasting risk stratification in primary care settings. Patients



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with borderline renal function or multiple metabolic comorbidities should be counseled cautiously, closely monitored, and advised against fasting when clinically indicated.

Keywords: Ramadan Fasting, Acute Kidney Injury, Hyperkalemia, Insulin Resistance, Primary Care, Metabolic Risk

Functional Foods as Nutritional Strategies for Brain Health and Cognitive Function: An Updated Review

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Objective

This review aims to evaluate the effects of functional foods on brain health and cognitive functions in light of current evidence, and to examine the neuroprotective mechanisms of bioactive components such as omega-3 fatty acids, polyphenols, probiotics and B vitamins, as well as the protective potential of dietary patterns against cognitive decline.

Materials and Methods

This study is a comprehensive review based on a systematic literature search conducted using PubMed, Scopus and Google Scholar databases. The search was performed using the keywords functional foods, cognitive function, neuroinflammation, gut-brain axis (GBA), Mediterranean diet and MIND diet; predominantly including randomized controlled trials, meta-analyses and systematic reviews published between 2010 and 2026.

Results

Omega-3 fatty acids, particularly docosahexaenoic acid (DHA) and eicosapentaenoic acid (EPA), support neuronal membrane integrity, enhance brain-derived neurotrophic factor

(BDNF) expression and suppress neuroinflammation. Epidemiological data consistently demonstrate an inverse relationship between omega-3 consumption and the risk of cognitive decline and dementia. Polyphenols inhibit pro-inflammatory cytokine production via the NF- κ B pathway and strengthen antioxidant defense through Nrf2 activation; flavonoid-rich dietary patterns have been shown to significantly reduce the risk of cognitive decline. Probiotics influence brain functions through the GBA via the vagus nerve, short-chain fatty acids (SCFA) and neurotransmitter precursors; an umbrella meta-analysis of 3,910 participants reported that probiotic supplementation significantly improved cognitive functions in individuals with mild cognitive impairment (MCI) and Alzheimer's disease. Deficiency of B12, B6 and folate triggers neuronal damage through homocysteine accumulation; elevated homocysteine levels are reported to approximately double the risk of dementia. The VITACOG trial demonstrated that high-dose B vitamin supplementation significantly slowed brain atrophy in individuals with MCI. At the dietary pattern level, a meta-analysis of 65,955 participants showed that high adherence to the Mediterranean diet provided significant protective effects against all types of dementia. The large-scale randomized controlled MIND diet trial yielded findings suggesting that cognitive performance was preserved or partially improved in both groups.

The current body of evidence indicates that nutrition plays a substantial role in the prevention and progression of cognitive decline and dementia. Across individual nutrients, bioactive compounds, and dietary patterns, several nutritional strategies appear to exert neuroprotective effects through complementary biological mechanisms.

Among specific nutrients, omega-3 fatty acids, particularly DHA and EPA, have been consistently associated with better cognitive outcomes. Their protective effects are mainly attributed to the preservation of neuronal membrane fluidity, enhancement of synaptic plasticity, upregulation of brain-derived neurotrophic factor (BDNF), and attenuation of neuroinflammatory processes. Similarly, B-group vitamins, especially vitamins B12, B6, and folate, appear to contribute to cognitive health by regulating

homocysteine metabolism. Elevated homocysteine has been repeatedly linked to neurodegeneration, vascular injury, and increased dementia risk, while interventional studies such as the VITACOG trial suggest that B-vitamin supplementation may slow brain atrophy in individuals with mild cognitive impairment (MCI).

In addition, polyphenols and flavonoids have emerged as promising neuroprotective compounds due to their antioxidant and anti-inflammatory properties. These compounds appear to modulate oxidative stress, suppress pro-inflammatory signaling pathways such as NF- κ B, and activate endogenous defense mechanisms including Nrf2-mediated antioxidant responses. Epidemiological findings further support the association between flavonoid-rich dietary patterns and reduced risk of cognitive decline.

Another important area identified in the literature is the role of the gut-brain axis in cognitive aging. Probiotics may influence cognitive function through modulation of gut microbiota composition, short-chain fatty acid production, vagal signaling, and neurotransmitter precursor availability. Recent meta-analytic evidence suggests that probiotic supplementation may improve cognitive outcomes, particularly in individuals with MCI and Alzheimer's disease, although heterogeneity in strains, dosage, and intervention duration remains a limitation.

At the broader dietary level, adherence to Mediterranean-style and MIND dietary patterns appears to provide the most consistent protective effect against cognitive decline and dementia. These dietary models are characterized by high intake of vegetables, fruits, whole grains, legumes, nuts, olive oil, and fish, combined with lower consumption of ultra-processed foods and saturated fats. Their benefits likely arise from the synergistic action of anti-inflammatory, antioxidant, vascular-protective, and microbiota-modulating components. Overall, the literature suggests that dietary interventions may be most effective when considered as multifactorial and pattern-based strategies, rather than isolated nutrient supplementation alone.

Conclusion In conclusion, the available evidence strongly suggests that nutrition is a modifiable factor with significant potential in supporting cognitive health and reducing the risk of dementia. Both individual nutrients—such as omega-3 fatty acids, B vitamins, polyphenols, and probiotics—and comprehensive dietary patterns—particularly the Mediterranean and MIND diets—demonstrate promising associations with neuroprotection and preservation of cognitive function. Nevertheless, despite the growing consistency of observational and interventional findings, the literature is still characterized by methodological heterogeneity, including differences in study populations, intervention duration, dosage, baseline nutritional status, and cognitive outcome measures. Therefore, while current evidence supports the incorporation of healthy dietary strategies into dementia prevention frameworks, further large-scale, long-term randomized controlled trials are needed to clarify causality, identify optimal intervention components, and determine the populations most likely to benefit.

From a clinical and public health perspective, dietary interventions represent a low-cost, accessible, and sustainable approach that may complement existing strategies for the prevention and management of cognitive decline. Future research should focus not only on isolated nutrients but also on integrated, personalized, and life-course nutritional approaches to promote healthy brain aging.

Functional foods and holistic dietary patterns stand out as accessible, safe and promising strategies for preventing cognitive decline. These findings are particularly valuable from a family medicine perspective: nutritional counseling should be integrated into primary care as an indispensable component of cognitive health protection strategies. Current evidence indicates that the neuroprotective potential of holistic dietary models — where synergistic components are presented together — is stronger than the isolated effects of individual nutrients.¹⁻⁵

Keywords: Omega-3 Fatty Acids, Cognitive Functions, Review, Brain Health, Nutritional Dietary

Gastric Adenocarcinoma Diagnosed Based on Alarm Symptoms in Primary Care: A Case Report

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Abstract

Gastric cancer is a significant cause of morbidity and mortality worldwide and is often diagnosed at advanced stages. Early diagnosis plays a crucial role in patient prognosis. In this case report, we present a 63-year-old male patient who presented to a primary care clinic with complaints of loss of appetite, weight loss, and nausea-vomiting, and was subsequently diagnosed with gastric adenocarcinoma following further evaluation. This case highlights the importance of early recognition of alarm symptoms in primary care settings.

Introduction

Gastric cancer is one of the most common malignancies worldwide and is frequently diagnosed at advanced stages. Early-stage detection significantly improves survival rates. Primary care plays a critical role in early diagnosis, as it is often the first point of contact for patients. Alarm symptoms such as unintentional weight loss, loss of appetite, and persistent gastrointestinal complaints should be carefully evaluated for potential malignancies.

Poster Presentation - PP129

Case Presentation

A 63-year-old male patient presented to the primary care clinic with complaints of loss of appetite, nausea, vomiting, and an unintentional weight loss of approximately 5 kilograms over one month. The patient had no known chronic medical conditions. Physical examination revealed no significant pathological findings. Due to the presence of alarm symptoms, further investigations were initiated. Laboratory tests showed an elevated CA 19-9 level of 233 kU/L and a mildly elevated carcinoembryonic antigen (CEA) level. Other biochemical parameters were within normal limits. Upper gastrointestinal endoscopy revealed an ulcerovegetative mass lesion in the prepyloric antrum, partially obstructing the pylorus, with features suggestive of malignancy. Multiple biopsies were obtained. Abdominal ultrasonography demonstrated irregular wall thickening of approximately 2 cm in the antropyloric region. Contrast-enhanced abdominal computed tomography revealed increased gastric wall thickness, without evidence of liver metastasis or pathological lymphadenopathy. Positron emission tomography-computed tomography (PET-CT) showed asymmetrical wall thickening extending from the gastric corpus to the antropyloric region, causing luminal narrowing and exhibiting hypermetabolic activity (SUVmax: 7.4). No distant metastasis or significant lymph node involvement was detected. Histopathological examination of the biopsy specimens confirmed the diagnosis of gastric adenocarcinoma. The patient was referred to general surgery and oncology departments for further evaluation and treatment planning.

Discussion

Gastric adenocarcinoma is often diagnosed at an advanced stage due to its nonspecific clinical presentation. However, early recognition of alarm symptoms can significantly expedite the diagnostic process. In this case, the patient initially presented to a primary care setting, where alarm symptoms were promptly identified, leading to timely referral and diagnosis. The concordance between endoscopic, radiological, and metabolic imaging findings strengthened the diagnostic accuracy. Importantly, the absence of distant

metastasis on PET-CT suggests that the patient may be a candidate for surgical treatment. This underscores the critical role of primary care physicians in early detection and appropriate referral, which can directly influence patient outcomes.

Conclusion

Early recognition of alarm symptoms in primary care is essential for the timely diagnosis of gastrointestinal malignancies. This case demonstrates that prompt evaluation and referral can significantly contribute to early diagnosis and improve treatment opportunities.

Keywords: Gastric Cancer, Primary Care, Alarm Symptoms, Early Diagnosis, Weight Loss

Turkish Validity and Reliability Study of WaLIDD Score

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Introduction

The WaLIDD score (Working ability, Location, Intensity, Days of Pain, Dysmenorrhea), developed in line with this need, is a short and applicable measurement tool that addresses the impact of menstrual pain on the individual in a broader framework. The score has been shown to be an effective tool in both diagnosing dysmenorrhea and predicting the consequences of this condition such as loss of workforce by evaluating the distribution area, duration, intensity of pain and the individual's capacity to perform daily functions together (1-7).

This study aims to fill this gap by adapting the WaLIDD score into Turkish and examining its psychometric properties. Thus, it is aimed to provide a practical, culturally appropriate and scientifically sound assessment tool for both field research and clinical applications.

Method

Research Design

This study is a cross-sectional and methodological study conducted online, aiming to evaluate the validity and reliability of the Turkish version of the WaLIDD Score used to

assess dysmenorrhea. The linguistic and cultural adaptation of the scale was carried out in accordance with the translation-adaptation principles recommended by the World Health Organization, and then its psychometric properties were tested.

Permits

Before starting the study (08.01.2025), permission was obtained from the authors who developed the score. Afterwards, permission was obtained from Hacettepe University Health Sciences Research Ethics Committee /Research Number: SBA 25/078; Session date: 18.02.2025; Session number: 2025/05; Decision Number: 2025/05-17), the study was started on 01.03.2025 and completed on 21.05.2025.

Participants and Sample Characteristics

Female individuals living in Turkey, aged 18 and over, with active internet access were included in the study on a voluntary basis. Participants were invited to study through social media channels. Inclusion criteria included: Being over 18 years of age, having regular menstruation in the last 3 months, being between the 6th and 9th day of the menstrual cycle at the time of the survey, not having a diagnosis of chronic disease and not taking regular medication. Pregnancy, postmenopausal period, being within 12 months postpartum, history of pelvic infection and incomplete or contradictory answers were defined as exclusion criteria. The sample size was determined by taking at least 10 times the number of questions in the scale ($n = 4$); 30% additional sample was targeted due to possible refusal, dropout and exclusion criteria. Thus, it was envisaged to reach at least 52 participants in the study.

Data Collection Process

The data collection process was conducted as an online questionnaire via Google Forms. Participants completed the questionnaire after reading and approving the informed consent text. The questionnaire consisted of four sections:

1. Demographic Information Form

It includes basic variables such as age, marital status, education level, occupation, smoking and alcohol use status of the participants.

2. WaLIDD Score - English Version

The WaLIDD score was first developed by Teherán et al. and is a unique scale that aims to assess dysmenorrhea with a multidimensional approach, not only based on pain intensity. The scale consists of four questions, and each question is scored between 0 and 3 points (total score range: 0-12). The dimensions assessed are:

- **Ability to work:** The impact of pain on daily functioning.
- **Pain localization:** The anatomical extent of the pain (e.g. lower abdomen, lower back, leg, groin).
- **Pain intensity:** Subjective assessment based on the Wong-Baker facial pain scale.
- **Duration of pain:** Number of days of pain during menstruation.

The WaLIDD score indicates no dysmenorrhea at low scores, mild to moderate dysfunction at moderate scores, and severe dysmenorrhea-related functional impairment at high scores. In the study in which it was developed, it was defined as a diagnostic tool with high discrimination (7).

1. Numerical Pain Rating Scale (NRS)

The NRS is a simple and reliable assessment tool that asks individuals to rate their pain between 0 (no pain) and 10 (unbearable pain). It is widely preferred because it can be administered verbally and is easily understood by the patient (8). In this study, WaLIDD score was used as a reference criterion to test its relationship with pain intensity.

2. Health-related Quality of Life Scale (SF-36)

SF-36 is a self-report scale that evaluates individuals' general health perceptions and quality of life in eight sub-dimensions. The Turkish version was adapted by Koçyiğit et al. and validity and reliability analyses were performed (9). Sub-dimensions: Physical Function (FF); Physical Role Restriction (FRR); Emotional Role Restriction (ERR); Body Pain (VA); Social Function (SF); Vitality (C); Mental Health (MS); General Health Perception (GS)

Each subscale is scored between 0-100, with higher scores indicating better health status. The SF-36 was used to understand the impact of dysmenorrhea on quality of life and to test the functional validity of the WaLIDD score.

Adaptation of WaLIDD Score into Turkish

The linguistic adaptation of the scale was carried out using the forward-backward translation method. In the first stage, translations were made from English to Turkish by two independent translators, and then a common text was created by the researchers. This draft was evaluated by an expert committee in terms of language, content and cultural appropriateness. After the content validity was assessed, the text translated into Turkish was translated back into English by a translator whose native language was English and who was not familiar with the scale; this version was compared with the original author to ensure the integrity of meaning. The pilot study was conducted with 10 women, and the comprehensibility of the statements was tested.

Statistical Analysis Plan

All statistical analyses were performed using SPSS (Version 23.0) and LISREL software. Descriptive analysis of the data (mean, standard deviation, media, quartiles, min-max) were calculated. Internal consistency and reliability of the WaLIDD scale were assessed using Cronbach's alpha coefficient. Construct validity, the relationship between WaLIDD

questions and NRS scores was tested with Spearman correlation analysis. Correlate validity, the relationship between WaLIDD and SF-36 subscales was examined with Spearman correlations. Confirmatory Factor Analysis (CFA), single-factor structure of WaLIDD was tested with LISREL; model fit was evaluated using CFI, TLI, RMSEA and χ^2 statistics. The significance level $p < .05$ was accepted as 0.05.

Results

The mean age range of the participants was 32.07 (SD=6.58) and the age range was between 22 and 43. It is seen that 70% of the participants have at least one child and the average number of children is 0.70. Data on employment type, smoking and alcohol use were also included in the table; it was observed that the rates of smoking (mean= 1.53) and alcohol use (mean = 1.79) were particularly low. In addition, as of the day of the survey, most of the participants were between the 7th and 8th day of their menstrual cycle (Mean= 7.5 days; min:6, max:9).

The mean WaLIDD total score of the individuals participating in the study was 5.66 ± 4.04 (variance $1.40^2 = 1.96$). This value indicates that the problems experienced by individuals with dysmenorrhea are at a moderate level. In addition, the mean pain intensity measured by the NRS (Numerical Pain Rating) scale was 4.83 ± 1.01 , indicating a moderate level of pain experience. Among the sub-dimensions of the SF-36 quality of life scale, the highest mean was found to be 'Mental Health' (69.98 ± 1.45), indicating that individuals felt generally well mentally. However, the meaning of the 'Vitality' sub-dimension was 62.57 ± 2.19 , and it can be interpreted that their energy levels may be limited.

Based on the total scores obtained from the WaLIDD scale, participants were categorized into four levels of dysmenorrhea severity. Among the 284 respondents, 10.2% ($n = 29$) reported a total score of 0, indicating an absence of dysmenorrhea-related symptoms. Approximately one-third of the participants (33.8%, $n = 96$) fell within the mild symptom range (score: 1–4), while 19.4% ($n = 55$) were classified as experiencing moderate

dysmenorrhea (score: 5–7). Notably, the highest proportion of respondents (36.6%, $n = 104$) reported severe symptoms, corresponding to a total score between 8 and 12. This distribution suggests that although a minority of individuals are asymptomatic, most participants experience some level of functional limitation due to menstrual pain, with more than one-third exhibiting symptoms of considerable severity. These findings underscore the importance of routine functional assessment in individuals with dysmenorrhea and highlight the utility of the WaLIDD score as a multidimensional screening tool.

The results of the Spearman correlation analysis between the total score of the WaLIDD scale and the eight sub-dimensions of the SF-36 health questionnaire are presented in Table 1. Correlation coefficients (r) and p values indicate the direction and significance level of the relationship.

Table 1. Correlation between WaLIDD Total Score and SF-36 Subscales

SF-36 Subdimension	Spearman r	p value
Physical Function	0.051	0.395
Physical Role Restriction	-0.108	0.07
Emotional Role Restriction	0.071	0.235
Body Pain	0.063	0.291
Social Function	-0.066	0.268
Mental Health	-0.11	0.065
Vitality	0.049	0.413
General Health	0.038	0.522

According to the results, there was no statistically significant correlation between the total score of WaLIDD and the eight sub-dimensions of SF-36 (all $p > 0.05$). The correlation coefficients were low, and the highest absolute correlation was negative and weak with the Physical Role Restriction subscale ($r = -0.108$, $p = 0.070$). These results suggest that WaLIDD scores do not directly correlate strongly with SF-36 subscales, suggesting that

the WaLIDD reflects the specific experience of menstrual pain, especially compared to the more general health perception components of the SF-36.

Reliability Analysis

There are 3 questions in the WaLIDD scale (k=4). The standard deviation of the total score was calculated as 1.40 and the variance as 1.96. The table below shows the standard deviation and variance of each question (Table 2).

Table 2. Reliability analysis

Article	Standard Deviation	Variance
Question 1	1.0068	1.0136
Question 2	1.1038	1.2184
Question 3	1.0333	1.0677
Question 4	1.0620	1.1278

Total variance: 16.3103

Total variance of questions: 4.4275

When the formula is applied:

$$\sigma_1^2 + \sigma_2^2 + \sigma_3^2 + \sigma_4^2 = 1.0136 + 1.2184 + 1.0677 + 1.1278 = 4.4275$$

$$\alpha = (4 / 3) * (1 - 4.4275 / 16.3103) = 0.9714$$

The calculated Cronbach's Alpha value is 0.9714. This value shows that the four items of the WaLIDD scale are highly compatible with each other and that the items in the scale strongly measure the same construct (dysmenorrhea-related functioning). In this context, the internal consistency of the WaLIDD Turkish form is very high.

A very high and significant positive correlation ($r = 0.975$, $p < 0.001$) was found between the WaLIDD total score and the Numerical Pain Score (NRS). This suggests that the scale shows high agreement with instruments measuring similar concepts (pain intensity).

Validity Analysis

1. Construct Validity (Correlation with Numerical Pain Scale)

In the Spearman correlation analysis between the first three questions of the WaLIDD scale and the NRS; $r = 0.7493$ with Question 1, $r = 0.6638$ with Question 2 and $r = 0.7077$ with Question 3. These results revealed that the relevant items of the WaLIDD accurately reflected the severity of pain and showed a high level of positive correlation with the NRS. A correlation coefficient close to or above 0.70 indicates a strong relationship between the two measurement tools (Table 3).

Table 3. Spearman Correlations between WaLIDD Questions and NRS

WaLIDD Question	Correlation with NRS (r)
Question 1	0.7493
Question 2	0.6638
Question 3	0.7077

1. Correlative Validity (Correlation with SF-36)

When WaLIDD Question 4 (effect of pain on activities of daily living) was compared with the 8 sub-dimensions of the SF-36 quality of life scale, the highest correlation was observed with mental health ($r = -0.1312$) and physical role restriction ($r = -0.1083$). These negative correlations indicate that as pain increases, individuals' general health perception and functional roles are negatively affected. The low correlation coefficients indicate that WaLIDD measures a different dimension than SF-36 (pain-specific functioning), but the direction of the relationships is in the expected direction (Table 4).

Table 4. Correlations between WaLIDD Question 4 and SF-36 Subscales

SF-36 Subdimension	Correlation (r)
Physical Function (FF)	0.0730

Physical Role Restriction (PRR)	-0.1083
Emotional Role Restraint (ERR)	0.0706
Body Pain (VA)	0.0692
Social Function (SF)	-0.0553
Mental Health (MS)	-0.1312
Vitality (C)	0.0624
General Health (GS)	0.0695

Confirmatory Factor Analysis (CFA)

1. Scree Plot

In the Scree Plot analysis, the principal components plot obtained from the four items of WaLIDD showed that the first factor was clearly dominant. This result supports the scale that has a one-factor structure. The scree plot showed that the first factor was clearly dominant on the curve. This indicates that the four items in the scale represent a single construct, and a one-factor model is appropriate.

The Scree Plot above shows the results of Principal Component Analysis (PCA) for the four items of the WaLIDD scale. The proportion of variance explained by the first component is clearly larger than the others, suggesting that: WaLIDD scale has a single-factor structure, and it shows that confirmatory factor analysis (CFA) can be based on a single factor model (Table 5).

Table 5. Confirmatory Factor Analysis (CFA)

Statistics	Value
DoF	2
DoF Baseline	6
χ^2 (Chi-square)	4.2873
χ^2 p-value	0.1172
χ^2 Baseline	1459.4985
CFI (Comparative Fit Index)	0.9984

The fit statistics obtained because of Confirmatory Factor Analysis (CFA) were interpreted in various aspects to evaluate the fit of the model to the data. First, the Degrees of Freedom (DoF) of the model was determined as 2. This value indicates that the model is predictable and has sufficient degrees of freedom. The degrees of freedom represent the difference between the number of parameters included in the model and the observable information in the data structure, and a positive value is a prerequisite for the testability of the model.

The chi-square (χ^2) value calculated to test the fit of the model is 4.2873. This value measures the difference between the observed covariance matrix and the covariance matrix estimated by the model. The p-value, which is the significance level for the chi-square statistics, is 0.1172. A p-value greater than 0.05 indicates that there is no statistically significant difference between the model and the observed data, thus the model fits the data well. In other words, in this case, the hypothesis is not rejected, and the model is accepted.

In the analysis, statistics related to the baseline model were also evaluated. The degrees of freedom (DoF Baseline) of the comparative model are 6 and the chi-square value of this model is calculated as 1459.4985. This model is an independent model that is established with the assumption that there is no relationship between the variables. How well the default model performs compared to this comparative model is evaluated by the CFI (Comparative Fit Index).

The CFI value is an important index that ranges between 0 and 1 and measures model fit and was obtained as 0.9984 in this study. A CFI value above 0.95 indicates that the model provides a very good fit, while values above 0.90 indicate an acceptable fit. In this context, it can be said that the model created for the WaLIDD scale shows a very strong fit.

In general, when all these fit statistics are evaluated together, it is concluded that the one-factor model established for the WaLIDD scale has high validity both statistically and

theoretically. These findings support the structural integrity and factor structure of the scale.

1. Factor Loadings and Variance Explained

WaLIDD items were CFAed with a single factor model and factor loadings, explained variance (R^2) and error variances of each item were calculated (Table 4). The factor loadings calculated for each item of WaLIDD were quite high (between 0.91-0.96). Most of the variance of each question (R^2 : 83-92%) can be explained by the factor. For example, 92.03% of the variance of Question 2 was explained by the general dysmenorrhea factor. (Table 7).

1. Model Fit Indices

The fit statistics of the one-factor CFA model are presented in Table 5. The fit indices show **that the model fits the data very well**. The model fit indices calculated as CFI = 0.998, TLI = 0.995 and RMSEA = 0.0636 show that the CFA model fits the data very well. CFI and TLI values above 0.95 indicate strong structural validation of the model. Since the RMSEA value is below 0.08, it shows that the model is compatible with an acceptable margin of error (Table 6).

Table 6. CFA Model Fit Statistics

Statistics	Value	Description
Chi-square	4.29	$p = 0.117 (>0.05)$
CFI	0.998	Perfect fit
TLI	0.995	Perfect fit
RMSEA	0.0636	Acceptable fit
AIC / BIC	Low	Advantages in model comparison

When the structural features in the model created because of CFA were evaluated, the fit indices (CFI = 0.998, TLI = 0.995, RMSEA = 0.0636) revealed that the model provided a

very good fit to the data. The χ^2 value of the model was 4.29 and the p-value was 0.117, and this result, which was not statistically significant, also supported the good fit of the model.

In conclusion, confirmatory factor analysis reveals that the Turkish version of the WaLIDD scale has a single-factor, strong and reliable structure, and its questions represent the common factor at a high level. Thanks to this structure, WaLIDD can be used as a powerful tool to assess the impact of dysmenorrhea on quality of life.

As seen in the model, the factor loadings of all question range between 0.91 and 0.96 and show quite strong relationships. The low error variances support the adequacy of the questions to represent the common factor. This structure shows the single-factor and highly coherent structure of the scale.

The data obtained show that the Turkish version of WaLIDD has strong psychometric properties in terms of both construct validity and internal consistency. The high correlation with numerical pain assessments reveals that the scale accurately reflects the dysmenorrhea-specific condition. The correlations with SF-36 sub-dimensions also support the effect of pain on quality of life. The very high fit of the model with CFA analysis reinforces the structural integrity of the scale and its success in representing the concept it is intended to measure.

The findings revealed that WaLIDD Turkish form: It has high internal consistency, is strongly correlated with the numerical pain score (NRS), shows conceptually significant and directionally expected relationships with the quality of life (SF-36) scale, and its single-factor structure was confirmed.

The WaLIDD score is capable of reliably and validly assessing dysmenorrhea-related functional limitations in the Turkish-speaking population.

Discussion

In this study, the validity and reliability of the Turkish version of the WaLIDD Score, which aims to measure dysmenorrhea-specific functional effects multidimensionally, were evaluated. The Cronbach's alpha value (.97) obtained for the internal consistency of the scale indicates a high level of homogeneity among the questions of the scale. This finding is consistent with the reliability level reported in the study in which the scale was first developed ($\alpha = .88$) and similarly, strong internal consistency values ($\alpha = .91$) were obtained in the Arabic validity study (7,10).

The high correlation between WaLIDD and NRS suggests that these two instruments measure similar constructions. In particular, the positive correlation between the first three questions of the WaLIDD and the NRS, which measures pain intensity, supports that the scale accurately reflects the individual experience dimension of pain. In the literature, it is emphasized that unidimensional scales such as the NRS are inadequate in the evaluation of dysmenorrhea and that measurement tools including functional effects should be preferred instead (5).

It is noteworthy that there were generally weak correlations between WaLIDD and eight sub-dimensions of SF-36. Negative and low correlations were observed especially with some sub-dimensions such as physical role limitation and mental health. These findings suggest that WaLIDD measures a more specific dimension of functionality specific to dysmenorrhea and that general health questionnaires such as SF-36 may be insufficient to directly assess this area (9).

Confirmatory factor analysis results showed that the Turkish version of the WaLIDD Score has a single-factor structure as in the original version. The high factor loadings (.91-.96) and the very good fit of the model to the data (CFI = .998, RMSEA = .0636) indicate that the scale works in accordance with the theoretical foundations. This is in line with similar fit values in the Arabic validity study (10).

The mean WaLIDD score was found to be moderate (5.66), indicating that a significant proportion of the women who participated in the study experienced functional effects related to dysmenorrhea. In previous field studies conducted in Turkey, it has been reported that dysmenorrhea is common among young women and has significant effects on quality of life (2,3). In this context, the WaLIDD Score can be considered as a short, applicable and clinically meaningful tool that can be used in dysmenorrhea evaluations.

The strengths of the study include the adequate sample size, the systematic language adaptation process, and the use of advanced statistical methods such as confirmatory factor analysis. However, the fact that the study was conducted online may cause homogeneity in the sample, and the inclusion of only Turkish-speaking individuals may limit cultural generalizability. Retrospective reporting of a subjective experience such as pain is also one of the possible biases.

Conclusion

The Turkish adapted version of the WaLIDD Score can be considered as a valid and reliable measurement tool for assessing dysmenorrhea-specific functional effects. Thanks to its strong correlation with pain severity and its single-factor, holistic structure, it can be used safely both in clinical practice and in research settings. Its addition as a complement to general health scales such as SF-36 may contribute to the multidimensional assessment of women's health.

Keywords: Dysmenorrhea, Walidd Score, Validity, Reliability, Confirmatory Factor Analysis, Quality Of Life, SF-36

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Importance Of Mentzer Index In The Differential Diagnosis Of Persistent Microcytosis: A Case Of Beta-Thalassemia Trait

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Introduction And Aim: Microcytosis is a common laboratory finding in primary care, often reflexively treated as iron deficiency anemia (IDA)(5).However, persistent microcytosis despite adequate iron therapy requires careful evaluation to avoid unnecessary supplementation and iron overload. This case highlights the clinical utility of the Mentzer Index in distinguishing Beta-Thalassemia Trait (BTT) from IDA in a pediatric patient.

Case Report: A 2-year-10-month-old male patient presented with persistent microcytosis. Despite recurrent courses of iron supplementation, his Mean Corpuscular Volume (MCV) remained low. Hematologic parameters were evaluated using age-specific reference ranges(6).

Laboratory analysis revealed a Red Blood Cell (RBC) count of $5.89 \times 10^{12}/L$ (mean: $4.6 \times 10^{12}/L$, lower limit of normal: $3.9 \times 10^{12}/L$), Hemoglobin (HB) of 10.4 g/dL (mean: 12.5 g/dL, lower limit: 11.5 g/dL), an MCV of 55.7 fL (mean: 81 fL, lower limit: 75 fL), RDW of 19.3% (normal range: 11.5-14.5%), and Ferritin of 35 ng/mL (normal range: 10-140 ng/mL).

The Mentzer Index (MCV/RBC) was calculated as 9.45 (below the 13 threshold), strongly suggesting thalassemia (1). Based on this clinical suspicion, the patient was referred to

the pediatric hematology for definitive diagnosis. Hemoglobin electrophoresis showed HbA₂: 5.4%, HbA: 91.9%, and HbF: 2.7%, confirming the diagnosis of BTT. Family screening revealed the mother as a carrier. Following the diagnosis, unnecessary iron treatments were discontinued, and genetic counseling was provided.

Discussion: In primary care, the Mentzer Index serves as a simple, cost-effective tool to differentiate IDA from BTT using a standard Complete Blood Count (CBC) (3). While IDA typically presents with a low RBC count and a Mentzer Index >13, BTT is characterized by a relatively high RBC count and an index <13 (2).

This case demonstrates that repeated clinical encounters for microcytosis should trigger the use of simple indices to avoid diagnostic inertia. It is crucial for family physicians to evaluate persistent microcytosis with this index before labeling it as refractory IDA. While an elevated RDW may initially suggest IDA, it is important to recognize that coexisting iron deficiency and BTT are common in pediatric patients.

Persistent microcytosis after adequate iron therapy—especially with low MCV and high RBC count—should raise suspicion for BTT. In such cases, the Mentzer Index serves as an effective screening tool, followed by hemoglobin electrophoresis for confirmation. If electrophoresis is normal despite strong suspicion, genetic testing for alpha-thalassemia should be considered.

Conclusion: This case underscores the importance of clinical suspicion in persistent microcytosis. Utilizing simple diagnostic indices in first-level health services can prevent misdiagnosis, avoid unnecessary medical cost, and protect patients from the risks of inappropriate iron loading (4).

Keywords: Persistent Microcytosis, Beta-Thalassemia Trait (BTT), Iron Deficiency Anemia (IDA), Mentzer Index, Primary Care

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Biological False-Positive VDRL in Pediatric Epstein-Barr Virus Infection: A Diagnostic Pitfall

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Introduction: Infectious mononucleosis is a common clinical syndrome in childhood, characterized by fever, pharyngitis, cervical lymphadenopathy, hepatosplenomegaly, and elevated transaminase levels (1). Epstein-Barr virus (EBV), the most common causative agent, may lead to false-positive serological test results through polyclonal B-cell activation during infection (2). We present a case of biological false-positive VDRL detected during the course of infectious mononucleosis.

Case: A 5-year-old boy presented with a 2-day history of fever and sore throat. He was hospitalized because of elevated liver enzymes (AST 536 U/L, ALT 250 U/L). Physical examination revealed bilateral cervical lymphadenopathy (approximately 2 cm), cryptic tonsillitis, and splenomegaly. Laboratory findings were as follows: CRP 3.4 mg/L, WBC $6.4 \times 10^3/\mu\text{L}$, Hb 11.7 g/dL, platelet count $204 \times 10^3/\mu\text{L}$, monocyte count $0.74 \times 10^3/\mu\text{L}$, lymphocyte count $3.8 \times 10^3/\mu\text{L}$, and neutrophil count $1.84 \times 10^3/\mu\text{L}$.

Peripheral blood smear showed reactive lymphocytes compatible with viral infection. Neck ultrasonography demonstrated multiple bilateral reactive lymph nodes, and abdominal ultrasonography confirmed splenomegaly. Throat culture was negative. Investigations for toxoplasmosis, cytomegalovirus, brucellosis, hepatitis and parvovirus were unremarkable. Serological testing showed a reactive VDRL result. Syphilis

confirmatory tests, including Treponema pallidum total antibody, FTA-ABS IgG and FTA-ABS IgM were all negative. The VDRL reactivity was therefore considered a biological false-positive reaction. The patient was discharged after liver function tests showed improvement. Approximately 10 days later, EBV serology revealed positive VCA IgM and negative VCA IgG consistent with acute primary EBV infection. On follow-up, the VDRL test became negative.

Discussion: Non-treponemal tests such as VDRL are widely used for syphilis screening; however, biological false-positive results may occur in infections, autoimmune diseases, and inflammatory conditions (2,3). A recent study showed that EBV-associated infectious mononucleosis may be accompanied by substantially elevated non-treponemal test reactivity in biological false-positive reactions (2). In childhood, VDRL positivity should be interpreted cautiously, especially when clinical findings are inconsistent with syphilis. Positive non-treponemal test results should always be interpreted together with treponemal confirmatory tests and the clinical context (2,3).

Conclusion: A positive VDRL result in the setting of infectious mononucleosis is not sufficient for the diagnosis of syphilis. Especially in childhood, biological false-positive reactions should be considered in clinically incompatible cases, and results should be interpreted together with confirmatory testing and clinical findings.

Keywords: Epstein-Barr virus, Infectious Mononucleosis, VDRL, Biological False-Positive, Pediatric

Fournier Gangrene Developing in a Paraplegic Patient Followed in a Palliative Care Unit: A Case Report

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Aim: Fournier gangrene is a necrotizing soft tissue infection involving the perineal and genital regions that may progress rapidly and requires prompt diagnosis and treatment. Clinical recognition may be delayed, particularly in patients with neurologic deficits, impaired pain perception, or palliative care needs. This case report presents Fournier gangrene that developed over a short period in a paraplegic patient followed in a palliative care unit and highlights the importance of frequent bedside examination and close clinical monitoring.

Materials and Methods: This case report is based on the retrospective evaluation of the clinical, laboratory, and imaging findings of a 63-year-old male patient followed in a palliative care unit.

Results: While being followed in the palliative care unit for wound care, the patient was noted to have rapidly progressive signs of infection in the scrotal region. Because of lower extremity paraplegia, he was unable to report pain, which complicated the clinical assessment. Physical examination revealed diffuse erythema in the scrotal and perineal regions, necrotic areas, and crepitus. Laboratory evaluation showed a white blood cell count of $33.08 \times 10^9/L$, C-reactive protein of 45 mg/L, and creatinine of 0.91 mg/dL. Superficial ultrasonography demonstrated a 19 mm wall thickening adjacent to

the right testis, with an edematous wall appearance and echogenic gas foci. Contrast-enhanced pelvic computed tomography, evaluated together with the clinical findings, supported the diagnosis of Fournier gangrene. The patient underwent emergency surgical treatment; orchiectomy was performed together with excision of necrotic tissues, and antimicrobial therapy was initiated. At approximately 10 days of follow-up, the infection was brought under control and the patient's clinical condition stabilized.

Conclusion: Fournier gangrene is a life-threatening infection that may progress silently in palliative care patients and lead to severe clinical deterioration within a short time. In the presence of neurologic deficits such as paraplegia, the absence of typical pain symptoms may delay diagnosis. This case demonstrates that frequent bedside examination and close clinical monitoring are crucial for early recognition in palliative care patients. Early awareness and rapid surgical intervention may be decisive for clinical outcome.

Keywords: Fournier Gangrene, Palliative Care, Paraplegia, Necrotizing Fasciitis, Family Medicine

A Rare Cause of Hyperinsulinemia: Beckwith–Wiedemann Syndrome

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Introduction: Beckwith–Wiedemann syndrome (BWS) is a congenital disorder characterized by macrosomia, hemihypertrophy, abdominal wall defects, hypoglycemia, visceromegaly, macroglossia and an increased risk of childhood malignancies¹. It was first described by Beckwith in 1963 and by Wiedemann in 1964². The incidence is approximately 1 in 10.300–13.700 live births, with a similar frequency in both sexes³.

Epigenetic alterations in the chromosome 11p15 region affect the expression of growth-regulating genes such as IGF2 and CDKN1C⁴. The clinical spectrum is broad, ranging from mild phenotypic features to pronounced dysmorphic findings accompanied by overgrowth. In the neonatal period, the most critical clinical manifestation is persistent hypoglycemia due to hyperinsulinism. Failure to adequately control hypoglycemia may result in significant neurodevelopmental morbidity.

The coexistence of omphalocele and macrosomia on antenatal ultrasonography should raise suspicion for BWS. Although diagnosis is primarily based on clinical criteria, molecular analyses can confirm the diagnosis. Early recognition of BWS is crucial for appropriate metabolic and surgical management as well as for regular malignancy surveillance. The long-term risk of childhood malignancies and endocrine disorders is

increased; therefore, early diagnosis and genetic counseling for families are of vital importance⁴.

Here, we present a case of BWS with omphalocele detected in the antenatal period, accompanied by hemihypertrophy and hypoglycemia in the neonatal period.

Case Presentation: A female infant was born at 37 weeks' gestation with Apgar scores of 8/9 at 1 and 5 minutes, respectively. The patient was admitted to the neonatal intensive care unit due to omphalocele. She was the first child of a 27-year-old mother, and there was no history of consanguinity between the parents.

On physical examination, the birth weight was 3860 gram (90th–97th percentile), length was 49 cm (90th–97th percentile), and head circumference was 36 cm (50th–90th percentile). Left-sided hemihypertrophy was present. Abdominal examination revealed bowel loops within a sac located in the midline above the umbilical cord, consistent with omphalocele (Figures 1 and 2). Cardiovascular examination was normal, and no murmur was detected. Echocardiography showed a thin patent ductus arteriosus (PDA) and a small atrial septal defect (ASD).



Figure 1. Hemihypertrophy and omphalocele



Figure 2. Umbilical cord, consistent with omphalocele

The serum glucose level was 38 mg/dL, and intravenous dextrose infusion was initiated. Due to persistent hypoglycemia, the glucose infusion rate was gradually increased. As the

maximum dextrose concentration that could be administered via a peripheral vein (12.5%) was exceeded, a percutaneous central catheter was placed, and the dextrose concentration was increased to 22.5%.

To confirm hyperinsulinemic hypoglycemia, critical samples obtained during hypoglycemia included insulin and counter-regulatory hormones (C-peptide, ketones, ACTH, cortisol, and growth hormone). In addition, plasma amino acids, very long-chain fatty acids, lactate, and pyruvate levels were evaluated to exclude inborn errors of metabolism. The insulin level was found to be 23 μ U/mL. Based on clinical and laboratory findings, hyperinsulinemic hypoglycemia secondary to BWS was diagnosed, and diazoxide therapy was initiated in consultation with pediatric endocrinology.

Blood samples were sent for chromosomal analysis and whole exome sequencing (WES). The patient, who was in good general condition and receiving full enteral feeding, was discharged with a multidisciplinary follow-up plan for high-risk neonates, and the family was provided with genetic counseling.

Conclusion: In BWS, early clinical diagnosis without waiting for genetic analysis and the implementation of a multidisciplinary approach are crucial for both the management of acute metabolic complications and the improvement of long-term outcomes, including the risk of malignancy and neurodevelopmental prognosis.

Keywords: Hemihypertrophy, Hypoglycemia, Omphalocele, Newborn

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Chronic Wound Management in Primary Care: Evidence-Based Approaches and Common Clinical Errors

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Aim: This narrative review aims to evaluate the current approaches to chronic wound management in primary care and to identify common clinical errors that are associated with delayed healing and suboptimal patient outcomes.

Materials and Methods: A comprehensive narrative literature review was conducted using PubMed/MEDLINE, Scopus, and Google Scholar to identify relevant studies published between January 2015 and March 2026. The search strategy incorporated predefined keywords “chronic wound,” “primary care,” “venous leg ulcer,” “diabetic foot ulcer,” “arterial ulcer,” and “wound management.” Peer-reviewed articles, clinical studies, systematic reviews, and international guidelines were deemed eligible. Google Scholar was additionally screened to identify relevant studies not captured in primary database searches. The selected literature was synthesized using a thematic approach, focusing on management strategies and recurrent clinical errors in primary care practice.

Results: The most common chronic wounds encountered in primary care include venous leg ulcers, diabetic foot ulcers, and arterial ulcers. Effective management requires an

integrated approach targeting both local wound care and the underlying etiology. A prominent finding across the literature is the underutilization of compression therapy in venous ulcers, despite strong supporting evidence. Similarly, inadequate implementation of off-loading strategies in diabetic foot ulcers remains a major contributor to delayed healing. Additional recurring challenges include a disproportionate emphasis on topical wound dressings, insufficient or delayed debridement, and misclassification of wound etiology. Limited patient education, poor adherence to treatment, and delayed referral to specialized care were also consistently associated with adverse outcomes.

Conclusion: Chronic wound management in primary care remains challenging and frequently suboptimal despite the availability of established evidence-based guidelines. Addressing common clinical errors and reinforcing etiology-driven management strategies are essential to improve healing outcomes. Strengthening primary care capacity, enhancing clinician education, and promoting multidisciplinary collaboration may help bridge the gap between evidence and practice.

Keywords: Chronic Wounds, Primary Health Care, Wound Management, Venous Leg Ulcer, Diabetic Foot Ulcer, Arterial Ulcer, Wound Healing, Compression Therapy, Off-Loading, Debridement

Central Obesity, Atherogenic Dyslipidemia, and Marked Insulin Resistance Detected in Primary Care: A Case Report

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Introduction

Metabolic syndrome is characterized by the coexistence of central obesity, hypertension, atherogenic dyslipidemia, and impaired glucose metabolism. Early recognition in primary care is essential because it enables timely identification of patients at high cardiometabolic risk. We present a middle-aged male patient in whom metabolic syndrome was identified together with marked insulin resistance and elevated liver enzymes during primary care evaluation.

Case Presentation

A 48-year-old male patient was evaluated in primary care. He was 170 cm tall, weighed 105 kg, and had a waist circumference of 106 cm. His body mass index was 36.3 kg/m². He was an active smoker, did not consume alcohol, and was not using any regular medication. Blood pressure was 140/100 mmHg. Laboratory evaluation revealed fasting plasma glucose 90 mg/dL, HbA1c 5.95%, triglycerides 384 mg/dL, HDL cholesterol 38.1 mg/dL, LDL cholesterol 92.1 mg/dL, and total cholesterol 207 mg/dL. Additional findings included insulin 189 µU/mL, HOMA-IR 61.6, ALT 134 U/L, AST 63.9 U/L, GGT 116 U/L, uric acid 7.98 mg/dL, and ferritin 610 ng/mL.

Based on central obesity, elevated triglycerides, low HDL cholesterol, and elevated blood pressure, the patient fulfilled the diagnostic criteria for metabolic syndrome. The markedly elevated insulin and HOMA-IR levels supported severe insulin resistance. Concomitant elevation of liver enzymes suggested possible metabolic dysfunction-associated steatotic liver disease.

Discussion

This case highlights that metabolic syndrome in primary care should not be viewed merely as obesity. Simple anthropometric measurements combined with routine biochemical tests can uncover a substantial silent cardiometabolic burden. In this patient, severe hypertriglyceridemia, low HDL cholesterol, hypertension, and pronounced insulin resistance indicated a high-risk phenotype despite a fasting glucose level within the normal range. Elevated transaminases and GGT further strengthened the suspicion of hepatic involvement associated with metabolic dysfunction.

Conclusion

Primary care evaluation plays a critical role in the early recognition of metabolic syndrome and its systemic consequences. Waist circumference, blood pressure, and lipid profile should be assessed together in obese adults. This case demonstrates that central obesity accompanied by atherogenic dyslipidemia and marked insulin resistance may reveal an extensive cardiometabolic risk profile even before overt diabetes develops.

Keywords: Metabolic Syndrome, Primary Care, Family Medicine, Insulin Resistance, Hypertriglyceridemia, Central Obesity

The Role of Primary Care Services in the Diagnosis and Follow-up of Metabolic Syndrome During Adolescence: An Evaluation in the Context of the Rising Burden of Obesity

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Abstract

Obesity has become a major public health problem with its steadily increasing prevalence, particularly during childhood and adolescence. Metabolic syndrome associated with obesity is characterized by the coexistence of cardiometabolic risk factors such as insulin resistance, dyslipidemia, and hypertension. During adolescence, metabolic syndrome is often asymptomatic, and diagnosis is therefore frequently delayed. This may lead to serious complications later in life. Primary care services play a critical role in the early recognition, screening, and follow-up of at-risk individuals. This review discusses the diagnostic criteria, clinical significance, and the role of primary care services in the identification and management of metabolic syndrome during adolescence.

Introduction

In recent years, the increasing prevalence of obesity has become a major health problem, especially among children and adolescents. Sedentary lifestyle, high-calorie dietary habits, and increased consumption of sugar-sweetened beverages are among the main causes of this trend. Unhealthy eating habits and disordered eating behaviors place

Poster Presentation - PP148

children at significant risk for future obesity, metabolic syndrome, and other serious cardiometabolic diseases. Metabolic syndrome is a clinical condition characterized by the coexistence of abdominal obesity, insulin resistance, dyslipidemia, and hypertension, and it constitutes an important risk factor for the development of cardiovascular diseases and type 2 diabetes mellitus. Although it has traditionally been considered a disorder of adulthood, its origins often begin during adolescence. Since most patients in this period remain asymptomatic, metabolic risk factors can easily be overlooked. For this reason, early diagnosis in primary care settings is of great importance.

Metabolic Syndrome During Adolescence

There is no single universally accepted definition of metabolic syndrome in adolescents as there is in adults. However, one of the most commonly used definitions is that proposed by the International Diabetes Federation (IDF). According to the IDF criteria, central obesity is the core component. In addition, at least two of the following findings are required: elevated triglyceride levels, low HDL cholesterol, elevated blood pressure, and impaired glucose metabolism. These criteria demonstrate that obesity lies at the center of metabolic syndrome and that early recognition is critical.

Role of Primary Care Services

Family physicians are among the healthcare professionals who have the most frequent contact with adolescent individuals. During routine visits, body mass index should be calculated, dietary habits should be questioned, and physical activity level should be assessed. Early recognition of subclinical findings is critical for diagnosis. In primary care, metabolic risks can be detected early through simple assessments such as fasting blood glucose, lipid profile, and blood pressure measurement. When indicated, further evaluation for insulin resistance may be planned. Metabolic syndrome is a chronic process and requires regular follow-up. Family physicians perform periodic evaluations, assess adherence to treatment, and detect complications at an early stage. The greatest strength

of primary care services is the preventive medicine approach. Lifestyle modifications such as healthy nutrition education, reduction of sugar-sweetened beverage consumption, and increasing physical activity should be emphasized.

Discussion

Metabolic syndrome during adolescence often has a silent course, which leads to delayed diagnosis. Obesity is the main determinant of this process, and when not addressed early, it paves the way for serious diseases in adulthood. Primary care services represent the most critical point for the early recognition and management of these patients. In particular, screening high-risk individuals, ensuring regular follow-up, and initiating family-based lifestyle interventions are among the most important strategies that may alter the natural course of the disease.

Conclusion

Metabolic syndrome during adolescence has become an important public health problem together with the increasing prevalence of obesity. In this process, primary care services have a central role in early diagnosis, screening, and follow-up. Increasing family physicians' awareness of this issue and strengthening screening strategies are critically important for reducing the future burden of cardiometabolic disease.

Keywords: Metabolic Syndrome, Adolescence, Obesity, Primary Care, Screening, Family Medicine

Isolated Headache Leading to a Rare Diagnosis: A Case of Graves' Disease Highlighting Low-Prevalence Medicine

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Background:

Headache is one of the most common reasons for consultation in family medicine and is typically associated with benign primary headache disorders. However, low-prevalence endocrine conditions may remain concealed behind such nonspecific and frequently encountered symptoms, leading to diagnostic delays. This case report describes the diagnostic process of Graves' disease-related hyperthyroidism in an adolescent patient presenting solely with headache, emphasizing the importance of systematic evaluation in primary care.

Case Presentation:

A previously healthy 14-year-old girl presented to the pediatric outpatient clinic with a several-week history of recurrent headaches. The pain was described as bilateral, temporally localized, and episodic throughout the day, without associated nausea, vomiting, photophobia, or focal neurological deficits. There was no prior history of migraine or chronic headache disorders. Although the patient reported occasional palpitations, she attributed these to academic stress. She denied weight loss, heat intolerance, excessive sweating, or tremor. Family history revealed Graves' disease in a paternal relative.

On physical examination, the patient was alert and in good general condition, with stable vital signs. Her weight was 45.5 kg (SDS: -1.65; 4.99th percentile), height 158.4 cm (SDS: -0.57; 28.54th percentile), and body mass index 18.13 kg/m² (SDS: -1.4; 8.03rd percentile). Blood pressure was 127/64 mmHg and heart rate was 80 bpm. Thyroid palpation revealed no nodules or tenderness. Neurological examination was unremarkable.

Laboratory investigations performed to exclude secondary causes of headache incidentally revealed abnormal thyroid function tests. Thyroid-stimulating hormone (TSH) was suppressed (<0.005 mIU/L), with elevated free T3 (8.72 pg/mL) and free T4 (2.68 ng/dL), consistent with overt hyperthyroidism. Thyrotropin receptor antibody (TRAb) was positive at 5.22 (above reference range), and anti-thyroid peroxidase antibody was elevated at 195.9 U/mL, while anti-thyroglobulin antibody was low (1 U/mL).

Thyroid ultrasonography demonstrated an enlarged right lobe, a normal-sized left lobe, decreased and mildly heterogeneous parenchymal echogenicity, and increased vascularity in both lobes without nodules.

Based on the clinical, laboratory, and imaging findings—suppressed TSH, elevated thyroid hormones, positive TRAb, and increased vascularity—a diagnosis of autoimmune thyrotoxicosis consistent with Graves' disease was established. The presentation with isolated headache, along with subtle and easily overlooked hyperthyroid symptoms, highlights a diagnostic pathway from a common complaint to a relatively uncommon condition in primary care.

Conclusion:

Headache is a frequent complaint in both community and primary care settings, and only a small proportion of cases are attributable to serious systemic conditions. Although palpitations, weight loss, and tremor are the most common symptoms of Graves' disease

in adolescents, isolated headache as the presenting symptom is rarely reported. The pathophysiology of hyperthyroidism-related headache remains unclear but may involve cerebral vasodilation, increased metabolic rate, and heightened autonomic activity.

This case underscores the importance of maintaining a broad differential diagnosis in family medicine practice. While headache is often benign, the presence of subtle accompanying symptoms such as palpitations, weight changes, or heat intolerance should prompt consideration of endocrine etiologies.

Keywords: Headache; Hyperthyroidism, Graves' Disease, Family Medicine

Recurrent Urticaria Triggered by Smoking Cessation and Resolving with Smoking Resumption: A Rare Clinical Paradox

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Introduction

The process of smoking cessation may lead to various systemic and dermatological changes associated with nicotine withdrawal and accompanying psychosocial stress (1). Although urticaria is commonly associated with allergic, infectious, or idiopathic causes, recurrent urticaria triggered by smoking cessation has rarely been reported (2). In this case, we present a case of recurrent urticaria that developed after smoking cessation and resolved upon resumption of smoking.

Case

A 33-year-old male patient (F.L.), an engineer, started smoking at the age of 20. His daily cigarette consumption increased to 40 cigarettes over the past two years, with a total smoking history of 13 pack-years. His Fagerström Test for Nicotine Dependence (FTND) score was 9, indicating high dependence. The patient had previously attempted to quit smoking three times, with the longest abstinence period being one year.

During smoking cessation periods, he reported withdrawal symptoms including irritability, difficulty concentrating, sleep disturbances, increased appetite, and intense cigarette craving. No adverse events were observed during nicotine replacement therapy

used three years earlier; however, urticaria attacks began after discontinuation of treatment.

Each time he quit smoking, he developed sudden-onset, pruritic, erythematous, well-demarcated, and migratory plaques, typically occurring 7–10 days after cessation. The lesions showed an intermittent course and appeared on different parts of the body.

During the third cessation attempt, this condition persisted for approximately one year. The patient was evaluated by dermatology, immunology, and internal medicine clinics, and no allergic, infectious, or autoimmune etiology was identified. Notably, the lesions completely resolved when the patient resumed smoking.

During the fourth cessation attempt, similar symptoms reappeared following cytisine treatment. Laboratory investigations performed at an external center, including total IgE, CRP, and eosinophil levels, were within normal limits. Dermatological evaluation was consistent with urticaria.

The patient reported that similar lesions developed after each smoking cessation attempt and resolved upon smoking resumption. At the most recent visit, his primary concern regarding quitting smoking was the recurrence of these symptoms.

Discussion

This case suggests that recurrent urticaria developing after smoking cessation may be associated with nicotine withdrawal and psychosocial stress (3). The immunomodulatory effects of nicotine and the role of stress in mast cell activation represent plausible mechanisms underlying this clinical presentation (4).

The recurrent and reversible nature of the symptoms observed in this case also suggests a possible “rechallenge phenomenon,” supporting a potential causal relationship between nicotine withdrawal and urticaria.

Reports of urticaria associated with smoking cessation are extremely limited in the literature, indicating that this condition may represent a rare and potentially underrecognized clinical entity in routine practice.

Conclusion

Atypical dermatological manifestations occurring during the smoking cessation process should be carefully considered by clinicians. This case suggests that nicotine withdrawal and psychosocial stress may contribute to the development of urticaria and highlights the importance of a multidisciplinary approach in its evaluation and management.

Keywords: Urticaria, Smoking Cessation, Nicotine Withdrawal, Stress

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Acute Dyspnea in Family Medicine: The Importance of Clinical Decision-Making and Thorough Differential Diagnosis in Identifying Hypertensive Pulmonary Edema

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Background:

Dyspnea is a common and potentially life-threatening symptom frequently encountered in primary care, requiring prompt evaluation and clinical decision-making. It accounts for approximately 3–6% of emergency admissions and is associated with increased morbidity and mortality, particularly in elderly patients with comorbid conditions. Hypertensive pulmonary edema is an acute clinical condition caused by a sudden elevation in blood pressure, necessitating urgent recognition and management. This report aims to emphasize the importance of early diagnosis and appropriate referral of hypertensive pulmonary edema in the primary care setting.

Case Presentation:

A 63-year-old male presented to a primary care center with complaints of progressive dyspnea. Although symptoms had been present for a prolonged period, they had worsened significantly in recent days, with the development of orthopnea over the past two days. His medical history included hypertension, diabetes mellitus, and chronic kidney disease. The patient had previously been evaluated at other healthcare facilities and treated for a presumed lower respiratory tract infection with moxifloxacin and inhaled therapy, without clinical improvement.

On examination, vital signs were as follows: temperature 36.1°C, blood pressure 187/87 mmHg, heart rate 74 beats/min, respiratory rate 22 breaths/min, and oxygen saturation

96%. Auscultation revealed prolonged expiration, bilateral basal crackles, and wheezing. Pretibial edema was present in the lower extremities. Electrocardiography demonstrated normal sinus rhythm.

Considering the presence of orthopnea, severe hypertension, basal crackles, and peripheral edema, a cardiogenic etiology was suspected. The patient was referred to the emergency department with a preliminary diagnosis of hypertensive pulmonary edema. Following antihypertensive and diuretic therapy, his symptoms improved, and outpatient follow-up with cardiology and pulmonology was recommended.

Discussion:

The evaluation of dyspnea in primary care requires a rapid, structured, and systematic approach to distinguish between cardiac and pulmonary causes. Hypertensive pulmonary edema is characterized by acute fluid accumulation in the alveolar spaces due to elevated hydrostatic pressure and can be effectively managed if recognized early. Radiographic findings such as cardiomegaly, bilateral effusions, and Kerley B lines are valuable in supporting the diagnosis. This case highlights the critical role of primary care physicians in early recognition, differential diagnosis, and timely referral. Furthermore, it underscores the importance of optimal hypertension management—including regular monitoring, patient education, and adherence to treatment—in preventing acute complications such as pulmonary edema.

Keywords: Dyspnea, Primary Care, Early Diagnosis, Referral, Hypertensive Pulmonary Edema

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An Occupational Hepatitis B Virus Exposure of a Healthcare-Worker with Incomplete Immunization History: After 14 Years in Clinical Practice

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Introduction:

Healthcare workers (HCWs) are at higher risk of exposure to infectious diseases compared to the general population due to their contact with patients and contaminated materials in their work environment (1). Therefore, protecting HCWs through vaccination is an important part of patient safety and infection prevention and control programs (2). Hepatitis B virus (HBV), one of the risky occupational agents, is a vaccine-preventable disease (3). However, failure to check antibody levels after vaccination and neglecting booster doses may lead to gaps in the "immunization chain" (4). Additionally, factors such as unexpressed workload, failure of HCWs to internalize the provided information and health examinations, perceiving them merely as formal obligations, and not having experienced occupational accidents for many years have all been reported to reduce adherence to vaccination recommendations (5,6).

Through this case report, it is aimed to draw attention to missed vaccination opportunities against vaccine-preventable diseases, particularly HBV, among HCWs; to

emphasize the necessity of regular antibody monitoring; and to highlight the importance of catch-up immunization. It also highlights mistakes in practice that may occur due to panic following needlestick and sharps injuries.

Keywords: Healthcare Workers, Hepatitis B Virus, Occupational Exposure, Needle-Stick Injury, Vaccination, Catch-Up Immunization.

Case:

GZ, a 32-year-old mother of three with a total of 14 years of professional experience, including 10 years in internal medicine and 4 years in surgical departments, presented to our occupational health unit after a needle-stick injury on the day she was assigned to the outpatient clinic. During a procedure, she attempted to pick up a suture needle manually instead of using a clamp, resulting in accidental injury. She subsequently learned that the source patient had been followed for hepatitis B for the past 10 years. During the interview, GZ stated that immediately after the incident, she first poured povidone-iodine over the injured area, then squeezed her hand in an attempt to induce bleeding, and repeatedly washed it with soap out of anxiety. She reported that her vaccinations had been incomplete at the beginning of her profession and that she had not subsequently completed the recommended vaccinations or follow-up testing. A more detailed history revealed ongoing psychosocial and family-related difficulties. The laboratory findings of both the HCW and the source patient are presented in Table 1.

Table 1. HBV Laboratory Findings of Source Patient and Healthcare Worker

	2016	2023	2025	2026
Source Patient				
HBsAg				>5000
AntiHBs				2.96
AntiHBe				>100
HBV-DNA				Positive
Healthcare worker				
HBsAg	Negative	Negative	Negative	Negative
AntiHBs	Negative	3.52	4.46	7.75

Review of her previous employee health records showed that HBV vaccination had been recommended her during earlier occupational health visits. When this was confirmed with the HCW, she stated that other vaccines had also been recommended, but she had been unable to comply due to her workload.

After an occupational accident report was completed, GZ was referred to the Department of Clinical Bacteriology and Infectious Diseases. She was hospitalized, administered intramuscular immunoglobulin, and initiated on HBV vaccination the following day. No adverse effects were observed, and she was discharged with outpatient follow-up scheduled one month later.

Discussion and Conclusion:

Although HCWs in surgical units are generally aware of patients' ELISA results before procedures, the fact that nurse GZ failed to take the necessary precautions and handled the suture needle manually instead of with a clamp once again demonstrates that, beyond negligence alone, problems encountered in daily life may adversely affect work performance and attention. Therefore, HCWs who fail to comply with recommendations such as vaccination should be approached through a comprehensive biopsychosocial perspective. Individually evaluating HCWs who do not complete their vaccinations or neglect follow-up testing, and recalling them for repeated assessment by physicians in occupational health units, may help prevent such omissions and contribute to protection against infectious diseases such as HBV.

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Pregnancy-related Uncontrolled Chronic Hypertension: The Critical Role of Patient Adherence and Preconception Care

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Introduction

Chronic hypertension in pregnancy is a major cause of maternal and fetal morbidity and mortality, and is seen in 0.9–1.5% of pregnant women. In these patients, not only strict blood pressure control but also close monitoring of target organ damage, particularly renal involvement, is of critical importance. This case aims to demonstrate, from a primary care perspective, the relationship between severe hypertension developing in early pregnancy in a woman with pre-existing chronic hypertension and the lack of preconception care and poor patient adherence, as well as the impact of these factors on clinical outcomes.

Case

A 26-year-old primigravid woman with a six-year history of chronic hypertension presented at 5–6 weeks of gestation with complaints of headache and fatigue. She was enrolled in antenatal follow-up at presentation, and routine pregnancy visits were scheduled. Home blood pressure measurements revealed values as high as 200/120 mmHg. Her pre-pregnancy antihypertensive regimen included ramipril/hydrochlorothiazide, doxazosin, and nebivolol. Because of their potential

Poster Presentation – PP157

teratogenicity, these drugs were discontinued after pregnancy was confirmed, and a new regimen consisting of methyldopa, nifedipine, and metoprolol succinate was initiated.

Weekly blood pressure charts showed persistently elevated values. The patient's adherence to treatment and follow-up recommendations was poor; she used her medications irregularly and frequently missed scheduled visits. Serum creatinine levels during pregnancy remained between 1.0 and 1.38 mg/dL, without the expected physiological decline, suggesting underlying chronic kidney disease. The patient was followed in a multidisciplinary manner under the coordination of family medicine, in collaboration with obstetrics and nephrology clinics; however, irregular attendance and poor adherence significantly limited the effectiveness of follow-up. This clearly highlights the decisive role of adherence in determining clinical outcomes among pregnant women with chronic diseases.

Discussion and Conclusion

This case illustrates the practical reflection of WONCA core competencies—patient-centred care, comprehensiveness, coordination, and continuity of care—in the management of a complex pregnant patient. Preconception counselling in women with chronic diseases is a critical step for pregnancy planning, medication adjustment, and risk assessment. Transitioning to appropriate antihypertensive therapy and assessing renal function prior to conception may help reduce potential maternal and fetal complications. Furthermore, patient adherence and effective communication are key determinants of therapeutic success in conditions requiring long-term follow-up. Adopting a holistic approach in primary care is essential both for improving clinical outcomes and for enhancing the overall quality of healthcare services.

Keywords: Chronic Hypertension, Pregnancy, Preconception Care, Primary Care

Deep Hypokalemia and Paralytic Ileus Due to Diarrhea in an Elderly Patient with Dementia: Successful Conservative Management with a Palliative Approach

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Introduction:

Dementia is a common clinical condition in the elderly population that negatively affects patients' self-care abilities, treatment adherence, and nutritional status. This condition predisposes patients to metabolic complications, particularly electrolyte imbalances.

Paralytic ileus is a clinical condition characterized by the temporary or permanent cessation of gastrointestinal motility, which can lead to significant morbidity. Although it is most commonly observed in the postoperative period, it may also develop secondary to electrolyte disturbances, infections, or medications.

In this case, we present the conservative management of paralytic ileus secondary to hypokalemia in an elderly patient with dementia, managed successfully with a palliative care approach.

Case:

An 88-year-old female patient presented to the emergency department with watery diarrhea and general deterioration. Due to refractory electrolyte imbalance, she was admitted to the intensive care unit.

Her medical history included dementia, hypertension, diabetes mellitus, and chronic obstructive pulmonary disease. Although she was conscious, her orientation and cooperation were limited. The patient was bedridden and was being fed a soft diet with a low risk of aspiration. Physical examination revealed cachexia and a sacral pressure ulcer, with no other remarkable findings.

At admission, her serum potassium level was 2.2 mEq/L, and potassium replacement therapy was initiated. Endocrine causes were excluded (plasma renin activity, aldosterone, ACTH, and cortisol levels were within normal ranges). Stool examinations performed due to ongoing watery diarrhea were negative.

During follow-up, abdominal distension developed, and a general surgery consultation was obtained. The clinical picture was considered consistent with paralytic ileus. The patient was managed conservatively with potassium replacement, intravenous fluid therapy, metoclopramide and neostigmine administration, along with rectal tube insertion and enemas. Probiotic therapy was also initiated as part of the supportive treatment.

With daily clinical and radiological follow-up, abdominal findings regressed, serum potassium level increased to 4.2 mEq/L, and the patient's overall clinical condition improved significantly. The patient was discharged without the need for surgical intervention.

Conclusion:

Nutritional deficiencies and electrolyte imbalances are common in elderly patients with dementia and may lead to serious gastrointestinal complications. Hypokalemia, in particular, is an important and reversible risk factor for the development of paralytic ileus.



This case demonstrates that early diagnosis, appropriate electrolyte replacement, and a multidisciplinary approach can lead to successful outcomes without the need for surgical intervention.

In family medicine practice, close monitoring of electrolytes and early intervention in frail elderly patients are critical in reducing morbidity and mortality.

Keywords: Dementia, Hypokalemia, Paralytic Ileus, Palliative Care, Elderly Patient, Conservative Treatment

Early Integration of Palliative Care in Chronic Diseases: Advancing Patient-Centered Outcomes and Healthcare Efficiency

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Aim: This narrative review aims to critically evaluate the impact of early integration of palliative care on symptom burden, quality of life, and healthcare utilization in patients with chronic life-limiting conditions, while also highlighting existing gaps in implementation.

Materials and Methods: A narrative review methodology was adopted. Relevant literature published between 2016 and 2025 was identified through PubMed, Scopus, and Web of Science. Search strategies included combinations of the terms “palliative care”, “early integration”, “symptom burden”, “quality of life”, and “chronic disease”. Priority was given to high-quality evidence, including randomized controlled trials, systematic reviews, and meta-analyses. Both oncological and non-oncological populations were included to ensure a comprehensive and clinically relevant synthesis.

Results: Accumulating evidence indicates that early integration of palliative care leads to clinically meaningful improvements in symptom burden and patient-reported outcomes. Patients with chronic diseases frequently present with complex, multidimensional symptom clusters—such as pain, dyspnea, fatigue, and psychological distress—that are

often under-recognized in conventional disease-centered models of care. Early palliative care facilitates structured symptom assessment, timely intervention, and advance care planning, thereby enabling alignment of treatment strategies with patient-defined goals. These interventions are associated with a reduction in non-beneficial aggressive end-of-life care and more appropriate healthcare utilization. Notably, early palliative care has been associated with approximately a 30% reduction in aggressive end-of-life interventions, along with significant improvements in quality-of-life measures. Importantly, the benefits extend beyond oncology. Increasing evidence supports its effectiveness in chronic non-malignant conditions—including chronic obstructive pulmonary disease, heart failure, and neurodegenerative disorders—where early integration improves symptom control and reduces hospital utilization. However, a critical gap persists between evidence and clinical practice. Despite strong recommendations, palliative care is often introduced late in the disease trajectory, thereby limiting its potential benefits. This discrepancy reflects structural barriers, prognostic uncertainty, and persistent misconceptions equating palliative care exclusively with end-of-life care.

Conclusion: Early integration of palliative care should be regarded as a standard component of comprehensive, patient-centered care in chronic diseases rather than a reactive, end-stage intervention. Beyond improving symptom control and quality of life, it contributes to more efficient healthcare utilization and aligns medical care with patient priorities. Future efforts should focus on the development of systematic referral triggers, the expansion of multidisciplinary care models, and the integration of palliative care into routine clinical workflows at earlier stages of disease progression.

Keywords: Palliative Care, Early Integration, Chronic Disease; Symptom Burden, Quality of Life, Healthcare Utilization

Atypical Localization of Cystic Echinococcosis: A Case with Renal and Psoas Involvement

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ABSTRACT

Cystic echinococcosis is a zoonotic parasitic disease commonly affecting the liver and lungs. However, atypical localization may occur and lead to diagnostic challenges, particularly in endemic regions. We present a 55-year-old male livestock farmer who presented with intermittent left flank pain radiating to the groin for 3–4 months. Physical examination was unremarkable. Laboratory tests revealed microscopic hematuria, elevated erythrocyte sedimentation rate, increased total IgE levels, and a strongly positive indirect hemagglutination test for hydatid disease. Abdominal computed tomography demonstrated cystic lesions involving the left kidney and psoas muscle, initially suggesting alternative diagnoses such as angiomyolipoma. Considering the patient's epidemiological risk factors and serological findings, atypical cystic echinococcosis was diagnosed. This case highlights the importance of considering hydatid disease in the differential diagnosis of atypical renal and retroperitoneal lesions, especially at the primary healthcare level.

Keywords: Cystic Echinococcosis, Renal Involvement, Psoas Muscle, Atypical Localization, Primary Care

Poster Presentation – PP162

INTRODUCTION

Cystic echinococcosis (hydatid disease) is a zoonotic parasitic infection caused by the larval form of *Echinococcus granulosus*, which is widespread worldwide but endemic particularly in regions where livestock farming is common. Humans become infected as accidental intermediate hosts through consumption of food and water contaminated with the parasite's eggs or through direct contact with infected animals. After the parasite passes from the gastrointestinal system into the circulation, the organs most commonly involved are the liver (70–75%) and lungs (10–20%). However, atypical localizations such as the kidney, spleen, bone, central nervous system, and muscle tissue have been reported more rarely (I).

Renal involvement is a rare form of cystic echinococcosis, accounting for approximately 1–5% of all cases. Renal hydatid cysts are usually unilateral, solitary, and located in the renal cortex. Clinical findings are generally nonspecific and may remain asymptomatic for a long time; flank pain, hematuria, a palpable mass, and rarely hydatiduria may be observed. The most valuable diagnostic methods are ultrasonography, computed tomography, and magnetic resonance imaging; serological tests are supportive of the diagnosis, although their sensitivity is variable (II, III).

Retroperitoneally located echinococcal cysts, and especially psoas muscle involvement, are extremely rare and can often be confused with other retroperitoneal cystic or solid lesions. In these localizations, the disease is generally diagnosed late, and the diagnosis is often confirmed intraoperatively or by histopathological examination. The coexistence of retroperitoneal and psoas muscle involvement with renal involvement has been reported in only a limited number of cases in the literature and poses important diagnostic challenges from clinical, radiological, and surgical perspectives (I, IV).

Because misdiagnosis in atypically located hydatid cysts may lead to inappropriate interventions, cyst rupture, anaphylaxis, and peritoneal dissemination, echinococcosis must always be considered in the differential diagnosis, especially in endemic regions. In

this context, presenting cases with simultaneous involvement of the kidney, psoas muscle, and retroperitoneum is important in terms of contributing to the literature regarding the diagnostic features, imaging findings, and treatment approaches of the disease. In this case report, this rare pattern of multiple involvement is presented in detail and discussed in light of the current literature.

CASE REPORT

The patient was a 55-year-old man (Z.A.) residing in the Korgan district of Ordu province who had been engaged in small- and large-animal husbandry for many years. He presented to a healthcare institution with a complaint of intermittent pain that had been present for approximately 3–4 months, starting in the left flank region and occasionally radiating to the left groin. He had no systemic complaints such as fever, weight loss, night sweats, loss of appetite, or general malaise.

The patient had no known comorbid disease, previous surgical operation, or history of urological disease. On physical examination, his general condition was good and his vital signs were stable. Abdominal and urogenital system examinations were evaluated as normal; no palpable mass or tenderness was detected.

In laboratory investigations, the serum creatinine level was measured as 1.13 mg/dL. Microscopic erythrocyte positivity was present in urinalysis. No growth was detected in urine culture. The erythrocyte sedimentation rate was elevated at 36 mm/hour. The total IgE level was 207 IU/mL. The indirect hemagglutination test performed for cystic echinococcosis was positive at a titer of 1/1280.

On non-contrast abdominal computed tomography, grade 3–4 hydronephrosis was observed in the left kidney and grade 1 hydronephrosis in the right kidney. In the left kidney, an irregularly bordered mass lesion approximately 4.5×4 cm in size, accompanied by fat and cystic densities, was detected (Figure 1). In addition, a well-circumscribed hypodense area measuring approximately 8×5 cm was present within the left psoas muscle. A 4.5×3 cm hypodense area was also detected medial to the left kidney, initially

thought to belong to the ureter, with surrounding calcification and an appearance compatible with stone.



Figure 1: Transverse-section CT image of an irregularly bordered mass lesion approximately 4.5×4 cm in size in the left kidney, accompanied by fat and cystic densities

On CT urography performed to deepen the diagnostic evaluation, a well-circumscribed heterogeneous-density lesion measuring 52×47 mm was observed in the mid-zone of the left kidney; it contained macroscopic fat densities, enhanced with contrast, and was primarily considered suggestive of angiomyolipoma. However, a hypodense lesion measuring 37×31 mm with peripheral calcification was seen in the left paraaortic perihilar area, causing compression of the ureter and resulting in grade 2 hydronephrosis in the left kidney. In addition, a cystic lesion measuring 54×56×90 mm with calcifications on its inferior wall was detected within the left psoas muscle, and another cystic lesion

measuring 40×30×50 mm containing septa-like hyperdensities was identified in the subdiaphragmatic area adjacent to the left diaphragmatic crus (Figure 2).



Figure 2: Coronal-section CT image showing a cystic lesion measuring 54×56×90 mm with calcifications on its inferior wall within the left psoas muscle, and another cystic lesion measuring 40×30×50 mm containing septa-like hyperdensities in the subdiaphragmatic area adjacent to the left diaphragmatic crus

When all clinical, laboratory, and radiological findings were evaluated together, atypically localized cystic echinococcosis became the leading preliminary diagnosis because the patient lived in an endemic region, had a history of animal husbandry, had highly positive echinococcal serology, and had cystic lesions in multiple atypical localizations. The patient is currently being prepared for surgical intervention for definitive diagnosis and treatment planning and is being followed with a multidisciplinary approach.

DISCUSSION

Cystic echinococcosis is a zoonotic disease caused by the larval form of *Echinococcus granulosus* and continues to be an important public health problem in endemic regions, including our country. The disease most commonly involves the liver (70–75%) and lungs (10–20%), while involvement of other organs is reported rarely (I, III). Renal involvement accounts for approximately 1–5% of all cystic echinococcosis cases and is usually unilateral, solitary, and cortical in location (II, V).

Renal hydatid cysts may remain asymptomatic for a long time or may present with nonspecific symptoms. Flank pain, microscopic or macroscopic hematuria, and rarely hydatiduria are the most commonly reported clinical findings (II, VI). In the present case, the patient had only intermittent left flank pain lasting for 3–4 months and microscopic hematuria; the absence of systemic symptoms reflects a typical clinical picture that may lead to delayed diagnosis.

The noteworthy aspect of this case in terms of the literature is the presence of simultaneous cystic lesions in the psoas muscle, paraaortic area, and subdiaphragmatic region in addition to renal involvement. Retroperitoneal and psoas muscle hydatid cysts are extremely rare and can often be confused with abscess, hematoma, tuberculosis, or malignancy (VII, VIII). In the literature, it has been reported that in a large proportion of such atypically localized cases, the diagnosis is made intraoperatively or histopathologically (VIII, IX). In this case as well, the imaging findings initially raised differential diagnoses such as angiomyolipoma and tuberculosis.

Imaging methods, especially ultrasonography, computed tomography, and magnetic resonance imaging, play a fundamental role in the diagnosis of renal hydatid cysts. However, depending on the stage and content of the hydatid cysts, they may display a heterogeneous appearance containing calcification or macroscopic fat, which may lead to confusion with benign renal tumors such as angiomyolipoma (III, IV). In the present case,

the lesion being initially interpreted on CT urography as suggestive of angiomyolipoma clearly demonstrates the diagnostic difficulty of atypical renal hydatid cysts.

Although serological tests are supportive of the diagnosis, their sensitivity varies according to the localization and viability of the cyst. Nevertheless, especially in endemic regions, highly positive indirect hemagglutination or ELISA tests provide strong support for the diagnosis (I). In this case, the indirect hemagglutination test being positive at a titer of 1/1280 and the elevated total IgE level strongly supported the diagnosis of cystic echinococcosis when evaluated together with the patient's involvement in animal husbandry.

Physicians working in primary healthcare services tend to consider hydatid cyst disease as a condition mostly limited to the liver and lungs. However, considering that renal, retroperitoneal, and muscle tissue involvement have been reported in the literature, atypical localizations must also be kept in mind in patients living in endemic regions and having risk factors (III, V, VIII). This awareness is critically important in preventing serious complications such as cyst rupture, anaphylaxis, and peritoneal dissemination that may develop due to misdiagnosis and inappropriate interventions (VI, IX).

In conclusion, this case shows that cystic echinococcosis is not limited only to the liver and lungs; it may also occur in rare localizations such as the kidney, psoas muscle, and retroperitoneal area. It is of vital importance that primary care physicians, especially in endemic regions, always consider hydatid cyst disease in the differential diagnosis when encountering atypical cystic lesions, in terms of early diagnosis and appropriate referral.

CONCLUSION

Although cystic echinococcosis is most commonly seen in the liver and lungs, it may also occur in rare localizations such as the kidney and retroperitoneal area. This presented case demonstrates that renal, psoas muscle, and retroperitoneal involvement may coexist and that the disease may create diagnostic difficulties in atypical localizations.

In patients living in endemic regions and engaged in animal husbandry, hydatid cyst must definitely be considered in the differential diagnosis even in the presence of nonspecific symptoms and atypical imaging findings. Awareness of this issue among primary care physicians is of great importance for early diagnosis and appropriate referral.

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Atypical Postprandial Abdominal Pain Revealing Gallstone Disease: A Case of “Turkish Delight-Like” Morphology

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Abstract

Background: Gallstone disease is a common clinical condition typically presenting with right upper quadrant pain and classical biliary colic. However, atypical clinical presentations may mimic functional gastrointestinal disorders, leading to diagnostic delay.

Case Presentation: A 55-year-old female presented with recurrent postprandial abdominal pain without typical biliary features. Physical examination and laboratory findings were unremarkable. Abdominal computed tomography revealed a hyperdense gallstone with a lobulated and irregular contour resembling a “Turkish delight” appearance. This atypical morphology was considered a potential cause of intermittent cystic duct obstruction and fluctuating symptoms.

Conclusion: Atypical gallstone morphology may contribute to non-classical clinical presentations and diagnostic uncertainty. Recognition of unusual imaging features, such as the “Turkish delight sign,” may facilitate early diagnosis and appropriate management in patients with unexplained postprandial abdominal pain.

Keywords: Gallstone, Atypical Presentation, Postprandial Pain, Primary Care, Cholelithiasis

Introduction

Gallstone disease is a common clinical condition encountered in both primary care and emergency settings. It typically presents with right upper quadrant pain, nausea, and intolerance to fatty meals (1,2). However, atypical clinical and radiological presentations may lead to diagnostic challenges and delayed management (3).

Intermittent postprandial abdominal pain without classical biliary colic may mimic functional gastrointestinal disorders such as dyspepsia or irritable bowel syndrome (4).

Case Presentation

A 55-year-old female patient presented with recurrent episodes of abdominal pain predominantly occurring after meals. The pain was intermittent, non-specific in localization, and not consistent with typical biliary colic.

The patient did not report significant nausea, vomiting, or fever. Physical examination findings were unremarkable, and routine laboratory tests, including liver function tests and pancreatic enzymes, were within normal limits.

Due to persistent symptoms, further imaging evaluation was performed.

Imaging Findings

Abdominal computed tomography (CT) demonstrated a hyperdense lesion within the gallbladder lumen consistent with a gallstone. Interestingly, the morphology of the stone was atypical, showing a lobulated and irregular contour resembling a “**Turkish delight**” appearance (Figure 1).

This unusual morphology may contribute to intermittent cystic duct obstruction, potentially explaining the patient’s non-classical and fluctuating symptom pattern.

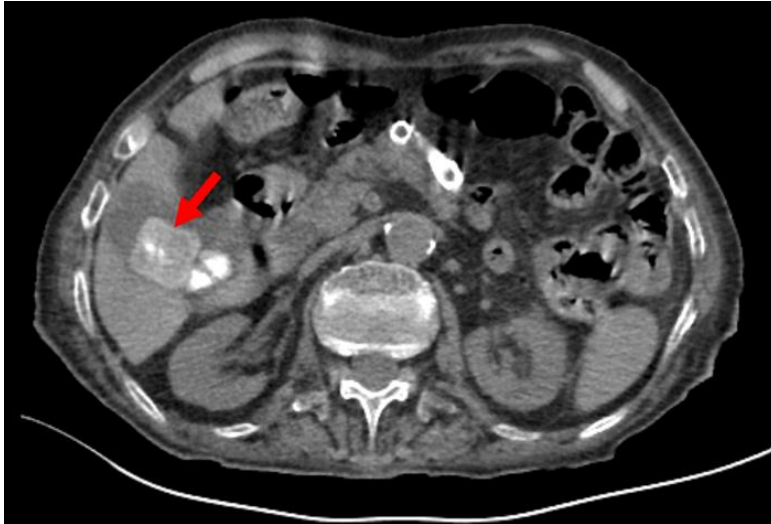


Figure 1 . Atypical lobulated gallstone “**Turkish delight sign**” on CT (red arrow).

Discussion

Gallstone disease is a common clinical condition; however, atypical presentations are not uncommon and may complicate the diagnostic process (3,5). While typical biliary colic is well described, patients may present with non-specific and intermittent symptoms, particularly in cases of partial or transient cystic duct obstruction.

In the present case, the patient exhibited recurrent postprandial abdominal pain without classical biliary features, which may easily lead to misdiagnosis as dyspepsia or other functional gastrointestinal disorders (4). The absence of significant laboratory abnormalities further contributed to diagnostic uncertainty, as liver function tests and pancreatic enzyme levels may remain within normal limits in uncomplicated or intermittently obstructive gallstone disease (6).

The morphology of the gallstone in this case was notably atypical, demonstrating a lobulated and irregular contour resembling a “Turkish delight.” Such unusual structural characteristics may predispose to intermittent obstruction of the cystic duct, resulting in fluctuating symptom patterns rather than continuous biliary colic. This highlights the

importance of considering not only the presence but also the morphology of gallstones in clinical evaluation.

Imaging plays a central role in the diagnosis of gallstone disease. Ultrasonography is the first-line modality; however, it may fail to detect small, non-shadowing, or irregularly shaped stones, particularly in cases with atypical morphology (7). In contrast, computed tomography is not routinely used as a primary diagnostic tool for gallstones but may incidentally reveal hyperdense stones and provide additional information regarding morphology and associated findings (8).

This case underscores the importance of maintaining a high index of suspicion for biliary pathology in patients presenting with recurrent postprandial abdominal pain, even in the absence of classical clinical and laboratory findings. Early recognition of atypical presentations is particularly important in primary care settings, where initial diagnostic decisions are made and delays in diagnosis may lead to prolonged patient discomfort and unnecessary investigations.

Conclusion

Atypical gallstone presentations can pose a diagnostic challenge in primary care practice. Intermittent postprandial abdominal pain should prompt consideration of biliary pathology, even when classical features are absent.

Recognition of unusual imaging appearances, such as the “Turkish delight-like” morphology observed in this case, may facilitate early diagnosis and appropriate management.

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Heterogeneous Evolution of Multisite Pressure Injuries In A Bedridden Palliative Care Patient: A Case Report

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Abstract

Background: Pressure injuries are common in palliative care, but lesions arising in the same patient may not follow a uniform clinical course. **Case:** An 87-year-old bedridden male patient with severe cerebrovascular disease, tracheostomy and enteral feeding developed multisite pressure injuries involving the sacrum, right trochanter/hip and right distal leg. **Results:** Serial photographs and consultation notes showed different trajectories between sites: the sacral lesion behaved as a more superficial moisture-associated erosive wound, the trochanteric lesion evolved into a more organized granulating chronic wound, and the right leg lesion remained the deepest and slowest-healing lesion, likely influenced by local depth and impaired perfusion. Arterial Doppler demonstrated monophasic flow, and CT angiography later showed significant stenoses in the trifurcation arteries. **Conclusion:** Even within the same patient, pressure injuries may demonstrate lesion-specific evolution. Site-based assessment, individualized wound care and multidisciplinary follow-up are essential in palliative settings.

Introduction

Pressure injuries are common in frail, immobilized, and highly dependent patients, especially in palliative care settings where advanced neurological impairment, prolonged pressure, moisture exposure, nutritional compromise, and reduced mobility often coexist. International guidance emphasizes that prevention and treatment should not rely on staging alone; repositioning, pressure redistribution, moisture control, skin protection, nutritional optimization, and appropriate local wound care all form part of effective management. This case is clinically relevant because multiple pressure injuries developed in the same patient yet did not evolve in the same way. The aim of this report is to present the heterogeneous course of sacral, trochanteric, and lower-extremity pressure injuries in a bedridden palliative care patient and to highlight the value of site-specific, multidisciplinary wound management.

Case

An 87-year-old male patient with severe cerebrovascular disease was followed in a palliative care unit after neurosurgical intervention. He was bedridden, non-cooperative, tracheostomized, and dependent on enteral feeding. Multiple pressure injuries were documented, including a stage 3 ulcer on the right leg, a stage 2 sacral ulcer, and a stage 1 lesion on the back.

Serial clinical photographs and consultation records showed that the lesions did not progress uniformly despite developing in the same patient under the same general systemic conditions. The sacral lesion initially had a superficial erosive appearance with surrounding moisture-related skin change. The trochanteric lesion evolved into a chronic open wound with progressive granulation. In contrast, the right leg lesion remained deeper, with persistent tissue loss and fibrin/slough, and represented the most complex wound throughout follow-up.

Management was multidisciplinary. Dermatology identified moisture- and irritation-associated changes in the hip/sacral region and recommended repositioning every four hours, protection from fecal and moisture exposure, and lesion-specific topical care.

Orthopaedic and vascular reassessment drew attention to the depth of the right leg ulcer and the possibility of impaired peripheral perfusion contributing to slower healing. In the lower extremity work-up, arterial Doppler showed monophasic flow, and subsequent CT angiography demonstrated significant stenoses in the trifurcation arteries. Infectious diseases revised systemic antimicrobial therapy according to culture findings and the broader clinical course.

Discussion

The strength of this case lies in the visual and clinical demonstration that pressure injuries in the same patient may behave very differently according to anatomical site. The sacral lesion behaved like a more superficial, moisture-sensitive wound; the trochanteric lesion became a more organized chronic granulating wound; and the right leg ulcer remained the deepest and most treatment-resistant lesion. This pattern suggests that wound behaviour is influenced not only by global frailty and pressure exposure but also by local tissue environment, depth, contamination/irritation, and vascular factors. In this patient, the slower healing of the right leg lesion was also supported by vascular findings, with monophasic distal flow on Doppler ultrasonography and significant trifurcation stenoses on CT angiography.

Another important lesson is that management should be individualized by lesion rather than standardized across all wounds. Dermatology recommendations changed the care strategy by emphasizing repositioning, moisture control, and topical treatment tailored to wound location. At the same time, the lower-extremity lesion required deeper structural and vascular consideration. In practical terms, this case supports a site-specific approach: each pressure injury should be assessed as a distinct wound within the same patient, even when lesions arise simultaneously.

Keywords: Pressure Injury, Pressure Ulcer, Palliative Care, Wound Care, Multidisciplinary Management

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Leriche Syndrome: A Rare Cause of Claudication

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Leriche syndrome (aortoiliac occlusive disease) is a rare but clinically significant vascular condition characterized by the chronic occlusion of the terminal abdominal aorta and the common iliac arteries. Classically defined by the triad of intermittent claudication, erectile dysfunction, and absent lower extremity pulses, this syndrome typically manifests as a consequence of advanced atherosclerosis. Early diagnosis is of critical importance in preventing irreversible ischemic damage and potential limb loss.

A 45-year-old male patient presented to primary care with complaints of intermittent pain, paresthesia, and coldness in the right lower extremity. The patient's medical history was significant for hypertension and hyperlipidemia. Physical examination revealed diminished distal pulses. Arterial Doppler ultrasonography of the lower extremity demonstrated biphasic flow patterns persisting to the distal segments. Due to the severity of the pain, computed tomography (CT) angiography of the abdomen and lower extremities was performed, which revealed a thrombus occupying the majority of the lumen in the infrarenal abdominal aorta (Figure 1). Furthermore, the right common and external iliac arteries were occluded, with observed thinning of the vessel calibration. Following the diagnosis of Leriche syndrome, the patient underwent peripheral catheter angiography and stent placement by the cardiovascular surgery department.

Poster Presentation - PP166

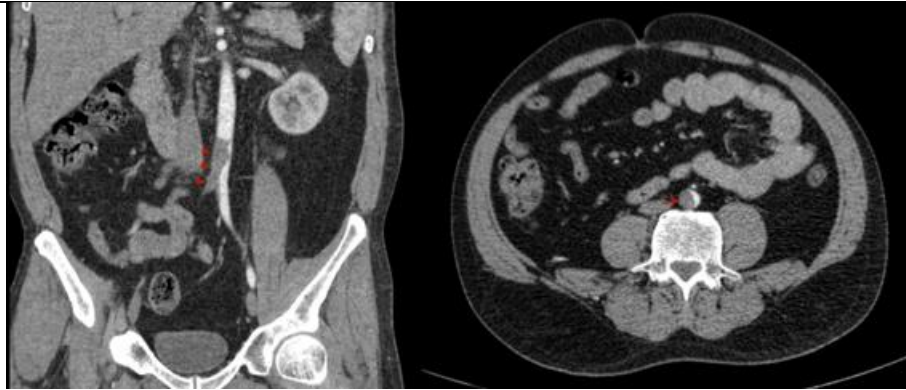


Figure 1: Coronal (left) and axial (right) views showing near-total thrombotic occlusion of the abdominal aorta.

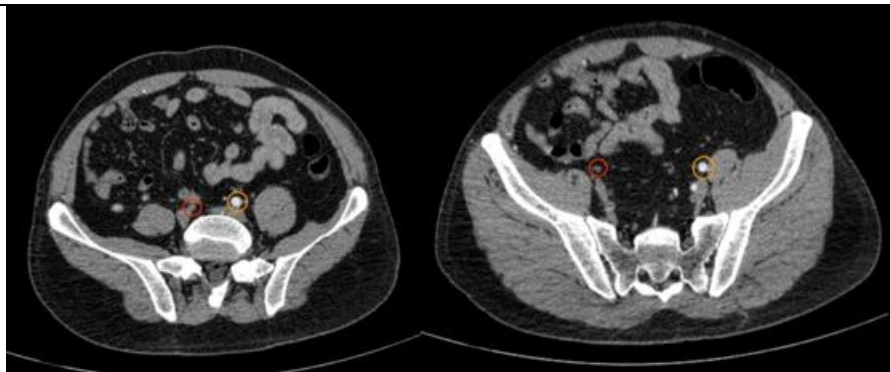


Figure 2: Bilateral iliac arteries. The right iliac artery is thrombosed with no intraluminal contrast enhancement and shows a reduced vessel diameter compared to the left (red circle). The left iliac artery demonstrates normal vessel volume and contrast enhancement (orange circle).



Figure 3: Contrast filling is observed in the right external iliac artery via the inferior epigastric artery (red arrow), with a calibration similar to the left side (orange circles).

In conclusion, Leriche syndrome is an insidiously progressing vascular pathology that necessitates prompt diagnosis through detailed physical examination and radiological imaging, particularly in high-risk patient groups. Tailoring the treatment plan to the individual patient plays a fundamental role in both alleviating symptoms and reducing long-term morbidity.

Case Report: A Rare Cause of Resistant Headache and Hypertension in a Young Adult: Cushing's Syndrome

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Cushing's Syndrome (CS) is a clinical entity characterized by chronic exposure to glucocorticoids of either endogenous or exogenous origin. The estimated annual incidence of endogenous CS ranges from 1.8 to 3.2 cases per million. CS, which may present in young adults with non-specific symptoms such as hypertension and rapid weight gain, can lead to severe metabolic complications if not diagnosed early through meticulous physical examination and biochemical screening. In this report, a case of Cushing's Syndrome presenting with atypical headache and hypertension is discussed.

A 22-year-old male presented with a history of headache, malaise, and weight gain at the family medicine clinic. His medical history revealed that the frequency of the headache had increased over the past month; it was described as dull in character and unresponsive to analgesics. The patient had no known chronic diseases, prior surgeries, or history of medication use. Family history was significant for coronary artery disease and hypertension in his maternal grandmother. On physical examination, blood pressure was 145/90 mmHg, and waist circumference was increased at 105 cm. Inspection of the abdomen revealed pink-purple striae located in the lower quadrants. Biochemical investigations were unremarkable except for hypertriglyceridemia (402 mg/dL). Given the presence of striae, hypertension at a young age, and truncal obesity, hypercortisolism was primarily suspected, and screening tests were ordered. The 24-hour urinary free

Poster Presentation - PP168

cortisol level was measured at 272 µg/day (approximately three times the upper limit of normal). The patient was referred to the Endocrinology outpatient clinic for further evaluation and management. It was noted that a 1 mg dexamethasone suppression test was performed, which failed to suppress cortisol levels, thereby confirming the diagnosis of Cushing's syndrome. To determine the etiology, plasma ACTH was measured at 16 pg/mL. Subsequent pituitary MRI as an advanced imaging study revealed a 7.5 mm adenoma. Consequently, a diagnosis of Cushing's Disease was established, and the patient was referred to the Department of Neurosurgery.

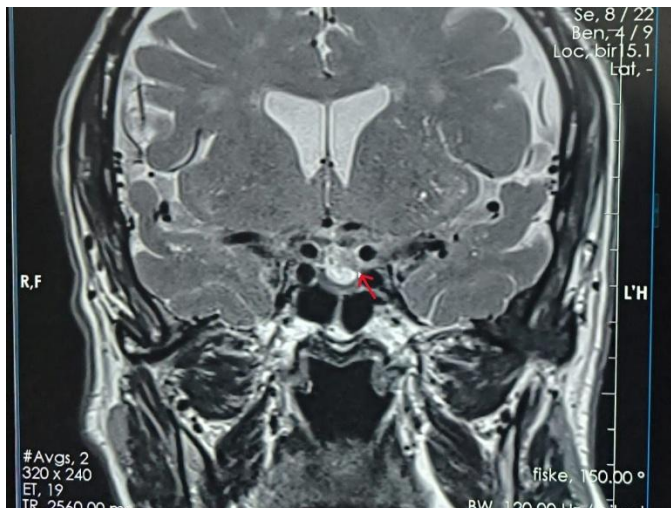


Figure 2: Pituitary MRI revealing a lesion consistent with a microadenoma, measuring 7.5 mm at its widest dimension, located in the left posterior aspect of the adenohypophysis (indicated by the red arrow).

In conclusion; headache is a very common symptom encountered in primary care practice. However; when headache is resistant to analgesics and accompanied by findings such as hypertension and weight gain, Cushing's Syndrome (Disease) must be considered among the secondary causes of hypertension, particularly in young patients. This case underscores the vital importance of a meticulous physical examination and a low-prevalence medicine approach in the pathway to early diagnosis.

Keywords: Cushing Syndrome(Disease), Secondary Hypertension, Family Medicine, Low-Prevalence Medicine, Early Diagnosis

A Rare Cause of Abdominal Pain and Mass in Adolescence: Isolated Hematocolpos

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Abdominal pain is a common reason for presentation in primary care; however, in adolescents, the presence of accompanying primary amenorrhea necessitates thorough investigation of underlying etiologies. Although initial evaluation often considers gastrointestinal or urinary system causes, gynecological pathologies should also be prioritized in the differential diagnosis in the presence of abdominal distension, and pelvic pathologies must be evaluated. As the first point of contact, primary care plays a critical role in preventing potential complications through early diagnosis and appropriate referral.

A 14-year-old female patient presented with complaints of abdominal distension. Her medical history revealed primary amenorrhea. On physical examination, marked suprapubic distension was noted. Biochemical investigations were within normal limits. To elucidate the etiology, a whole abdominal ultrasonography was performed, revealing a heterogeneous fluid collection measuring 169 × 114 × 112 mm, filling the cervical and vaginal canal and displacing the uterus toward the supraumbilical region. These findings were primarily suggestive of hematocolpos. Following consultation with the Department of Obstetrics and Gynecology, contrast-enhanced abdominal computed tomography (CT) was performed to confirm the diagnosis and evaluate anatomical relationships. CT imaging

demonstrated a massive fluid collection occupying the infraumbilical midline region, displacing the uterus superiorly, expanding the endometrial cavity (hematometra), and showing continuity along the vaginal canal, consistent with hematocolpos. No additional pathological findings were observed in the ovarian regions. Surgical intervention was planned by the Obstetrics and Gynecology team, and treatment was successfully achieved by drainage of the fluid collection.

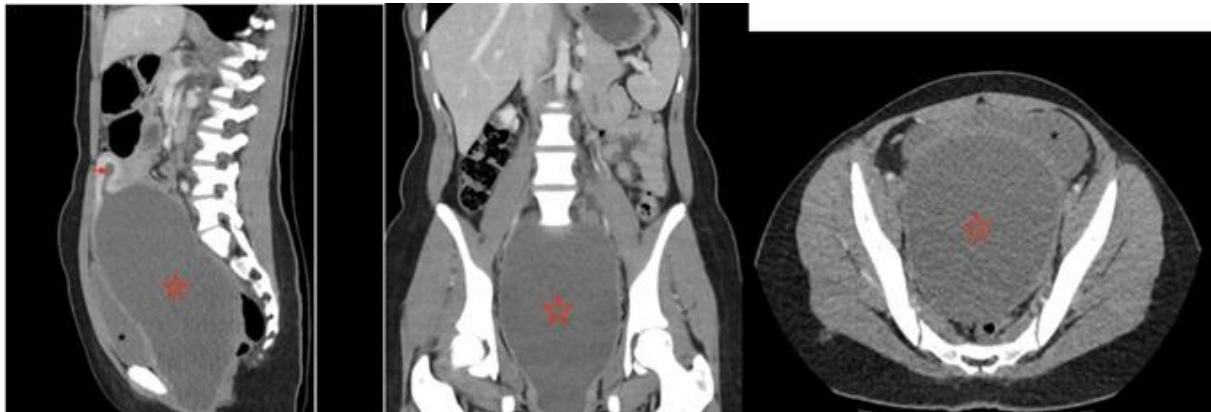


Figure 1

Figure 1. Sagittal, coronal, and axial contrast-enhanced CT images (from left to right). A fluid collection extending to the level of the umbilicus (red star), with an associated enlarged endometrial cavity (red arrow). The urinary bladder is visualized separately in the anterior region (small black star).

In this case, the diagnosis of hematocolpos was established through the correlation of clinical findings and imaging modalities, and successful treatment was achieved with timely surgical intervention without the development of complications. Imaging modalities play a decisive and elucidating role in the evaluation of intra-abdominal pathologies, particularly in demonstrating large-volume fluid collections and anatomical relationships, thereby guiding the investigation of the underlying etiology when used appropriately.

Keywords: Primary Amenorrhea, Hematocolpos, Adolescent

A Rare Cause of Chronic Wrist Pain: A Case Report of Kienböck Disease

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Kienböck disease is a progressive osteonecrosis resulting from impaired vascular supply to the lunate bone. It is most commonly observed in young adults, and its etiology involves microtrauma, vascular insufficiency, and anatomical variations. Clinically, it presents with wrist pain, limited range of motion, and decreased grip strength. The aim of this study is to present the clinical and radiological features of a patient diagnosed with Kienböck disease.

A 21-year-old male patient presented to the outpatient clinic with progressively worsening right wrist pain persisting for approximately one year. Physical examination revealed localized tenderness without any history of trauma. Plain radiography of the wrist demonstrated sclerosis and flattening of the lunate bone (Figure 1). Magnetic resonance imaging (MRI) of the wrist showed hypointense signal changes on T1-weighted images and hyperintense signal changes on fat-suppressed proton density sequences in the lunate, consistent with Kienböck disease (Figure 2). The patient was referred to the orthopedic department for appropriate surgical management.

Poster Presentation - PP170

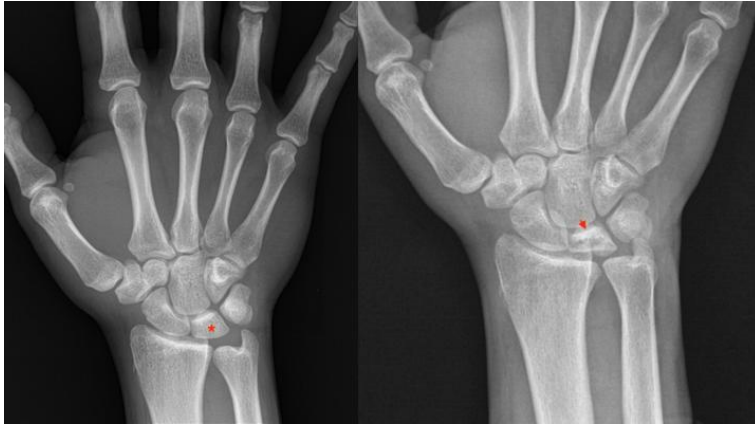


Figure 1. Wrist radiographs obtained 15 months apart. The earlier radiograph (left) shows normal lunate height and no changes in bone opacity. The recent radiograph (right) demonstrates loss of lunate height and sclerosis (red arrows).

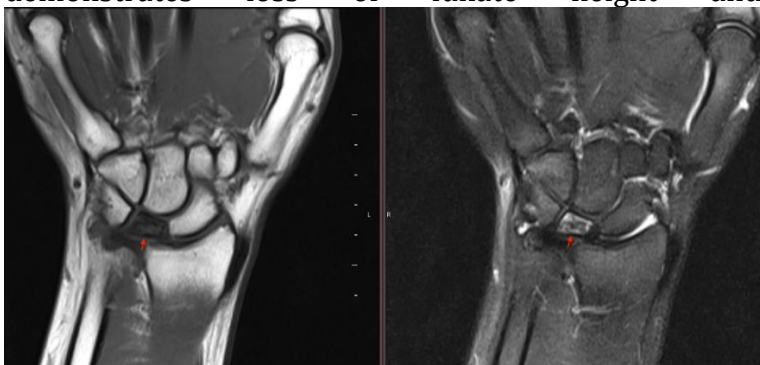


Figure 2. Wrist MRI images: T1-weighted (left) and fat-suppressed proton density (right). The lunate shows hypointense signal on T1-weighted images and hyperintense signal on fat-suppressed proton density sequences (red arrows).

Early diagnosis of Kienböck disease is crucial to slow disease progression and prevent functional loss. It should always be considered in the differential diagnosis of patients presenting with chronic wrist pain. Successful clinical outcomes can be achieved with treatment planned according to the disease stage.

Keywords: Kienböck Disease, Osteonecrosis, Wrist Pain, Magnetic Resonance Imaging, Radiography

Bilateral Temporal Arachnoid Cysts as an Unusual Radiologic Feature in Glutaric Aciduria Type I

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Abstract

Background: Glutaric aciduria type I (GA-1) is a rare autosomal recessive neurometabolic disorder characterized by macrocephaly, neurological deterioration, and typical MRI findings. Early diagnosis is crucial to prevent irreversible neurological damage.

Case Presentation: A 15-month-old boy presented with seizures and developmental regression following a febrile illness. Cranial MRI revealed frontotemporal atrophy, widening of the Sylvian fissures, bilateral lentiform nucleus hyperintensities, and bilateral temporal arachnoid cysts.

Conclusion: Although characteristic MRI findings of GA-1 are well known, bilateral temporal arachnoid cysts represent an unusual radiological feature. Recognition of such atypical findings may support the diagnosis in clinically suspected cases.

Keywords: Bilateral Arachnoid Cysts, Glutaric Aciduria Type I, MRI

Introduction

Glutaric aciduria type I (GA-1) is a rare organic aciduria inherited in an autosomal recessive manner, caused by a deficiency of the enzyme Glutaryl-CoA dehydrogenase, which is involved in the metabolism of lysine, hydroxylysine, and tryptophan. The estimated incidence of the disease is approximately 1 in 100,000 live births (1). The clinical presentation is highly variable and is most commonly characterized by macrocephaly, acute encephalopathic crises triggered by infection or trauma, dystonia, rigidity, seizures, and delayed neurodevelopment (2,3). Although patients may exhibit normal development during the early years of life, irreversible neurological damage may occur, particularly under conditions of metabolic stress (2).

Therefore, early diagnosis is crucial, and magnetic resonance imaging (MRI) findings play a key role in establishing the diagnosis. The aim of this study is to present a rare radiological feature in a patient diagnosed with GA-1.

Case Presentation

A 15-month-old male patient was admitted to the pediatric neurology clinic with complaints of seizures and regression in neuromotor development following a recent febrile illness. His prenatal history was unremarkable. On physical examination, the head circumference was above the 90th percentile for age.

Cranial magnetic resonance imaging (MRI) demonstrated marked frontotemporal atrophy involving both cerebral hemispheres. Secondary to this atrophy, there was prominent widening of the Sylvian fissures. Additionally, cerebrospinal fluid (CSF)-intensity lesions consistent with arachnoid cysts were identified in the anterior aspects of both temporal fossae, measuring approximately 25 mm on the right and 29 mm on the left.

Furthermore, the craniofacial ratio was increased in favor of macrocephaly, and hyperintense signal changes were observed in the bilateral lentiform nuclei on T2-

weighted and FLAIR sequences. These imaging findings were considered suggestive of an underlying metabolic disorder.

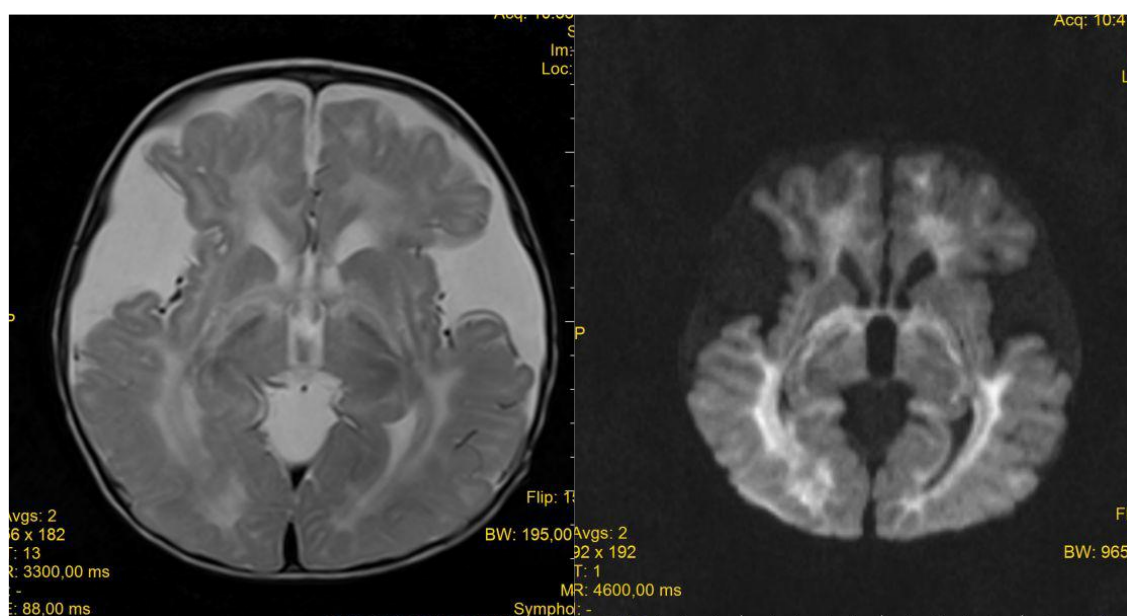


Figure 1. Axial T1- and T2-weighted magnetic resonance images demonstrate prominent widening of the Sylvian fissures consistent with frontotemporal atrophy, along with bilateral arachnoid cysts in the temporal fossae.

Discussion

Imaging findings play a crucial role in the early diagnosis of glutaric aciduria type I (GA-1). The most characteristic radiological feature of the disease is widening of the Sylvian fissures secondary to frontotemporal atrophy, often described as the “bat-wing” appearance (4).

Basal ganglia involvement is another typical finding, with the putamen being the most commonly affected structure, while involvement of the caudate nucleus and globus pallidus is less frequent (4). In addition, T2 hyperintensities in the periventricular white

matter and delayed myelination may also be observed (5). However, these findings may be subtle or absent in the early stages of the disease and should be interpreted in conjunction with clinical features.

In advanced stages, cortical atrophy and widening of the cerebral sulci become more pronounced. Although rare, bilateral temporal arachnoid cysts have been reported in association with GA-1 in the literature (6). Arachnoid cysts are typically benign and unilateral lesions; however, bilateral occurrence may be related to underlying metabolic or developmental processes.

From a pathophysiological perspective, the accumulation of glutaric acid and 3-hydroxyglutaric acid exerts a neurotoxic effect, particularly on the basal ganglia, leading to striatal injury. Additionally, carnitine deficiency, impaired energy metabolism, and increased metabolic demand during infections contribute to disease progression (2,3).

Conclusion

Glutaric aciduria type I should be considered in pediatric patients presenting with macrocephaly, neurological deterioration following infection, and seizures. Characteristic MRI findings, particularly frontotemporal atrophy, widening of the Sylvian fissures, and basal ganglia involvement, provide important diagnostic clues.

In this case, the presence of bilateral temporal arachnoid cysts represents a rare but noteworthy radiological feature that may serve as a supportive finding in the diagnostic process.

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Post-PTC Hepatic Arterial Hemorrhage Managed with NBCA Embolization

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Abstract

Background: Percutaneous transhepatic cholangiography (PTC) is a commonly used minimally invasive procedure for biliary decompression in malignant obstruction. However, it may lead to serious complications, including hepatic arterial hemorrhage.

Case Presentation: A patient with metastatic rectal cancer developed acute hemorrhage following PTC, presenting with a rapid decline in hemoglobin levels and active bleeding along the catheter tract. Emergency angiography revealed contrast extravasation from a branch of the left hepatic artery. Selective transarterial embolization using an N-butyl cyanoacrylate (NBCA)-lipiodol mixture was performed, resulting in complete hemostasis and clinical stabilization.

Conclusion: Hepatic arterial injury is a rare but potentially life-threatening complication of PTC. Prompt recognition and transarterial embolization, particularly with NBCA-lipiodol, provide effective and rapid hemostasis, improving patient outcomes.

Keywords: PTC, Hepatic Arterial Bleeding, NBCA Embolization

Introduction

Percutaneous transhepatic cholangiography (PTC) and drainage are widely utilized for the management of malignant biliary obstruction, particularly in patients with advanced gastrointestinal malignancies. Despite being an effective and minimally invasive technique, PTC is associated with several complications, including infection, bile leakage, and hemorrhage (1).

Hemorrhagic complications, although relatively uncommon, may be life-threatening and are most commonly related to injury of the hepatic arterial branches during needle puncture or catheter manipulation (2). Early recognition and prompt management are essential, as untreated bleeding can lead to significant morbidity and mortality.

Transarterial embolization has become the first-line treatment for procedure-related hepatic arterial hemorrhage, offering both diagnostic and therapeutic advantages (3). Among embolic agents, N-butyl cyanoacrylate (NBCA) mixed with lipiodol provides rapid and permanent vessel occlusion, making it particularly effective in acute bleeding scenarios (4).

Herein, we present a case of acute hepatic arterial hemorrhage following PTC in a patient with metastatic rectal cancer, successfully managed with NBCA–lipiodol embolization.

Case Presentation

A patient with known rectal carcinoma and liver metastases presented with jaundice. Hepatobiliary ultrasonography demonstrated dilatation of the intrahepatic bile ducts, consistent with obstructive biliary pathology.

Percutaneous transhepatic cholangiography and drainage (PTC) was subsequently performed. Following catheter placement into the left hepatic lobe, the patient developed acute hemorrhage along the catheter tract. Laboratory evaluation revealed a rapid decline in hemoglobin levels from 9 g/dL to 6 g/dL within two hours, indicating significant active bleeding.

Emergency abdominal angiography was performed, revealing active contrast extravasation from a branch of the left hepatic artery. Selective catheterization of the bleeding vessel was achieved, and embolization was performed using a mixture of N-butyl cyanoacrylate (NBCA) and lipiodol.

Post-embolization control angiography demonstrated complete cessation of contrast extravasation, confirming successful hemostasis. The patient's hemodynamic status stabilized following the procedure, and no further bleeding was observed.

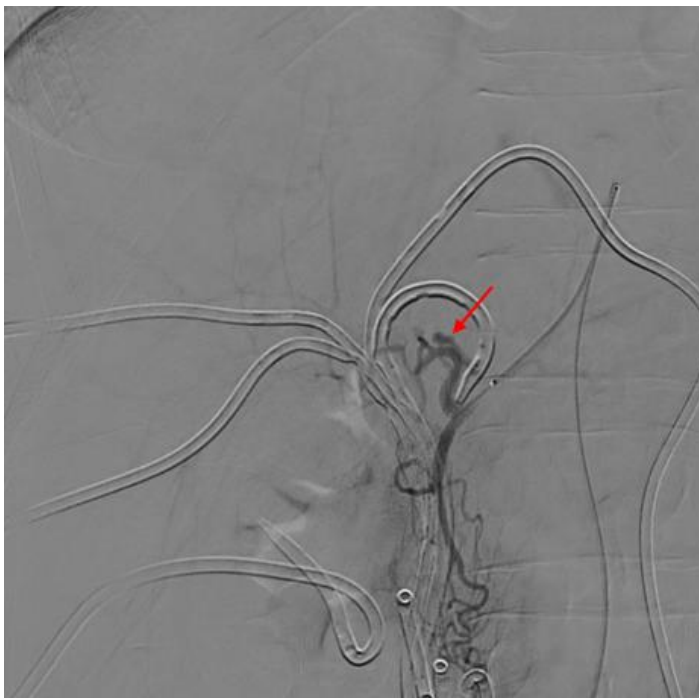


Figure 1. The main hepatic artery demonstrates active contrast extravasation following contrast injection (red arrow).

Discussion

PTC is a well-established technique for biliary decompression; however, vascular complications remain a significant concern. The reported incidence of hemorrhagic complications following PTC ranges from 2% to 5%, with hepatic arterial injury being the most common source of bleeding (1,2).

Clinical suspicion should be raised in cases of sudden hemoglobin drop, hemodynamic instability, or persistent bleeding through the catheter. In such scenarios, angiography serves as both a diagnostic and therapeutic tool (3).

Transarterial embolization is considered the gold standard for the management of hepatic arterial bleeding. Various embolic agents, including coils, particles, and liquid embolics, can be used depending on the clinical scenario. NBCA-lipiodol mixtures are particularly advantageous in acute hemorrhage due to their rapid polymerization and ability to achieve permanent occlusion, even in coagulopathic patients (4,5).

Compared to coil embolization, NBCA offers faster hemostasis and is less dependent on the patient's coagulation status, which is often impaired in patients with malignancy or biliary obstruction (5). However, careful technique is required to avoid non-target embolization.

In the present case, early recognition of hemorrhage and prompt endovascular intervention resulted in successful control of bleeding and clinical stabilization. This highlights the importance of rapid multidisciplinary management in such high-risk patients.

Conclusion

Hepatic arterial injury is a rare but potentially life-threatening complication of PTC. A sudden drop in hemoglobin levels following the procedure should prompt immediate evaluation for active bleeding. Transarterial embolization, particularly using NBCA-lipiodol, is a safe and highly effective treatment option that enables rapid hemostasis.

Early diagnosis and timely intervention are critical to improving patient outcomes.

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