Online ISSN 1308-531X

Turkish Journal of Family Practice

Volume 29 | Issue 2 | June 2025

Published by Turkish Association of Family Physicians
www.turkjfampract.org

Turkish Journal of Family Practice

Volume **29** | *Issue* **2** | *June* **2025**

Online ISSN 1308-531X

Turkish Journal of Family Practice

Official abbreviation: Turk J Fam Pract

ISSN (Online): 1308-531X

DOI Prefix: 10.54308

Owner
Owner on behalf of the Turkish Association of Family Physicians
Prof. Dr. Güzin Zeren Öztürk (President)

Publication Type
International peer-reviewed journal

Publication Frequency and Language
Quarterly (March, June, September, December), English

Abstracting and Indexing
Turkish Journal of Family Practice is abstracted and indexed in TR-Index, EBSCOhost, Gale OneFile, Academindex.

Editor in Chief
Prof. Dr. Güzin Zeren Öztürk
Department of Family Medicine, Şişli Hamidiye Etfal Training and Research Hospital, İstanbul, Türkiye
guzin_zeren@hotmail.com - https://orcid.org/0000-0001-7730-2929

Publisher
Turkish Association of Family Physicians

Publisher Address
Hacettepe Mah. Talatpaşa Bulvarı No: 113/15, 06230, Altındağ/Ankara, Türkiye
Phone: +90 530 642 92 43
E-mail: tahud@tahud.org.tr
Web: www.tahud.org.tr

Publishing Services
Akdema Informatics and Publishing
Address: Kızılay Mah. Gazi Mustafa Kemal Bulvarı No: 23/8 06420 Çankaya/Ankara, Türkiye
Certificate number: 52576
E-mail: bilgi@akdema.com
Tel: +90 533 166 80 80
Web: www.akdema.com

You can reach all publication policies and author guidelines from www.turkjfampract.org

Editorial Board

Table of Contents

Editorial

We are pleased to present the second issue of Volume 29 of the Turkish Journal of Family Practice. This issue presents a selection of original articles that contribute to the ongoing discourse in family medicine and primary care.

As healthcare continues to evolve, family physicians play a key role in providing comprehensive and patient-centered care. In this issue, the articles explore important topics such as healthcare worker well-being, access to health information, chronic disease care, and medical education, all relevant to daily practice in family medicine.

We thank our authors, reviewers, and editorial team for their valuable contributions and dedication to advancing scientific knowledge in the field. We hope this issue serves as a meaningful resource for clinicians, researchers, and educators committed to strengthening family medicine.

Sincerely,
Prof. Dr. Yasemin ÇAYIR
Editor-in-Chief
Turkish Journal of Family Practice

Turk J Fam Pract 2025;29(2):51-58
DOI: 10.54308/TJFP.2025.808

Research Article

Assessment of the relationship between physical activity and burnout levels of healthcare professionals during the COVID-19 pandemic

Mert Kayan[1], Hüseyin Elbi[2], Fatih Özcan[2]

[1]District Clinics Middle Franconia, Forensic Psychiatry, Germany
[2]Department of Family Medicine, Faculty of Medicine, Manisa Celal Bayar University, Manisa, Türkiye

ABSTRACT

Objective: During outbreaks, healthcare workers may encounter mental health challenges, including an increased risk of infection and burnout. Physical inactivity due to widespread restrictions may significantly worsen these adverse effects. This study aims to assess burnout and physical activity levels among healthcare workers in hospitals during the COVID-19 outbreak and to examine the relationship between these factors.

Methods: This cross-sectional study involved 294 healthcare professionals, including nurses, midwives, health technicians, physiotherapists, laboratory technicians, and emergency medical technicians, working in outpatient or inpatient clinics at a university hospital, separate from the COVID-19-related study units. Research data were collected from November 10, 2021, to February 10, 2022. The Maslach Burnout Inventory, International Physical Activity Questionnaire, and a sociodemographic form were used as data collection tools.

Results: Among the participants included in the study, 63.9% were female, 36.1% were male, and the mean age was 29.40±6.39 (min: 19, max: 58). Additionally, 70.1% of the participants were employed in units related to COVID-19. The emotional exhaustion and desensitization subscales were higher in physicians and nurses working in COVID-19 units ($p<0.05$). Furthermore, 13.9% of the participants in this study met the criteria for sufficient physical activity levels. Physical activity levels were greater among single participants ($p<0.05$). However, there was no significant relationship between the participants' burnout status and physical activity levels ($p>0.05$).

Conclusion: This study found that burnout levels among physicians and nurses were higher than those of other healthcare professionals. Additionally, burnout levels were elevated in employees working in units related to COVID-19. The physical activity levels of healthcare professionals participating in our study were low. However, no significant relationship was observed between participants' burnout and physical activity levels.

Keywords: Pandemic, COVID-19, health personnel, physical activity, burnout

Introduction

In situations that cause mass trauma, such as the COVID-19 pandemic, healthcare workers are the group at the highest risk and most affected, playing a vital role in the healthcare system.[1] During these outbreaks, particularly those who manage cases directly, they may face mental

✉ Fatih Özcan ▪ fatihozcan41@gmail.com
Received: 16.09.2024 **Accepted:** 26.04.2025 **Published:** 27.06.2025

health issues like burnout, along with a high risk of infection.[2] Burnout is an employee's inability to provide professional care for the people they serve while performing their job or their psychological distancing from their career as a response to excessive stress and dissatisfaction.[3] Today, burnout has become an increasingly significant issue, characterized by emotional fatigue, a diminished sense of personal accomplishment, and feelings of cynicism.[4]

Doctors and nurses are among the occupational groups at the highest risk for burnout. Factors such as workload, irregular and prolonged working hours, the challenge of understanding patients in difficult situations, the necessity of establishing a positive relationship with the patient, and the frequent need to take responsibility all contribute to increasing burnout.[5] Physical activity is a fundamental means of enhancing physical and mental health. Conversely, physical inactivity is a significant risk factor for cardiovascular and musculoskeletal disorders, type 2 diabetes, hypertension, certain oncological diseases, and psychological disorders.[6]

Physiological changes resulting from physical activity can reduce individuals' sensitivity to ongoing stress, enabling them to cope better with workplace stress without feeling overwhelmed. Consequently, this may decrease the risk of burnout.[7] Studies on the physical activity levels of healthcare workers indicate that physical activity levels are relatively low, while inactivity levels are high.[8,9]

Healthcare workers on the front lines of the COVID-19 outbreak faced an increased risk of burnout. They had limited opportunities for physical activity due to heavy workloads and challenging social conditions arising from restrictions. This study aimed to assess burnout and physical activity levels among healthcare workers during the COVID-19 pandemic and to explore the relationship between these factors.

Materials and Methods

Study design and participants

This cross-sectional study was conducted at a university hospital between November 10, 2021, and February 10, 2022. The study population consisted of physician residents and other healthcare professionals (nurses, midwives, health technicians, physiotherapists, laboratory technicians, and emergency medical technicians) who worked independently in units unrelated to COVID-19 at the university hospital. Our study population included 417 residents, 478 nurses, 24 laboratory technicians, 12 physiotherapists, 50 health technicians, and 67 emergency medical technicians, totaling 1048 individuals. The Epi Info program was used to calculate the sample size, aiming to reach at least 281 participants with a 50% prevalence and a 5% margin of error. Based on the percentages of the occupational groups in the population, we reached at least 112 residents, 129 nurses, and 40 other healthcare personnel.

Data collection

The Maslach Burnout Scale, which consists of 22 items and was adapted into Turkish by Ergin[10], the International Physical Activity Questionnaire, comprising 7 items along with a Turkish validity and reliability study conducted by Öztürk[11], and a sociodemographic data form, were utilized in the study. In the Maslach Burnout Scale, high scores on the emotional exhaustion and depersonalization subscales indicate significant levels of burnout. In contrast, low scores on the personal accomplishment subscale suggest high levels of burnout. Higher scores on the International Physical Activity Questionnaire are regarded as more favorable.

Data analysis

SPSS software for Windows (version 28.0; IBM Corp, Armonk, NY.) was used to evaluate and analyze

the data obtained from the study. The categorical variables in the study were presented as numbers and percentages to illustrate the distribution of patients, while numerical data were reported as means and standard deviations. Skewness-Kurtosis values were employed to determine whether the distribution of the variables was normal. Variables with a normal distribution were compared using the Student's t-test, while those not exhibiting a normal distribution were compared using the Mann-Whitney U and Kruskal-Wallis tests. The statistical significance level of the obtained data was interpreted with a "$p<0.05$" value.

Ethical approval

The ethics committee decision report numbered 20.478.486/947 was approved by the University Medical Faculty Health Sciences Ethics Committee on 22 September 2021. Additionally, approval was obtained from the Hospital's Director to conduct this research on hospital staff. During the study, informed written consent was acquired from the volunteers who agreed to participate.

Results

The research involved 294 participants, of whom 63.9% were female and 36.1% were male. Among them, 47.3% (n=139) were nurses, while 39.1% (n=115) served as residents. The mean age of the participants was 29.40±6.39 years (min: 19, max: 58). Additionally, 33.3% of participants lived alone, 47.6% cohabited with a spouse or children, and 56.5% had an income that equaled their expenses (Table 1).

Table 1. Distribution of participants according to sociodemographic characteristics

Variables		**n (%)**
Sex	Female	188 (63.9)
	Male	106 (36.1)
Occupation	Resident	115 (39.1)
	Nurse	139 (47.3)
	Physiotherapist	7 (2.4)
	Laboratory	15 (5.1)
	Health Technician	18 (6.1)
Marital Status	Single	150 (51.0)
	Married	140 (47.6)
	Other	4 (1.4)
Living Environment	Alone	98 (33.3)
	With Mother, Father, or Other Relative	37 (12.6)
	With Spouse, Children	140 (47.6)
	Other	19 (6.5)
Number of Children	No Children	202 (68.7)
	1 Child	60 (20.4)
	2 Children	29 (9.9)
	More Than 2 Children	3 (1.0)
Income Level	Less Than Expenses	67 (22.8)
	Equal to Expenses	166 (56.5)
	More Than Expenses	61 (20.7)
COVID-19 Related Unit Assignment	Yes	206 (70.1)
	No	88 (29.9)
	Total	294 (100)

Table 2. Participants' health status information

Variables		n (%)
Chronic Disease	Yes	59 (20.1)
	No	235 (79.9)
COVID-19	Diagnosed	76 (25.9)
	Not Diagnosed	218 (74.1)
Perceived health situation	Very Healthy	25 (8.5)
	Healthy	227 (77.2)
	Not Very Healthy	39 (13.3)
	Not Healthy at All	3 (1.0)

Among the participants, 70.1% work in a unit directly related to the pandemic, while 20.1% have at least one chronic disease. Additionally, 25.9% have been diagnosed with COVID-19, and 77.2% believe they are healthy (Table 2).

The mean total score on the Maslach Burnout Scale (MBS) for the participants was 68.32±9.76 (min: 44.0-max: 99.0) points. The mean scores for the MBS subscales were as follows: emotional exhaustion (EE) 28.18±6.67 (min: 12.0-max: 44.0), depersonalization (D) 11.76±4.43 (min: 5.0-max: 24.0), and personal accomplishment (PA) 28.36±5.41 (min: 13.0-max: 99.0).

When comparing employment in units related to COVID-19 with the sub-dimensions of the ITS, it was found that employees in these units experienced greater exhaustion than those who were not, regarding the total score, EE, and D subscale scores ($p<0.001$, $p = 0.027$, $p<0.001$, respectively). However, no statistically significant difference was observed in the MBS and its subscales among individuals diagnosed with COVID-19.

It was found that employees who felt unhealthy experienced greater exhaustion regarding DT and total scores from the sub-dimensions of MBS compared to those who felt healthy ($p=0.001$, $p=0.036$, respectively).

Physicians and nurses displayed statistically significantly higher levels of emotional exhaustion than other healthcare professionals ($p<0.001$ and $p=0.002$, respectively). In the depersonalization subgroup, physicians scored higher than nurses and other healthcare professionals ($p=0.001$ and $p<0.001$, respectively). Nurses scored significantly higher in the depersonalization subgroup than other healthcare professionals ($p=0.020$). When examining the relationship between the PA subgroup and occupation, physicians viewed themselves as more successful than nurses and other healthcare professionals ($p=0.014$ and $p=0.018$, respectively). No statistically significant difference was identified between nurses and other healthcare workers when assessing the PA subgroup ($p<0.05$) (Table 3).

45.6% of participants had low activity levels, with 40.5% not engaging in physical activity. Single participants exhibited significantly higher levels of physical activity ($p<0.05$). Comparing the scores obtained by participants in the sub-dimensions of the MBS regarding physical activity levels revealed no statistically significant difference in the evaluations of EE, D, and PA.

Discussion

This study highlights significant levels of burnout among healthcare workers, particularly in emotional burnout and depersonalization among those working in pandemic-related units. Doctors and nurses exhibited considerably higher emotional burnout and depersonalization than other healthcare workers, possibly due to the emotional demands of their roles. No significant association was found between activity level and burnout. However, most participants reported low or no physical activity, suggesting that the protective effects of physical activity may be limited under high-stress conditions such as the pandemic.

When analyzing the literature on the extent to which gender affects burnout, various results emerge. In this study, no significant relationship

Table 3. Comparison of Maslach Burnout Scores according to socio-demographic characteristics

Variables		Emotional exhaustion Mean±SD	Depersonalisation Mean±SD	Personal Achievement Mean±SD	Total Score Mean±SD
Sex	Female	28.68±6.88	11.27±4.42	28.16±5.54	68.12±10.32
	Male	27.30±6.21	12.64±4.35	28.72±5.18	68.66±8.71
Occupation†	Resident	29.12±6.17	13.25±4.12	27.10±5.59*	69.47±9.48*
	Nurse	28.48±6.63	11.27±4.39	29.00±5.04	68.76±10.07*
	Others	24.47 ±7.09	9.22±3.98	29.77±5.49	63.47±8.07
Marital Status#	Single	28.30±6.68	11.50±4.48	29.42±4.88*	69.23±9.69
	Married	28.07±6.68	12.00±4.39	27.40±5.70	67.49 ±9.78
Living Environment$	Alone	28.44±6.41	12.82±4.09*	27.18±5.47*	68.45±9.62
	Not Alone	28.05±6.81	11.23±4.51	28.95±5.30	68.25±9.85
Child(ren)	Yes	28.48±6.62	12.19±4.40	27.64±5.47	68.32±9.82
	No	27.54±6.77	10.83±4.39	29.94±4.95	68.32±9.68
Income Level	Less Than Expenses	29.35±6.16	11.83±4.56	28.08±5.11	69.28±9.43
	Equal to Expenses	28.04±7.16	11.65±4.46	28.39±5.56	68.08±9.43
	More Than Expenses	27.29±6.67	11.76±4.43	28.60±5.40	67.91±9.22
COVID-19 Related Unit Assignment$	Yes	28.74±6.70*	12.47±4.46*	28.51±5.44	69.74±9.78*
	No	26.87±6.46	10.11±3.91	28.01±5.36	65.00±8.91
Chronic Disease	Yes	28.01±6.62	11.18±4.8	29.28±5.32	68.49±9.16
	No	28.22±6.70	11.91±4.33	28.13±5.42	68.28±9.92
COVID-19	Diagnosed	28.84±6.16	12.22±4.31	28.17±5.35	69.23±10.03
	Not Diagnosed	27.95±6.84	11.61±4.48	28.43±5.44	68.00±9.66
Perceived health situation$	Healthy	27.67±6.52*	11.62±4.29	28.53±5.31	67.83±9.69*
	Unhealthy	31.23±6.82	12.61±5.21	27.38±5.93	71.23±9.74

*p<0.05 statistically significant.
#Student-t test, †Kruskal Wallis, $Mann-Whitney U test

was found between gender and burnout level. Similar findings were reported in the study conducted by Dinibütün et al.[12] In contrast, some research indicates that women's emotional exhaustion levels are higher.[13,14]

Most literature publications suggest no connection between marital status and burnout.[12,15] A study conducted on physicians during the COVID-19 pandemic in Türkiye found that marital status did not influence emotional exhaustion, depersonalization, or burnout.[13] In contrast to the literature, this study indicated that married participants had higher scores on the personal accomplishment subscale.

Healthcare workers are among the professional groups where burnout symptoms are most frequently encountered. Many studies show that nurses are more prone to burnout than other healthcare professionals.[16-18] In a study by Lasalvia et al., nurses and physician assistants were found to experience higher levels of burnout than other professions.[19] Sung et al. demonstrated that doctors and nurses are at greater risk for burnout than other health professionals.[20] This study reveals that the burnout status of healthcare professionals is high. However, since there was no analysis of the participants' burnout before the pandemic, the effect of the COVID-19 pandemic on this situation cannot be clearly expressed.

The impact of the living environment on burnout is a somewhat under-researched topic in the literature. In a study conducted by Elhadi et al. on healthcare workers, it was found that there was no relationship between lifestyle and three sub-dimensions of burnout.[15] This study revealed no statistical difference regarding the emotional exhaustion sub-dimension and total score. Lasalvia et al. emphasized that living alone increases emotional exhaustion and depersonalization.[19] This study identified a statistically significant difference between lifestyle and the depersonalization and low personal accomplishment subscales.

Healthcare workers on the front lines during the COVID-19 pandemic face challenges due to increased workloads, long hours, and the risk of exposure to positive cases.[21] The study by Arpacıoğlu et al. found that employees providing direct service to COVID-19 patients experienced statistically significant emotional exhaustion, depersonalization, and total scores.[22] In a study conducted with family physicians, it was found that emotional exhaustion and depersonalization rates increased with more frequent contact with COVID-19 patients.[23] Aligned with the studies in the literature, this study revealed that health professionals who provided direct service to COVID-19 patients experienced statistically significant emotional exhaustion, depersonalization, and total scores.

In a study conducted by Hoşgör et al. on 120 healthcare workers in Istanbul, no significant differences were found between the status of having a positive diagnosis of COVID-19 and all sub-dimensions of the burnout scale.[1] Similar to the literature, this study also found no significant difference between the status of having a positive diagnosis of COVID-19 and all sub-dimensions of the burnout scale. In contrast, the study conducted by Türkili et al. found high levels of depression and depersonalization in family physicians who were tested for COVID-19 and whose results were positive.[23]

In a study conducted by Çolak et al. on healthcare workers, physical activity levels were analyzed according to the International Physical Activity Questionnaire (IPAQ). It was found that 51.6% of the participants were inactive, 41.4% were lowly active, and only 6.9% had adequate physical activity levels.[24] In studies of healthcare workers before and after the COVID-19 pandemic, low physical activity levels remained similar.[25,26] A study involving healthcare workers in Singapore compared physical activity levels before and after the COVID-19 lockdown. It was found that significantly less physical activity was performed during the lockdown period.[27] Similarly, 45.6% of the participants in this study were found to have a low level of activity, 40.5% were not physically active, and 13.9% had an adequate level of activity.

When the literature was examined, a negative relationship between burnout and physical activity was identified in a significant portion of the studies comparing these two variables. However, some studies revealed no significant difference between burnout and physical activity. In the study conducted by Aydın et al. on nurses during the COVID-19 pandemic, no significant relationship was found between physical activity and burnout levels.[9] In the study conducted by Cecil et al. on medical faculty students, a negative relationship was identified between increased physical activity levels and Emotional Exhaustion levels; still, no significant relationship was observed between the two variables.[28] In the study analysis by Souza et al. on university students, physical activity was significantly associated with burnout symptoms, yet the adjusted model revealed no significant difference between the two.[29] Similarly, this study found no significant difference between physical activity and burnout.

Limitations of the study

This study has several limitations. First, it is confined to a university hospital; large-scale studies with more participants are recommended. Second, because resident physicians were included in the study, information could not be provided for other physicians.

Conclusion

This study demonstrates that burnout is a significant issue among healthcare professionals, particularly those working in pandemic-related units. Doctors and nurses exhibit the highest levels of emotional exhaustion and depersonalization. Living alone and being single are linked to low personal accomplishment. The emotional exhaustion and depersonalization subscales are elevated in those working in COVID-19-related units and among those experiencing burnout. When analyzing participants by gender, parental status, income level, chronic illness, and COVID-19 diagnosis, no differences in burnout are observed. The findings also indicate that most healthcare professionals engage in low or no physical activity, and no significant relationship is found between physical activity levels and burnout, aligning with some previous studies. Although the cross-sectional design and absence of pre-pandemic data restrict causal interpretations, the results underscore the need for targeted interventions to support the mental health and well-being of healthcare professionals (especially those in high-risk roles), regardless of lifestyle or demographic background. Future longitudinal studies are essential for better understanding the long-term effects of pandemic-related stressors on burnout and the potential protective roles of physical activity and other factors.

Ethical approval

This study has been approved by the Manisa Celal Bayar University, Faculty of Medicine Dean's Office, Health Sciences Ethics Committee (approval date 22.09.2021, number 20.478.486/947). Written informed consent was obtained from the participants.

Author contribution

The authors declare contribution to the paper as follows: Study conception and design: FÖ, MK, HE; data collection: MK; analysis and interpretation of results: MK, HE; draft manuscript preparation: MK, HE, FÖ. All authors reviewed the results and approved the final version of the article.

Source of funding

The authors declare the study received no funding.

Conflict of interest

The authors declare that there is no conflict of interest.

References

1. Hoşgör DG, Tanyel T, Cin S, Demirsoy SB. Covıd-19 pandemisi döneminde sağlık çalışanlarında tükenmişlik: İstanbul ili örneği. Avrasya Sosyal ve Ekonomi Araştırmaları Dergisi. 2021;8(2):372-386.
2. Wu P, Fang Y, Guan Z, et al. The psychological impact of the SARS epidemic on hospital employees in China: exposure, risk perception, and altruistic acceptance of risk. Can J Psychiatry. 2009;54(5):302-311. **[Crossref]**
3. Aslan H, Alpaslan NZ, Aslan O, Ünal M. Hemşirelerde tükenme, iş doyumu ve ruhsal belirtiler. Nöro Psikiyatri Arşivi. 1996;33:192-199.
4. Koutsimani P, Montgomery A, Georganta K. The relationship between burnout, depression, and anxiety: a systematic review and meta-analysis. Front Psychol. 2019;10:284. **[Crossref]**

5. Haran S, Devrimci Özgüven H, Ölmez Ş, Sayı I. Ankara Üniversitesi Tıp Fakültesi Hastaneleri ve Ankara Numune Hastanesinde çalışan doktor ve hemşirelerde tükenmişlik süzeyleri. Kriz Dergisi. 1997;6:75-84. **[Crossref]**

6. Bull FC, Al-Ansari SS, Biddle S, et al. World Health Organization 2020 guidelines on physical activity and sedentary behaviour. Br J Sports Med. 2020;54(24):1451-1462. **[Crossref]**

7. Ochentel O, Humphrey C, Pfeifer K. Efficacy of exercise therapy in persons with burnout. A systematic review and meta-analysis. Journal of Sports Science and Medicine. 2018;17:475-484.

8. Kılınç F, Tosun N. Hemşirelerin fiziksel aktivite düzeyleri ile yaşam kaliteleri arasındaki ilişkinin incelenmesi: tanımlayıcı bir araştırma. Adıyaman Üniversitesi Sağlık Bilimleri Dergisi. 2020;6:207-215. **[Crossref]**

9. Aydın Y, Kamuk YU. Hemşirelerin fiziksel aktivite düzeylerinin, yaşam kalitesi ve tükenmişlik düzeylerine etkisi. Spor Bilimleri Araştırmaları Dergisi. 2021;6:88-105. **[Crossref]**

10. Ergin C. Doktor ve hemşirelerde tükenmişlik ve Maslach Tükenmişlik Ölçeğinin uyarlanması. VII. Ulusal Psikoloji Kongresi, Ankara; 2002.

11. Öztürk M. Üniversitede eğitim-öğretim gören öğrencilerde uluslararası fiziksel aktivite anketinin geçerliliği ve güvenirliği ve fiziksel aktivite düzeylerinin belirlenmesi [Master's thesis]. Hacettepe Üniversitesi Sağlık Bilimleri Enstitüsü, Ankara; 2005.

12. Dinibutun SR. Factors associated with burnout among physicians: an evaluation during a period of COVID-19 pandemic. J Healthc Leadersh. 2020;12:85-94. **[Crossref]**

13. Kantek F, Kabukcuoğlu K. Hemşirelerde tükenmişlik: ilgili faktörlerin meta analizi. Journal of Human Sciences. 2017;14(2):1242-1254. **[Crossref]**

14. Purvanova R, Muros J. Gender differences in burnout: a meta-analysis. J Vocat Behav. 2010;77:168-185. **[Crossref]**

15. Elhadi M, Msherghi A, Elgzairi M, et al. Burnout syndrome among hospital healthcare workers during the COVID-19 pandemic and civil war: a cross-sectional study. Front Psychiatry. 2020;11:579563. **[Crossref]**

16. Giusti EM, Pedroli E, D'Aniello GE, et al. The psychological impact of the COVID-19 outbreak on health professionals: a cross-sectional study. Front Psychol. 2020;11:1684. **[Crossref]**

17. Stathopoulou H, Karanikola MNK, Panagiotopoulou F, Papathanassoglou EDE. Anxiety levels and related symptoms in emergency nursing personnel in Greece. J Emerg Nurs. 2011;37(4):314-320. **[Crossref]**

18. Havaei F, Ma A, Staempfli S, MacPhee M. Nurses' workplace conditions impacting their mental health during COVID-19: a cross-sectional survey study. Healthcare (Basel). 2021;9(1):84. **[Crossref]**

19. Lasalvia A, Amaddeo F, Porru S, et al. Levels of burnout among healthcare workers during the COVID-19 pandemic and their associated factors: a cross-sectional study in a tertiary hospital of a highly burdened area of north-east Italy. BMJ Open. 2021;11(1):e045127. **[Crossref]**

20. Sung CW, Chen CH, Fan CY, et al. Burnout in medical staffs during a coronavirus disease (COVID-19) pandemic. The Lancet. 2020. **[Crossref]**

21. Li W, Yang Y, Liu ZH, et al. Progression of Mental Health Services during the COVID-19 Outbreak in China. Int J Biol Sci. 2020;16(10):1732-1738. **[Crossref]**

22. Arpacıoğlu MS, Z. Baltaci, B. Unubol. Burnout, fear of Covid, depression, occupational satisfaction levels and related factors in healthcare professionals in the COVID-19 pandemic. Cukurova Med J. 2021;46(1):88-100.

23. Türkili S, Uysal Y, Tot Şenel. Aile hekimlerinde Korona Virüs salgını nedeniyle yaşanılan zorluklar, kaygı ve tükenmişlik durumlarının incelenmesi. Turkish Journal of Family Medicine and Primary Care. 2021;15(2); 348-356. **[Crossref]**

24. Çolak M, Erol S. Sağlık çalışanlarının genel sağlık durumu, fiziksel aktivite düzeyleri ve etkileyen faktörler. Journal of Anatolia Nursing and Health Sciences. 2021;24(2):139-147. **[Crossref]**

25. Korkmaz N, Demirkan N. Hastanede çalışan sağlık personellerinin fiziksel aktivite düzeyinin değerlendirilmesi. Sport Sciences. 2017;12(4):52-62. **[Crossref]**

26. Arvidson E, Börjesson M, Ahlborg G, Lindegård A, Jonsdottir IH. The level of leisure time physical activity is associated with work ability-a cross sectional and prospective study of health care workers. BMC Public Health. 2013;13:855. **[Crossref]**

27. Kua Z, Hamzah F, Tan PT, Ong LJ, Tan B, Huang Z. Physical activity levels and mental health burden of healthcare workers during COVID-19 lockdown. Stress Health. 2022;38(1):171-179. **[Crossref]**

28. Cecil J, McHale C, Hart J, Laidlaw A. Behaviour and burnout in medical students. Med Educ Online. 2014;19:25209. **[Crossref]**

29. de Souza RO, Ricardo Guilherme F, Elias RGM, et al. Associated determinants between evidence of burnout, physical activity, and health behaviors of university students. Front Sports Act Living. 2021;3:733309. **[Crossref]**

Turk J Fam Pract 2025;29(2):59-69
DOI: 10.54308/TJFP.2025.809

Research Article

Assessment of vitamin D and iron supplementation practices and their determinants in Erzincan, Türkiye: A cross-sectional study

Ersan Gürsoy[1], Serhat Hayme[2], Hatice Çakır[3], Salih Eren[1], Agah Özdemir[1], Bilal Karabaş[4]

[1]Department of Family Medicine, Faculty of Medicine, Erzincan Binali Yıldırım University, Erzincan, Türkiye
[2]Department of Biostatistics and Health Informatics, Faculty of Medicine, Erzincan Binali Yıldırım University, Erzincan, Türkiye
[3]Department of Anatomy, Faculty of Medicine, Erzincan Binali Yıldırım University, Erzincan, Türkiye
[4]Family Medicine Clinic, Tercan State Hospital, Erzincan, Türkiye

ABSTRACT

Objective: Vitamin D and iron are crucial micronutrients, particularly for children in phases of rapid growth and development, playing significant roles in bone and dental health, immune function, cognitive development, and energy metabolism. Despite the initiation of prophylaxis programs by the Turkish Ministry of Health, adherence and effectiveness remain variable, highlighting the need for localized research to evaluate these initiatives. This study aims to assess the prevalence and continuity of vitamin D and iron supplementation among families in Erzincan, and identify determinants influencing the sustainability of these practices.

Methods: A cross-sectional and descriptive study was conducted among 200 families with children aged 1-5 years in the districts of Erzincan. Participants were recruited from family health centers using a convenience sampling method. Inclusion criteria encompassed families with children who met the age requirement, while exclusion criteria included children with special health conditions requiring high-dose supplementation. Data were collected through structured face-to-face questionnaires assessing supplementation practices, sources of medical advice, parental attitudes, and socio-demographic factors. Descriptive statistics summarized the data. The chi-square test and independent samples t-test assessed categorical and continuous variables, respectively. Multiple logistic regression identified factors influencing adherence, while Kaplan–Meier survival analysis evaluated supplementation duration.

Results: High rates of vitamin D (98.5%) and iron (94%) supplementation were observed, albeit with decreased adherence to the recommended durations (82.5% for vitamin D, 75.5% for iron). The absence of parental concern for their children's health and concurrent use of another type of prophylaxis had a positive effect on prophylaxis use. A pediatrician recommended vitamin D and iron prophylaxis to 33% (n=66) of the participants, a family physician to 49% (n=98), and auxiliary health personnel to 3% (n=6) only, whereas 15% (n=32) were advised by more than one health professional. (p=0.008 for vitamin D prophylaxis; p=0.014 for iron prophylaxis). The multivariable logistic regression analyses revealed that parental concern about their infants' health significantly impacted the continuity of vitamin D prophylaxis (p=0.010). However, demographic characteristics had no significant impact on supplementation practices.

Conclusion: Although vitamin D and iron supplementation rates are high in Erzincan, challenges in sustaining recommended durations suggest areas for improvement in prophylaxis programs. This study underscores the importance of healthcare professional recommendations and parental health perceptions in influencing

✉ Ersan Gürsoy ▪ ersangursoy@gmail.com
Received: 02.10.2024 **Accepted:** 29.04.2025 **Published:** 27.06.2025

supplementation practices. Recommendations include enhancing health education and accessibility to prophylaxis programs to improve sustainability and adherence.

Keywords: Vitamin D, iron, supplementation, child health, prophylaxis

Introduction

Vitamin D and iron are micronutrients of vital importance to human health. These nutrients play a critical role, especially in children who are in periods of rapid growth and development. Vitamin D is crucial for the regulation of bone and dental health, as well as the immune system, and it plays a significant role in the prevention of chronic diseases.[1,2] Iron, on the other hand, is essential for cognitive development, energy metabolism, and the transportation of oxygen, among other vital processes.[3,4] Nonetheless, inadequate intake of vitamin D and iron can lead to health issues such as childhood anemia and rickets. In this context, vitamin D and iron prophylaxis programs are considered a significant strategy for preventing such health problems.

The World Health Organization (WHO) and the United Nations Children's Fund (UNICEF) recommend the development of national policies and the promotion of distribution efforts to prevent iron deficiency anemia and vitamin D deficiency.[5] These recommendations serve as a foundation for preventing vitamin D and iron deficiencies, particularly among high-risk groups.

In Türkiye, the Ministry of Health has initiated prophylaxis programs aimed at preventing vitamin D and iron deficiencies among children.[6] These programs are comprehensively designed to improve children's health status and prevent nutritional deficiencies. However, the feasibility and effectiveness of these programs may vary due to a range of geographical and socioeconomic factors.

Despite the known benefits of vitamin D and iron supplementation, the literature on the effectiveness and adherence to prophylaxis programs in diverse regions remains scarce. This gap highlights the need for localized research to understand the dynamics affecting supplementation practices.

This study aimed to determine the prevalence and continuity of vitamin D and iron prophylaxis practices among families in a specific province and to identify factors affecting the sustainability of these practices. The findings of this research could contribute to the development of relevant health policies and prophylaxis programs, providing a significant reference for strategies aimed at preventing vitamin D and iron deficiencies.

Materials and Methods

This study was conducted using a cross-sectional and descriptive approach at family health centers located in the districts of Central, Kemah, and Tercan within the province of Erzincan.

Participant selection

Participants were selected from families living in the districts of Central, Kemah, and Tercan in Erzincan province, who had children aged between 1 to 5 years. The individuals selected for this study were those with the cognitive capacity to understand and respond to the research questions. Therefore, the target population segment for this study comprises families that match the specified geographical and demographic characteristics.

Babies with a history of premature birth (<36 weeks) and those receiving treatment doses of vitamin D or iron supplementation because of certain health conditions were excluded from the study. The exclusion criteria also included those requiring high doses of vitamins or minerals because of conditions such as rickets, osteomalacia, or malabsorption. This measure ensures the validity and reliability of the research findings for the general population, unaffected by special health conditions requiring treatment.

Method

This study focused on the iron and vitamin D prophylaxis programs initiated by the Ministry of Health in the years 2004 and 2005. A questionnaire was administered to parents, covering topics such as the status and duration of their children's use of iron and vitamin D, reasons for discontinuation, the preparations used, and who initiated the prophylaxis. Demographic information was also collected.

Preliminary permission for this study was obtained from the Erzincan Provincial Health Directorate. The following approval from the Erzincan University Clinical Research Ethics Committee with the number 2023-16/10, the study was commenced. Participation in the study was voluntary, and oral and written consent was obtained from all participants. No fee was paid for participation.

The questionnaire was administered to all participants who agreed to participate and met the participation criteria, without randomization. Although the exact population numbers for different age groups are not specified, according to 2022 data from the Turkish Statistical Institute (TUIK), the population under the age of 4 years in Erzincan province is 13.688. Considering the population growth rate, it is estimated that there are approximately 16,000 children under the age of 5 in Erzincan province in 2023. In a study by Karapınar et al., the rate of iron prophylaxis usage in infants older than 1 month was 80.5%.[7] Using a 90% confidence interval and a 5% significance level, the sample size was determined to be a minimum of 169 according to the formula $n=[DEFF \times N \times Z^2 \times p(1–p)] / [d^2 \times (N–1) + Z^2 \times p(1–p)]$. In this context, interviews were conducted with 200 individuals.

In accordance with Türkiye's health policies, individuals who received vitamin D prophylaxis for at least twelve months and iron prophylaxis for at least eight months were considered to have received adequate prophylaxis.

Statistical analysis

The data were analyzed using the IBM SPSS 25.0 software package (SPSS Inc., Chicago, IL, USA). The assumption of normal distribution was assessed using the Kolmogorov –Smirnov test, and the homogeneity of variances was evaluated using the Levene test. The descriptive statistics of the data were given as mean±standard deviation, frequency (percentage) for continuous and categorical variables, respectively. Chi- square, Fisher's exact test, Mann –Whitney U test, and Independent samples t-test were used to evaluate differences between groups. Multiple logistic regression analysis was used to identify the factors affecting the continuity of prophylaxis application. Variables with p-values less than 0.20 in univariate analyses were selected as candidate variables for the multiple model. The multiple logistic regression model was initially constructed using the Forward (LR) method, and clinically significant variables were then added to the final model using the Enter method, and odds ratios were adjusted. The mean duration of Vitamin

D and Iron prophylaxis was analyzed using the Kaplan-Meier test.

A statistical significance level of $p<0.05$ was accepted.

Results

A total of 200 parents and their children were included in the study. The average age of the children was 34.34 months (min=12, max=60). The average age of the mothers was 31.74±4.94, while the average age of the fathers was 34.40±6.14. Of the participants, 42% (n=84) had one child, and 37.5% (n=75) had two children. The highest number of children owned was five, accounting for 1% (n=2) of the participants. Other demographic data of the participants are provided in Table 1.

Table 1. The demographic data of the participants

	n	%
Infant Gender		
Male	108	54
Female	92	46
Mother's Employment Status		
Full-time employed	72	36
Part-time employed	23	11.5
Not employed	105	52.5
Father's Employment Status		
Full-time employed	161	80.5
Part-time employed	25	12.5
Not employed	14	7
Mother's Education Level		
Illiterate/Primary Education	46	23
High School	51	25.5
University and above	103	51.5
Father's Education Level		
Illiterate/Primary Education	30	15
High School	63	31.5
University and Above	107	53.5
Number of Children		
One	84	42
Two or more	116	58

At least one month of vitamin D supplementation was received by 98.5% (n=197) of the children, and 94% (n=188) received iron prophylaxis. The rate of taking vitamin D for the recommended duration of 12 months dropped to 82.5% (n=165), whereas the rate of taking iron for 8 months was 75.5% (n=151). Data related to the participants' vitamin D and iron prophylaxis status are presented in Table 2.

Table 2. Participants' status on receiving vitamin D and iron prophylaxis

	n	%
Receiving Vitamin D Prophylaxis		
Yes	197	98.5
No	3	1.5
Receiving Vitamin D Prophylaxis for an Adequate Duration		
Yes	165	82.5
No	35	17.5
Frequency of Vitamin D Intake		
Daily	179	89.5
Other	18	9
Form of Vitamin D		
Drops	191	97
Other	6	3
Receiving Iron Prophylaxis		
Yes	188	94
No	12	6
Receiving Iron Prophylaxis for an Adequate Duration		
Yes	151	75.5
No	49	24.5
Frequency of Iron Intake		
Daily	171	91
Other	17	9
Form of Iron		
Drops	171	91
Other	17	9
Reason for Not Receiving Prophylaxis		
Not recommended	7	3.5
Adverse effects	3	1.5
Other	4	2

A pediatrician recommended vitamin D and iron prophylaxis to 33% (n=66) of the participants, a family physician to 49% (n=98), and auxiliary health personnel to 3% (n=6) only, whereas 15% (n=32) were advised by more than one health professional (p=0.008 for vitamin D prophylaxis; p=0.014 for iron prophylaxis). The status of vitamin D and iron prophylaxis intake and associated factors are presented in Table 3 and Table 4, respectively.

Table 3. Status of infants receiving vitamin D prophylaxis

	Adequate Use of Vitamin D						
	No		Yes				
	n	%	n	%	df	χ^2	p*
Mother's Employment Status							
Full-time employed	12	16.7	60	83.3	2	0.525	0.769
Part-time employed	3	13	20	87			
Not employed	20	19	85	81			
Mother's Education Level							
Illiterate/Primary Education	7	15.2	39	84.8	2	0.821	0.663
High School	11	21.6	40	78.4			
University and above	17	16.5	86	83.5			
Father's Employment Status							
Full-time employed	28	17.4	133	82.6	2	0.190	0.909
Part-time employed	4	16	21	84			
Not employed	3	21.4	11	78.6			
Father's Education Level							
Illiterate/Primary Education	4	13.3	26	86.7	2	1.526	0.466
High School	14	22.2	49	77.8			
University and above	17	15.9	90	84.1			
Infant Gender							
Male	18	16.7	90	83.3	1	0.113	0.737
Female	17	18.5	75	81.5			
Number of Children							
One	16	19	68	81	1	0.240	0.624
Two or more	19	16.4	97	83.6			
Administering Iron Supplements to Infants							
Yes	29	15.4	159	84.6			**0.008**
No	6	50	6	50			
Concern About Infants' Health							
Yes	11	33.3	22	66.7	1	6.862	**0.009**
No	24	14.4	143	85.6			

* Fisher exact test

Table 4. Status of infants receiving iron prophylaxis

	Adequate Use of Iron						
	No		Yes				
	n	%	n	%	df	χ^2	p*
Mother's Employment Status							
Full-time employed	18	25	54	75	2	0.722	0.697
Part-time employed	4	17.4	19	82.6			
Not employed	27	25.7	78	74.3			
Mother's Education Level							
Illiterate/Primary Education	7	15.2	39	84.8	2	2.784	0.249
High School	14	27.5	37	72.5			
University and above	28	27.2	75	72.8			
Father's Employment Status							
Full-time employed	42	26.1	119	73.9	2	1.267	0.531
Part-time employed	4	16	21	84			
Not employed	3	21.4	11	78.6			
Father's Education Level							
Illiterate/Primary Education	3	10	27	90	2	4.532	0.104
High School	19	30.2	44	69.8			
University and above	27	25.2	80	74.8			
Infant Gender							
Male	30	27.8	78	72.2	1	1.364	0.243
Female	19	20.7	73	79.3			
Number of Children							
One	21	25	63	75	1	0.020	0.889
Two or more	28	24.1	88	75.9			
Administering a Vitamin D Supplement to an Infant							
Yes	46	23.4	151	76.6			**0.014**
No	3	100	0	0			
Concern About Infants' Health							
Yes	12	36.4	21	63.6	1	3.007	0.083
No	37	22.2	130	77.8			

*Fisher exact test

The multivariable logistic regression analyses revealed that parental concern about their infants' health significantly impacted the continuity of vitamin D prophylaxis (p=0.010). Specifically, children whose parents expressed concern about their health were more likely to adhere to the recommended supplementation duration (Table 5).

As shown in the Kaplan–Meier survival curve, the average duration of vitamin D prophylaxis intake was 13.025±0.409 months, whereas the average iron prophylaxis intake duration was 9.471±0.344 months (Figure 1).

Table 5. Results of multivariable logistic regression analysis for vitamin D and iron prophylaxis

					%95 C.I. for Odds Ratio	
Vitamin D	**Odds Ratio**	**B**	**S.E.**	**p**	**Lower**	**Upper**
Mother's Education Level				0.670		
Illiterate/Primary Education	Ref					
High School	0.656	-0.421	0.546	0.440	0.225	1.913
University and above	0.928	-0.075	0.512	0.886	0.334	2.576
Number of Children				0.446		
One	Ref					
Two or more	0.734	-0.309	0.406	0.446	.332	1.625
Concern About Infants' Health				**0.010**		
Yes	Ref					
No	3.061	1.119	.436	0.010	1.302	7.196
					%95 C.I. for Odds Ratio	
Iron	**Odds Ratio**	**B**	**S.E.**	**p**	**Lower**	**Upper**
Mother's Education Level				0.757		
Illiterate/Primary Education	Ref					
High School	0.667	-0.405	0.572	0.479	0.217	2.047
University and above	0.718	-0.332	0.535	0.535	0.718	2.047
Number of Children				.954		
One	Ref					
Two or more	1.025	0.025	0.432	0.954	0.439	2.393
Concern About Infants' Health						
Yes	Ref			0.631		
No	1.308	0.269	0.560	0.631	0.436	3.923

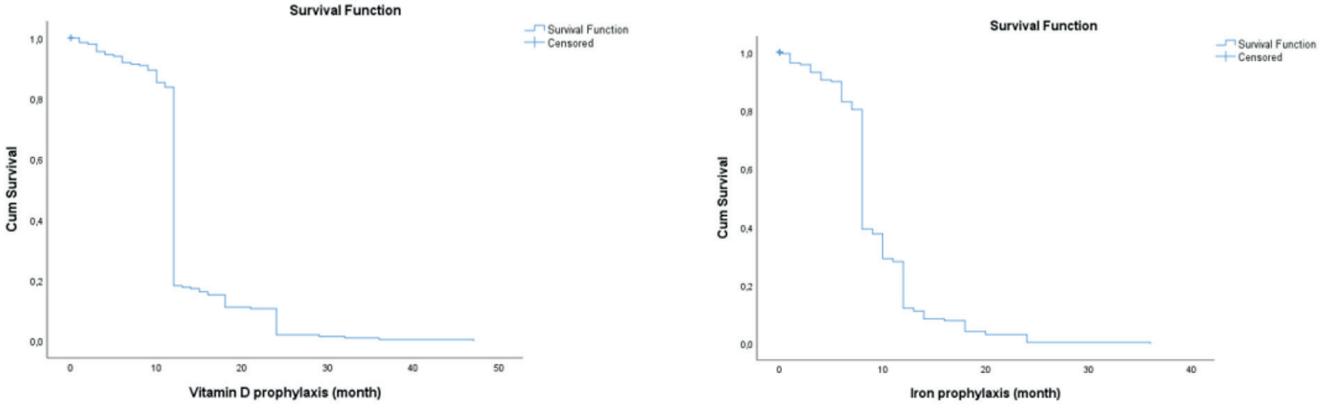

Figure 1. Survival duration of vitamin D and iron prophylaxis

Discussion

This study examined the status, prevalence, and associated factors of vitamin D and iron prophylaxis intake in the Erzincan province. These findings indicate high levels of vitamin D and iron supplementation. However, the decrease in the proportion of children receiving prophylaxis for the recommended duration suggests some challenges in the sustainability of these programs.

After the "Iron-like Turkey" campaign, a study conducted to assess the situation found that 68.8% of 1589 children received iron prophylaxis.[8] Similar rates have been observed in other national studies as well.[7,9] In a study conducted with 1002 children in İzmir, Türkiye, it was observed that 77% of the children received vitamin D prophylaxis, whereas the rates of adherence for the recommended duration dropped to 57%.[10] These findings indicate that iron and vitamin D prophylaxis are widely adopted across Türkiye; however, the effectiveness of these programs may be limited due to low adherence rates for the recommended durations. In a global context, similar adherence issues have been reported. A study in the United Kingdom highlighted that despite high initial compliance with vitamin D supplementation programs, adherence to recommended durations declined significantly due to lack of parental awareness and inconsistent follow-up by healthcare providers.[11] Similarly, a study in Canada found that while 80% of infants were initially given vitamin D supplementation, only about half continued for the recommended duration, with parental forgetfulness and misconceptions about dietary sufficiency being major barriers.[12] This situation underscores the need for further research on the feasibility and sustainability of prophylaxis programs. Moreover, enhancing awareness and education programs within target groups to increase and sustain the intake of these supplements is crucial.

Iron and vitamin D play a critical role in the growth and development of children, and deficiencies can lead to various health issues. The concurrent implementation of iron and vitamin D prophylaxis can create synergistic effects on child health; hence, prophylaxis programs often address these two essential micronutrients comprehensively.[13,14] Our study revealed a tendency for children receiving iron prophylaxis to also receive vitamin D prophylaxis, and vice versa. This correlation has been observed in other studies as well. A recent systematic review on micronutrient supplementation found that integrating vitamin D and iron supplementation into a single public health program increased overall adherence and effectiveness.[15] Similarly, a study conducted in Nepal found that children who adhered to iron and zinc supplementation were also more likely to adhere to vitamin A supplementation, suggesting that once parents commit to one prophylaxis measure, they are more likely to adopt others as well.[16] This relationship could be attributed to increased access to healthcare services and health awareness. The adoption of one recommendation by health professionals is likely to lead to the acceptance of another. These findings underline the necessity of an integrated approach to iron and vitamin D prophylaxis, offering a scientific basis for the development of related health policies and intervention programs.

Our research suggests that parents without concerns about their child's health may be more inclined to use iron and vitamin D prophylaxis. This could stem from a strong belief among parents regarding the benefits of prophylaxis practices for supporting their children's healthy growth and development. In other words, parents might view the use of prophylaxis as an indicator of their children's existing health, thereby harboring fewer health-related concerns. A study in Germany found similar behavioral patterns among parents, where those with higher health literacy were more likely to adhere to micronutrient supplementation

guidelines for their children.[17] This finding aligns with existing literature suggesting that parental beliefs, health literacy, and trust in medical guidance are critical determinants of adherence to micronutrient supplementation in children.[18] This finding reflects general confidence in the efficacy of prophylaxis programs and could signify proactive behaviors by parents in maintaining child health.[19]

Although our study did not find statistically significant associations between socio-demographic factors and adherence to vitamin D and iron supplementation, existing literature suggests that certain barriers may still negatively influence prophylaxis practices. For instance, adverse effects such as gastrointestinal discomfort are commonly reported reasons for early discontinuation of iron supplements in other studies.[20] Furthermore, inadequate counseling, inconsistent follow-up, and limited understanding of the long-term benefits of supplementation have been associated with poor adherence in various contexts.[11] While these factors did not reach significance in our cohort, they remain critical considerations, particularly in settings with lower health literacy or limited healthcare access. Therefore, continued efforts to address these potential barriers—through clearer communication, follow-up systems, and parent-targeted education—may help enhance the effectiveness of national supplementation programs. Consequently, health professionals and policymakers should develop strategies that reduce parental health concerns and encourage participation in prophylaxis programs. Integrating digital health solutions, such as mHealth apps and SMS reminders, telehealth programs, AI-driven digital platforms can enhance adherence to prophylaxis programs by providing real-time supplementation reminders, educational content, and direct communication with healthcare providers.[11,17,19]

Limitations of the Study

Acknowledging the limitations of our study and interpreting the findings considering these limitations are crucial. For instance, because of the cross-sectional design of the study, it is not possible to draw definitive conclusions about cause– effect relationships. Furthermore, relying on self-reported data from participants introduces the potential for reporting bias and recall errors. Therefore, caution should be exercised when extrapolating our findings to the general population.

Conclusion

This study examined the status, prevalence, and associated factors of vitamin D and iron prophylaxis intake in the Erzincan province. The findings demonstrate that demographic characteristics (such as the educational level of parents, employment status, number of children, and infant gender) do not significantly influence vitamin D and iron prophylaxis intake. Moreover, the high rates of vitamin D and iron prophylaxis intake reflect the success of health policies and childhood prophylaxis programs in Türkiye. However, the low rates of adherence to the recommended durations highlight the potential challenges in the sustainability and continuity of these programs. Considering this study's findings, various recommendations can be made for more effective planning and implementation of health policies and prophylaxis programs. Health education and awareness campaigns could help increase participation rates by providing parents with more information on the importance of prophylaxis programs. Additionally, developing strategies to enhance the feasibility and accessibility of prophylaxis programs could play a critical role in ensuring program continuity.

Ethical approval

This study has been approved by the Erzincan Binali Yıldırım University Clinical Research Ethics Committee (approval date 21.09.2023, number 2023-16/10). Written informed consent was obtained from the participants.

Author contribution

The authors declare contribution to the paper as follows: Study conception and design: EG, SH, SE, HÇ ; data collection: SE, AÖ, BK; analysis and interpretation of results: EG, SH, HÇ; draft manuscript preparation: EG, SE. All authors reviewed the results and approved the final version of the article.

Source of funding

The authors declare the study received no funding.

Conflict of interest

The authors declare that there is no conflict of interest.

References

1. Amrein K, Scherkl M, Hoffmann M, et al. Vitamin D deficiency 2.0: an update on the current status worldwide. Eur J Clin Nutr. 2020;74:1498-1513. **[Crossref]**
2. Cashman KD. Vitamin D deficiency: defining, prevalence, causes, and strategies of addressing. Calcif Tissue Int. 2020;106:14-29. **[Crossref]**
3. Lozoff B, Georgieff MK. Iron deficiency and brain development. Semin Pediatr Neurol. 2006;13:158-65. **[Crossref]**
4. Pasricha SR, Tye-Din J, Muckenthaler MU, Swinkels DW. Iron deficiency. Lancet. 2021;397:233-248. **[Crossref]**
5. World Health Organization (WHO), UNICEF. Global strategy for infant and young child feeding. Geneva: WHO; 2003. Available at: https://www.who.int/publications/i/item/9241562218
6. Hatun Ş, Ozkan B, Bereket A. Vitamin D deficiency and prevention: Turkish experience. Acta Paediatr. 2011;100:1195-9. **[Crossref]**
7. Karapınar TH, Bildik O, Köker SA, et al. The evaluation of taking iron supplements in children aged 6 months-2 years. The Journal of Pediatric Research. 2017;4:156-159. **[Crossref]**
8. Yalçın SS, Tezel B, Yurdakök K, et al. A community-based iron supplementation program, "Iron-Like Turkey", and the following prevalence of anemia among infants aged 12-23 months. Turk J Pediatr. 2013;55:16-28.
9. Çullas-İlarslan NE, Günay F, İleri DT, Elhan AH, Ertem M, Arsan S. Investigation of the frequency of iron insufficiency among infants in a population in which routine iron supplementation is implemented. Turk J Pediatr. 2018;60:22-31. **[Crossref]**
10. Koc F, Halicioglu O, Sutcuoglu S, Asik Akman S, Aksit S. Vitamin D supplementation during the first two years of life in Izmir, Turkey. Minerva Pediatr. 2014;66:141-146.
11. Moon RJ, Davies JH, Cooper C, Harvey NC. Vitamin D, and maternal and child health. Calcif Tissue Int. 2020;106:30-46. **[Crossref]**
12. Gallo S, Jean-Philippe S, Rodd C, Weiler HA. Vitamin D supplementation of Canadian infants: practices of Montreal mothers. Appl Physiol Nutr Metab. 2010;35:303-309. **[Crossref]**
13. Grindulis H, Scott PH, Belton NR, Wharton BA. Combined deficiency of iron and vitamin D in Asian toddlers. Arch Dis Child. 1986;61:843-848. **[Crossref]**
14. Kan A, Sayli T. Effects of vitamin D prophylaxis on oral iron treatments of iron deficiency anemia. Minerva Pediatr (Torino). 2022;74:761-765. **[Crossref]**
15. Prentice A, Schoenmakers I, Jones KS, Jarjou LMA, Goldberg GR. Vitamin D deficiency and its health consequences in Africa. Clin Rev Bone Miner Metab. 2009;7:94-106. **[Crossref]**
16. Freitas BACD, Lima LM, Moreira MEL, et al. Micronutrient supplementation adherence and influence on the prevalences of anemia and iron, zinc and vitamin A deficiencies in preemies with a corrected age of six months. Clinics (Sao Paulo). 2016;71:440-8. **[Crossref]**

17. Schwarzenberg SJ, Georgieff MK, COMMITTEE ON NUTRITION. Advocacy for improving nutrition in the first 1000 days to support childhood development and adult health. Pediatrics. 2018;141:e20173716. **[Crossref]**

18. Hoffmann MR, Alzaben AS, Enns SE, Marcon MA, Turner J, Mager DR. Parental health beliefs, socio-demographics, and healthcare recommendations influence micronutrient supplementation in youth with celiac disease. Can J Diet Pract Res. 2016;77:47-53. **[Crossref]**

19. Beatton T, Moores CJ, Sarkar D, Sarkar J, Silva Goncalves J, Vidgen HA. Do parental preferences predict engagement in child health programs? Health Econ. 2021;30:2686-2700. **[Crossref]**

20. Tosyali M, Koç F. Adherence to iron supplementation during the first year of life infants in Izmir, Turkey. Medicine (Baltimore). 2024;103:e38926. **[Crossref]**

Turk J Fam Pract 2025;29(2):70-78
DOI: 10.54308/TJFP.2025.815

Research Article

Evaluation of blood pressure measurement rates among outpatients presenting to a university hospital

Rumeysa Betül Kaya[1], Elif Ateş[1], Ömer Faruk Özceylan[2]

[1]Department of Family Medicine, Faculty of Medicine, Karadeniz Technical University, Trabzon, Türkiye
[2]Family Medicine, Araklı Bayram Halil State Hospital, Trabzon, Türkiye

ABSTRACT

Objective: Hypertension is an important health problem that affects the entire population and causes mortality and morbidity. Although there are screening recommendations in different diagnosis and treatment guidelines, there are studies showing that blood pressure measurement is skipped during examination in practice. This study aimed to evaluate the blood pressure measurement status in adults applying to different outpatient clinics in our hospital.

Methods: In our cross-sectional-analytical study, the data of patients who applied to the Karadeniz Technical University Farabi Hospital polyclinics for any reason between 01.01.2023 and 01.01.2024 were scanned retrospectively from the hospital information system. Patients who were over 18 years of age with their anamnesis taken and physical examination information completed were included in the study. Patients selected by random sampling method from 24 different branch clinics were included in the study. A sample of 215 people was calculated from each of the clinics. Patients' age, gender, chronic disease status, medication use information, and blood pressure measurement data were collected.

Results: The median age of the 5160 participants was 48 (IQR: 32-62) years. 58.4% (n=3015) of the participants were women. 13.8% of the participants had their blood pressure measured during their outpatient clinic examination. While the departments that performed the most measurements were nephrology, cardiology and general internal medicine, it was observed that none of the patients had their blood pressure measured in ten outpatient clinics, including oncology and neurosurgery. 49.7% (n=354) of the individuals whose blood pressure was measured already had hypertension diagnosis. When blood pressure staging was done according to the blood pressure measurement results, 46.1% (n=328) had increased blood pressure. 77.3% of individuals whose blood pressure was measured in the family practice outpatient clinic did not have a predetermined hypertension diagnosis.

Conclusion: The results reveal that the rate of blood pressure measurement, which is a part of the physical examination in outpatient clinics, is much lower than it should be. In order to ensure early diagnosis and blood pressure control of a chronic disease such as hypertension, which is common in society and can have serious complications, every polyclinic visit of the patients should be considered as an opportunity to measure blood pressure.

Keywords: Blood pressure, hypertension, blood pressure determination, screening, family practice

✉ Rumeysa Betül Kaya ▪ rbetulkaya93@gmail.com
Received: 24.10.2024 **Accepted:** 03.05.2025 **Published:** 27.06.2025

Introduction

Hypertension is defined as a condition where systolic blood pressure (SBP) is ≥ 140 mmHg and/or diastolic blood pressure (DBP) is ≥ 90 mmHg based on repeated clinic blood pressure measurements, according to the European Society of Cardiology (ESC/ESH) and many other guidelines.[1-4] Hypertension is a significant chronic disease affecting the entire population, associated with multifactorial problems, and poses a substantial burden on health and economics.[4] The global economic burden of high blood pressure is estimated to be approximately $370 billion, accounting for about 10% of global health expenditures.[5] The Global Burden of Disease analysis in 2017 identified high systolic blood pressure as the cause of death for 10.4 million individuals.[6] According to the Turkish Statistical Institute (TURKSTAT) evaluation of mortality statistics for 2022, deaths due to circulatory system diseases ranked first at 35.4%, with hypertension-related deaths constituting 9.9% of circulatory system deaths.[7] The PURE (Prospective Urban Rural Epidemiology) study conducted in 17 countries across five continents showed a prevalence of hypertension of 40.8%, particularly rising to 53.3% among individuals over 50 years of age. It was found that 46.5% of participants with hypertension were aware of their diagnosis, with 87.5% of those aware receiving pharmacological treatment, and only 32.5% of those treated having their blood pressure under control.[8] In Türkiye, the PatenT2 study conducted in 2012 found a hypertension prevalence of 30.3%[9], while the TURDEP-II study conducted in 2013 reported a prevalence of 31.4%.[10] The PURE Turkey study reported a prevalence of hypertension at 41.1%.[11] According to the PatenT2 study, awareness of hypertension in Türkiye was 54%, the proportion of those receiving treatment was 47.4%, and the proportion of those with controlled blood pressure was 28.7%.[9]

A study published in 2022 indicated that the average number of annual examinations performed in secondary and tertiary care over the last five years in Türkiye was approximately 297 million.[12] Although blood pressure measurement is a basic and easily applicable method in hypertension screening, there are studies reporting that it is not performed regularly in health institutions. However, according to the PatenT2 study, it was found that blood pressure measurements were not performed at all for 15.5% of individuals who applied to healthcare institutions for any reason.[9] In a study conducted at a university hospital in Brazil, it was observed that blood pressure measurements were not conducted in two-thirds of outpatient visits.[13] Despite the recommendations for hypertension screening in many diagnosis and treatment guidelines and the widespread prevalence of hypertension in the community, the rate of blood pressure measurement is surprisingly low. The aim of this study is to evaluate the blood pressure measurement rates of patients presenting to different outpatient clinics.

Materials and Methods

Study design and ethical approval

This cross-sectional analytical study was conducted following approval from the Chief Physician of Farabi Hospital, Faculty of Medicine, Karadeniz Technical University (Approval No: 48814514-299), and the Scientific Research Ethics Committee of Karadeniz Technical University Faculty of Medicine (Approval No: 24237859-288).

Study population

The study population consisted of adults aged 18 years and older who applied to 24 different outpatient clinics of Karadeniz Technical University Farabi Hospital between January 1, 2023, and January 1, 2024. These departments included: family medicine, dermatology, general internal medicine, endocrinology, gastroenterology, nephrology, hematology, medical oncology, immunology–rheumatology, cardiology, pulmonary diseases, infectious diseases, neurology, ophthalmology, physical therapy and rehabilitation, psychiatry, otolaryngology, orthopedics, obstetrics and gynecology, cardiovascular surgery, neurosurgery, general surgery, thoracic surgery, and plastic and reconstructive surgery.

Patients with incomplete medical history or physical examination notes were excluded. Additionally, the anesthesiology and urology departments were excluded due to the absence of patient documentation in the hospital information system. If a patient had multiple visits to the same clinic, only the most recent visit was included.

Data collection

Medical records were reviewed retrospectively via the hospital information system. Collected variables included age, sex, chronic disease status, medication use, and blood pressure (BP) measurement status during the patient's last outpatient visit. For those whose BP was measured, values were recorded, and hypertension staging was performed based on the 2019 Turkish Hypertension Consensus Report: normal blood pressure was defined as systolic BP <120 mmHg and diastolic BP <80 mmHg; elevated blood pressure as systolic BP 120–129 mmHg and diastolic BP <80 mmHg; hypertension stage 1 as systolic BP ≥140 mmHg or diastolic BP ≥90 mmHg; and hypertension stage 2 as systolic BP ≥160 mmHg or diastolic BP ≥100 mmHg.[4]

Sample size calculation

Based on the findings of a previous pilot study reporting a 27.3% BP measurement rate[14], the minimum required sample size was calculated as 215 people for each branch outpatient clinic, 5160 people in total from 24 outpatient clinics, with a 90% confidence level, 5% margin of error, and a type I error of 0.05. The calculation was performed using OpenEpi Version 3. A total of 5160 patients—215 from each of the 24 outpatient clinics—were included in the study over a 12-month period.

Statistical analysis

Statistical analysis were conducted using IBM SPSS Statistics software. Numerical data were tested for normality using the Kolmogorov–Smirnov test. As the data did not follow a normal distribution, continuous variables were presented as median and interquartile range (IQR), while categorical variables were expressed as frequencies and percentages.

The Chi-square test or Fisher's exact test was used for comparisons of categorical variables. Binary logistic regression analysis was performed to identify factors associated with BP measurement. Age, sex, presence of chronic disease, and hypertension diagnosis were included as independent variables, and the Enter method was applied. Odds ratios (OR) with 95% confidence intervals (CI) were reported. A p-value of less than 0.05 was considered statistically significant.

Results

Of the participants included in the study, 58.4% (n=3015) were female, with a median age of 48 (IQR: 32-62) years. 63.6% of the participants (n=3283) had at least one chronic disease. Those

Table 1. Characteristics of the participants

		n	%
Gender	Female	3015	58.4
	Male	2145	41.6
Chronic Disease	Yes	3283	63.6
	No	1877	36.4
Hypertension	Yes	1271	38.7
	No	2012	61.3
Regular Medication Use	Yes	3097	60
	No	2063	40

diagnosed with hypertension constituted 38.7% (n=1271) of participants with chronic diseases. 60% of participants (n=3097) were constant medication users. The characteristics of the participants are shown in Table 1.

It was observed that blood pressure was measured in 13.8% (n=712) of the participants during their outpatient examination. The median value for systolic blood pressure was found to be 120 mmHg (IQR: 110-140), and for diastolic blood pressure, it was 80 mmHg (IQR: 70-85). The departments with the highest rates of blood pressure measurement were nephrology (93%, n=200), cardiology (74.4%, n=160), general internal medicine (42.3%, n=91), endocrinology (39.5%, n=85), and family medicine (34.9%, n=75). No blood pressure measurements were found in any of the scanned patients in neurosurgery, dermatology, physical therapy and rehabilitation, ophthalmology, cardiovascular surgery, otolaryngology, oncology, orthopedics, plastic surgery, and psychiatry departments. The status of blood pressure measurement by specialty clinics is shown in Table 2.

In the obstetrics and gynecology clinic, 44.7% (n=96) of the 215 patients were pregnant. Only 1% (n=1) of pregnant patients had their blood pressure measured. Among those whose blood

Table 2. Blood pressure measurement status by departments

The last outpatient clinic visited	Was blood pressure measured?				p
	Yes		No		
	n	%	n	%	
Nephrology	200	93	15	7	<0.001
Cardiology	160	74.4	55	25.6	
General Internal Medicine	91	42.3	124	57.7	
Endocrinology	85	39.5	130	60.5	
Family Medicine	75	34.9	140	65.1	
Hematology	66	30.7	149	69.3	
Neurology	17	7.9	198	92.1	
Infectious Diseases	7	3.3	208	96.7	
Immunology-Rheumatology	4	1.9	211	98.1	
Thoracic Surgery	2	0.9	213	99.1	
Pulmonary Diseases	2	0.9	213	99.1	
Gastroenterology	1	0.5	214	95.5	
General Surgery	1	0.5	214	95.5	
Obstetrics and Gynecology	1	0.5	214	95.5	
Others *	0	0	2150	100.0	
Total	712	13.8	4448	86.2	

*Neurosurgery, dermatology, physical therapy and rehabilitation, ophthalmology, cardiovascular surgery, otolaryngology, oncology, orthopedics, plastic surgery, and psychiatry departments

pressure was measured, 49.7% (n=354) had a known diagnosis of hypertension. 11% (n=39) of patients diagnosed with hypertension had normal blood pressure based on the measurement results. Among those without a known diagnosis of hypertension, only 31.8% (n=114) had normal blood pressure measurements. When staging was performed based on the measurement results for individuals whose blood pressure was measured during their outpatient examination, 46.1% (n=328) had elevated blood pressure. The staging results based on blood pressure measurements are shown in Table 3.

Among all participants, 17.6% (n=577) of those with any known chronic disease and 27.9% (n=354) of those with known hypertension had their blood pressure measured during the examination (Table 4). In the nephrology clinic, 94.2% (n=129) of hypertensive patients had their blood pressure measured, 74.4% (n=93) in cardiology, and 73.9% (n=17) in family medicine, while no blood pressure measurements were recorded for hypertensive patients in some clinics. The status of blood pressure measurement among hypertensive patients by their last visited department is shown in Table 5.

In the family medicine clinic, 77.3% of individuals whose blood pressure was measured did not have a known diagnosis of hypertension. In the nephrology clinic, 64.5% of the measured patients had known hypertension, and in the cardiology clinic, 58.1% did (Figure 1).

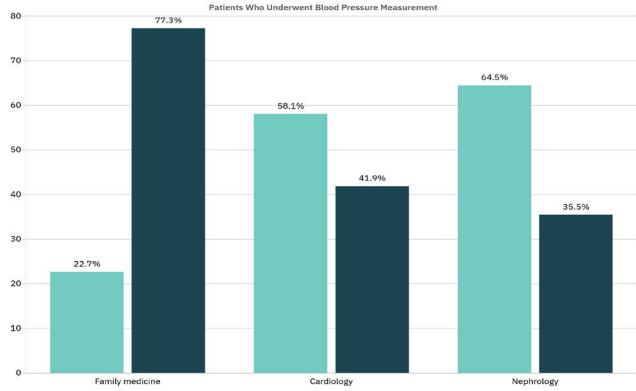

Figure 1. The status of having a current hypertension diagnosis among patients who underwent blood pressure measurement in the family medicine, cardiology, and nephrology departments.

Table 3. Blood pressure staging based on measurement results

			Normal	Elevated	Stage 1	Stage 2	Total
Hypertension	Yes	n	39	152	95	68	354
		%	11.0	42.9	26.8	19.2	100.0
	No	n	114	176	43	25	358
		%	31.8	49.2	12.0	7.0	100.0
Total		n	153	328	138	93	712
		%	21.5	46.1	19.4	13.1	100.0

Table 4. Blood pressure measurement status according to the characteristics of the participants

Total			Blood Pressure Measured		p
			n	%	
Chronic Disease	No	1877	135	7.2	<0.001
	Yes	3283	577	17.6	
Hypertension	No	3889	358	9.2	<0.001
	Yes	1271	354	27.9	
Gender	Female	3015	370	12.3	<0.001
	Male	2145	342	15.9	

Table 5. Blood pressure measurement status of hypertensive patients by departments

Hypertension		Blood Pressure Measurement		Total
		Yes n (%)	No n (%)	
The Last Department Visited	Nephrology	129 (94.2)	8 (5.8)	137
	Cardiology	93 (74.4)	32 (25.6)	125
	Family Medicine	17 (73.9)	6 (26.1)	23
	General Internal Medicine	36 (64.3)	20 (35.7)	56
	Endocrinology	43 (53.1)	38 (46.9)	81
	Hematology	23 (31.1)	51 (68.9)	74
	Neurology	10 (11.5)	77 (88.5)	87
	Infectious Diseases	2 (5.0)	38 (95.0)	40
	Pulmonary Diseases	1 (1.3)	77 (98.7)	78
	Neurosurgery	0 (0)	7 (100)	7
	Dermatology	0 (0)	13 (100)	13
	Physical Therapy & Rehabilitation	0 (0)	15 (100)	15
	Gastroenterology	0 (0)	56 (100)	56
	General Surgery	0 (0)	26 (100)	26
	Thoracic Surgery	0 (0)	56 (100)	56
	Ophthalmology	0 (0)	70 (100)	70
	Immunology-Rheumatology	0 (0)	53 (100)	53
	Obstetrics & Gynecology	0 (0)	11 (100)	11
	Cardiovascular Surgery	0 (0)	56 (100)	56
	Otolaryngology	0 (0)	26 (100)	26
	Medical Oncology	0 (0)	72 (100)	72
	Orthopedics	0 (0)	29 (100)	29
	Plastic & Reconstructive Surgery	0 (0)	54 (100)	54
	Psychiatry	0 (0)	26 (100)	26
	Total	354 (27.9)	917 (72.1)	1271

As a result of logistic regression analysis, the factors associated with blood pressure measurement status were found to be the presence of a chronic disease ($p<0.01$), having a diagnosis of hypertension ($p<0.01$), and being male ($p<0.01$). Having a diagnosis of hypertension increased the likelihood of blood pressure measurement by 3.20 times (95% CI: 2.61-3.92), having a chronic disease by 1.64 times (95% CI: 1.30-2.08), and being male by 1.35 times (95% CI: 1.15-1.59). The odds ratios and confidence intervals for blood pressure measurement status according to variables are shown in Table 6.

Discussion

This study revealed that blood pressure (BP) was not measured in over three-quarters of outpatient visits. Despite the high burden of hypertension and its associated complications, this finding highlights a significant gap in routine clinical assessment. Departments with the highest measurement rates were nephrology, cardiology, and general internal medicine, while several clinics-including neurosurgery and oncology-recorded no BP measurements at all.

Table 6. Results of binary logistic regression analysis regarding factors that may affect blood pressure measurement status

Variables	Odds Ratio	95% CI	p
Chronic Disease	1.64	1.30-2.08	<0.001
Hypertension Diagnosis	3.20	2.61-3.92	<0.001
Age	0.99	0.99-1.00	0.447
Gender	1.35	1.15-1.59	<0.001

Approximately two-thirds of the participants had at least one chronic disease, and one-third had a known diagnosis of hypertension-similar to the 30.3% prevalence reported in the PatenT2 study.[9] However, only one-third of hypertensive patients in our sample had their BP measured. This pattern is consistent with earlier studies, which also reported low BP measurement rates in both primary care[15] and hospital settings.[13] These findings emphasize that BP monitoring is often overlooked, even in patients at high risk.

Among those measured, fewer than half had normal BP values, suggesting both undiagnosed hypertension and inadequate control in treated patients. In a study conducted in China, less than half of those diagnosed with hypertension were aware of their condition, and only 7.2% of patients receiving antihypertensive treatment had controlled blood pressure.[16] These figures highlight the global gap in hypertension diagnosis and management, supporting the need for routine BP checks during outpatient visits for both detection and follow-up.

Particularly concerning was the finding that only 1% of pregnant women in obstetrics and gynecology clinics had their BP measured, despite national data from the U.S. showing that hypertension contributes to approximately 7% of maternal deaths, with 70% of these occurring postpartum.[17] Similarly, in oncology clinics, the insufficient of BP screening is problematic given evidence that hypertension is the most common comorbidity among cancer patients (38%).[18] Furthermore, a large cohort study involving over 577.000 adults found that elevated mean blood pressure was associated with an increased risk of cancer in men[19], underscoring the importance of BP monitoring all specialties.

While nephrology, cardiology, and family medicine demonstrated relatively higher measurement rates, these remain insufficient. In departments with low or absent screening, such as general surgery and psychiatry, this likely reflects a limited focus on conditions perceived as outside the specialty scope. Additionally, time constraints and the absence of support personnel may further contribute to the omission of routine BP checks.

Our results also suggest that physicians are more likely to measure BP in patients with known chronic illnesses, especially hypertension and diabetes, possibly due to perceived risk. However, this selective approach limits early detection efforts. Notably, about three-quarters of those measured in family medicine clinics had no prior hypertension diagnosis, yet many showed elevated values-highlighting missed opportunities for intervention.

Given that effective BP control remains low in national and international studies[11,19], it is clear that routine measurement is essential not only for diagnosis but also for monitoring treatment response. The variability in BP measurement across departments may be attributed to inconsistent clinical habits, documentation gaps, or institutional workflow issues. Despite being conducted in a university hospital, where clinic

personnel rotate frequently, the consistently low measurement rates point to systemic shortcomings.

This study has several limitations that should be acknowledged. First, as a single-center study conducted in a university hospital, the findings may not be generalizable to other healthcare settings with different institutional structures, patient populations, or clinical workflows. Second, the retrospective design relied on outpatient examination records, which may not fully capture clinical practices. Blood pressure may have been measured during some visits but not documented, leading to potential underestimation of actual measurement rates.

Third, due to the educational nature of the institution, outpatient clinic staff rotate periodically. This variability in personnel may have influenced the consistency of clinical practices, including blood pressure measurement frequency. Fourth, the study did not include qualitative data to explore the reasons behind the omission of blood pressure checks in certain departments. Factors such as physician attitudes, perceived relevance, time constraints, or systemic barriers remain unclear.

Despite these limitations, the large sample size and inclusion of diverse outpatient departments provide important insights into current clinical practices and emphasize the need for improved routine hypertension screening.

Conclusion

Only 13.8% of outpatients had their blood pressure measured, highlighting a missed opportunity for early detection of conditions like hypertension. Given its potential complications, routine blood pressure assessment should be an integral part of all outpatient visits.

That fewer than half of those measured had normal results suggests both undiagnosed cases and suboptimal control among known patients. Physicians-especially in primary care-must prioritize regular measurement, supported by education, favorable working conditions, and manageable patient loads. Employing assistant health staff in clinics may also enhance adherence.

This and future large-scale studies can help raise clinical awareness of hypertension's impact, identify gaps in current practice, and inform strategies to improve outcomes.

Ethical approval

This study has been approved by the Karadeniz Technical University Rectorate Faculty of Medicine Scientific Research Ethics Committee (approval date 09.05.2024, number 24237859-288). Written informed consent was obtained from the participants.

Author contribution

The authors declare contribution to the paper as follows: Study conception and design: RBK, EA; data collection: RBK, ÖFÖ; analysis and interpretation of results: RBK, ÖFÖ; draft manuscript preparation: RBK, EA. All authors reviewed the results and approved the final version of the article.

Source of funding

The authors declare the study received no funding.

Conflict of interest

The authors declare that there is no conflict of interest.

References

1. Williams B, Mancia G, Spiering W, et al. 2018 ESC/ESH Guidelines for the management of arterial hypertension. Eur Heart J. 2018;39:3021-3104. **[Crossref]**
2. Unger T, Borghi C, Charchar F, et al. 2020 International society of hypertension global hypertension practice guidelines. Hypertension. 2020;75:1334-1357. **[Crossref]**
3. Johnson KC, Whelton PK, Cushman WC, et al. Blood pressure measurement in SPRINT (Systolic Blood Pressure Intervention Trial). Hypertension. 2018;71:848-857. **[Crossref]**
4. Aydoğdu S, Güler K, Bayram F, et al. 2019 Turkish hypertension consensus report. Turk Kardiyol Dern Ars. 2019;47:535-546. **[Crossref]**
5. Beaney T, Schutte AE, Stergiou GS, et al. May measurement month 2019: the global blood pressure screening campaign of the international society of hypertension. Hypertension. 2020;76:333-341. **[Crossref]**
6. GBD 2017 Risk Factor Collaborators. Global, regional, and national comparative risk assessment of 84 behavioural, environmental and occupational, and metabolic risks or clusters of risks for 195 countries and territories, 1990-2017: a systematic analysis for the Global Burden of Disease Study 2017. Lancet. 2018;392:1923-1994. **[Crossref]**
7. Türkiye İstatistik Kurumu (TÜİK). Death and causes of death statistics, 2022. Available at: https://data.tuik.gov.tr/Bulten/Index?p=Death-and-Causes-of-Death-Statistics-2022-49679 (Accessed on Jun 12, 2024).
8. Chow CK, Teo KK, Rangarajan S, et al. Prevalence, awareness, treatment, and control of hypertension in rural and urban communities in high-, middle-, and low-income countries. JAMA. 2013;310:959-968. **[Crossref]**
9. Sengul S, Akpolat T, Erdem Y, et al. Changes in hypertension prevalence, awareness, treatment, and control rates in Turkey from 2003 to 2012. J Hypertens. 2016;34:1208-17. **[Crossref]**
10. Satman I, Omer B, Tutuncu Y, et al. Twelve-year trends in the prevalence and risk factors of diabetes and prediabetes in Turkish adults. Eur J Epidemiol. 2013;28:169-180. **[Crossref]**
11. Oğuz A, Telci Çaklılı Ö, Tümerdem Çalık B, PURE Investigators. The Prospective Urban Rural Epidemiology (PURE) study: PURE Turkey. Turk Kardiyol Dern Ars. 2018;46:613-623. **[Crossref]**
12. Beştemir A, Aydın H. 300 million patient examinations per year; evaluation of emergency and polyclinic services of 2nd and 3rd stage public health facilities in Turkey. Sakarya Med J. 2022;12:496-502. **[Crossref]**
13. Silva RP, Lima JW, Medeiros RP, et al. Blood pressure measurement in different outpatient clinics. Kidney Blood Press Res. 2010;33:235-239. **[Crossref]**
14. Özceylan ÖF, Set T. Polikliniklere başvuran hastaların kan basıncının ölçülme durumlarının değerlendirilmesi: bir kesitsel çalışma. 1. Karadeniz Aile Hekimliği Günleri, 2022 May 18, Samsun.
15. Özceylan ÖF, Set T. Polikliniklere başvuran hastaların kan basıncının ölçülme durumlarının değerlendirilmesi: bir kesitsel çalışma. Farabi Tıp Derg. 2023;2:6-10. **[Crossref]**
16. Lu J, Lu Y, Wang X, et al. Prevalence, awareness, treatment, and control of hypertension in China: data from 1·7 million adults in a population-based screening study (China PEACE Million Persons Project). Lancet. 2017;390:2549-2558. **[Crossref]**
17. Petersen EE, Davis NL, Goodman D, et al. Vital signs: pregnancy-related deaths, United States, 2011-2015, and strategies for prevention, 13 states, 2013-2017. MMWR Morb Mortal Wkly Rep. 2019;68:423-429. **[Crossref]**
18. Piccirillo JF, Tierney RM, Costas I, Grove L, Spitznagel EL. Prognostic importance of comorbidity in a hospital-based cancer registry. JAMA. 2004;291:2441-2447. **[Crossref]**
19. Stocks T, Van Hemelrijck M, Manjer J, et al. Blood pressure and risk of cancer incidence and mortality in the Metabolic Syndrome and Cancer Project. Hypertension. 2012;59:802-810. **[Crossref]**

Turk J Fam Pract 2025;29(2):79-86
DOI: 10.54308/TJFP.2025.830

Research Article

Measurement of critical thinking dispositions and comparison of critical approaches to information sources in medical residents: A cross-sectional study*

Fuat Görgün[1], Merthan Tunay[1]

[1]Adana City Training and Research Hospital, Adana, Türkiye

*This article is derived from Fuat Görgün's master's thesis entitled "Measurement of critical thinking disposition and comparison of critical approaches to information sources among resident physicians", conducted under the supervision of Merthan Tunay.

ABSTRACT

Objective: Critical thinking is the questioning of whether the information presented is real, reliable, evidence-based and unbiased. It provides a deeper understanding of the information and reaches the right conclusions by eliminating biases, erroneous and false data. Our study aimed to measure the critical thinking dispositions of medical residents and to determine the effect of this ability on the evaluation of the reliability of information sources.

Methods: Our cross-sectional study was conducted with the participation of 197 medical residents from different branches working in Adana City Training & Research Hospital after ethical approval. Sociodemographic data, results of the critical thinking disposition scale and data obtained after the evaluation of two different information sources using the DISCERN measurement tool were analyzed.

Results: Among the participants, 171 (86.8%) were working in clinical sciences and 26 (13.2%) were working in surgery. The mean score of the critical thinking disposition scale was 43.52±5.49. The mean scores of the Critical Openness subscale (27.51±3.65) and reflective skepticism (16.02±2.44) subscales were found to be significantly higher ($p<0.001$). There was no significant correlation between critical thinking dispositions and scores on the DISCERN measurement tool, which assesses the reliability and quality of information sources. ($p=0.550$)

Conclusions: In our study, although the critical thinking disposition scale scores of resident physicians were found to be high, no relationship was found on the evaluation of the quality of medical information sources. Critical thinking, which is a metacognitive ability that future health professionals should possess, should be further examined in medical education and supported by practical applications.

Keywords: Internship and residency, thinking, DISCERN questionnaire

✉ Merthan Tunay ▪ mtunay@yahoo.com

Received: 29.01.2025 **Accepted:** 09.05.2025 **Published:** 27.06.2025

Introduction

The concept of critical thinking has been extensively studied in both philosophy and education throughout history. Its most common use is the process of questioning whether the information presented is true, reliable, evidence-based and unbiased, and the process of analyzing, evaluating, interpreting and drawing logical conclusions.[1] Emphasizing the importance of critical thinking in physicians, the World Federation for Medical Education (WFME) has recognized critical thinking as one of the basic standards and competencies of medical education.[2] Similarly, the International Institute of Medical Education (IIME) has defined critical thinking as one of the seven main topics of knowledge, skills, professional attitudes and ethics that all physicians should possess.[3] According to WONCA (World Organization of Family Doctors), context, attitude and science competencies emphasize the importance of critical thinking.[4]

Healthcare providers should be able to evaluate the accuracy of information sources and distinguish fake news from real news, evaluate constantly renewed scientific data correctly and master up-to-date information, develop effective clinical skills and decide on the most appropriate diagnosis and treatment, They need to have a high level of critical thinking skills in order to analyze and solve complex medical cases by developing systematic problem solving skills, to identify problems in unexpected situations and complications, to cope with problems by evaluating solutions and reaching the most effective solution, to communicate effectively with patients and to involve patients in the treatment process. Inadequate critical thinking skills negatively affect medical care quality, professionalism and autonomy.

The necessity of critical thinking skills in physicians is obvious. Despite this reality, research on the critical thinking dispositions of resident physicians, including physicians from other branches, is very limited. In our study, we aimed to evaluate and understand the critical thinking dispositions of resident physicians; to examine the effect of sociodemographic variables and some personal attitudes we questioned on critical thinking dispositions. We aimed to measure the quality and reliability of the educational materials we offer and to compare the differences in evaluations that may occur with critical thinking dispositions, sociodemographic data and personal attitudes we questioned, and thus contribute to the development of strategies to improve the quality of health services.

Materials and Methods

Study type

Our cross-sectional study was conducted between 01 March 2024 and 15 May 2024 with 197 resident physicians working in Adana City Training and Research Hospital.

Study group

The population of the research consisted of 600 resident physicians working in Adana City Training & Research Hospital. In the calculation made with the Epi-Info statistical program, the sample size was found to be 195 people with 80% power, 95% confidence interval and 5% margin of error. Residents who agreed to participate and completed the consent form were included in the study, while participants who did not agree to participate or who later withdrew consent were excluded from the study.

Procedures

In our study, we used the Critical Thinking Disposition Scale (CTDS) developed by Sosu[5], Akın et al. conducted the validity and reliability of the Turkish version in 2015.[6] This scale consists of 11 questions. The answers are five-point Likert type (1=strongly disagree, 5=strongly agree). It has two subscales: reflective skepticism and critical

openness. Questions (1-7) determine the critical openness subscale, while the last four questions (8-11) determine the reflective skepticism subscale.

These two subscales aim to assess individuals' critical thinking processes from different perspectives. While Critical Openness emphasizes being open to new knowledge and change, Reflective Skepticism emphasizes evaluating existing knowledge in depth and critically. These two dimensions are used to determine whether an individual has both a flexible and analytical mindset.[6]

A training video titled "How to treat arthritis in the knee", which lasted 1 minute and 28 seconds, was shown on YouTube. The video was selected based on its accessibility to the general public, relevance to medical education, and position among the top search results for "knee arthritis treatment" on the platform. Participants watched the video individually, without any commentary or guidance, and were then instructed to evaluate it using the DISCERN measurement tool. Afterwards, a newspaper article titled "What are the harms of screen addiction in children?" was presented and similarly assessed with the DISCERN tool to measure the content quality of both educational resources. DISCERN is a short questionnaire that provides users with a valid and reliable way to quickly assess the quality of information about treatment options for a health problem. It was compiled by Deborah Charnock and Sasha Shepperd and published by Radcliffe Online.[7] The DISCERN measurement tool consists of three parts. The first eight questions assess reliability, while the last seven questions measure the quality of the data analyzed. The last section provides an overall quality rating based on the answers to the first two sections. Each of the 15 key questions of the first two sections represents a separate criterion. They are an essential characteristic or standard that is an important part of quality information on treatment options.

Statistical analysis

IBM SPSS version 24.0 statistical package program was used to analyze the data obtained. Descriptive statistics related to the socio-demographic characteristics of the participants were performed. Student's T-test was used for two-group comparisons of normally distributed parameters and Mann-Whitney U test was used for two-group comparisons of non-normally distributed parameters. For comparisons of numerical data between more than two groups, Kruskal Wallis test was used for those not showing normal distribution. Categorical data were compared by Chi-square test. Spearman's correlation analysis was used to evaluate the relationships between numerical data. p value <0.05 was considered statistically significant.

Ethical considerations

Before the study was started, written permissions were obtained from the administrations of the universities whose students were to be included in the study's sample. The approval of the Adana City Training and Research Hospital Clinical Research Ethics Committee dated 29/02/2024 and numbered 3195 was obtained.

Results

The participants scored 43.52±5.49 on the critical thinking disposition scale and 27.51±3.65 on the critical openness subscale and 16.02±2.44 on the reflective skepticism subscale (Table 1).

No statistically significant difference was found between the groups formed by the subscales of the critical thinking scale and sociodemographic findings [age groups (p=0.796, p=0.718), gender (p=0.577, p=0.613), marital status (p=0.346, p=0.970), specialty of practice (p=0.577, p=0.290), educational level of parents (p=0.781, p=0.537, p=0.876, p=0.993), economic level (p=0.838, p=0.422), academic career planning (p=0.880, p=0.553), membership to physician associations,

Table 1. Participants' Critical Thinking Disposition Scale data

	n	Mean±SD	Min-Max
Critical Thinking Disposition	197	43.52±5.49	17-55
Critical Openness		27.51±3.65	12-35
Reflective Skepticism		16.02±2.44	5-20

planning to work abroad (p=0.537, p=0.384), having the thought of resigning from the profession (p=0.690, p=0.365) and frequently used social media instrument (p=0.855, p=0.689)].

The newspaper article and YouTube video, which we presented to the resident physicians for reliability and quality assessment with the DISCERN measurement tool, were scored lower than the average in terms of reliability, quality and general quality assessment data, similar to the results of studies conducted with experts in the field in the literature (Table 2).

No significant relationship was found between the results of the resident physicians' assessment of sociodemographic findings.

No significant correlation was found between the critical thinking dispositions of resident physicians and their scores on the DISCERN measurement tool, which evaluates the reliability and quality of information sources (YouTube p=0.736-Newspaper p=0.975). When evaluating information sources, physicians working in surgical branches gave higher scores to the reliability (p=0.039) and quality (p=0.002) of YouTube video and the quality (p=0.015) of newspaper news information source than resident physicians working in internal branches (Table 3). In our study, as the years of seniority increased, the mean scores given for the evaluations of both news sources decreased (YouTube p<0.001, Newspaper p=0.002).

Table 2. Results of participants' evaluation of newspapers and YouTube as information sources (n=197)

	Newspaper	YouTube
DISCERN Part 1-2	**Mean±SD**	**Mean±SD**
Reliability	19.89±8.02	21.20±6.61
Quality	15.85±7.51	15.87±6.64
Total	35.74±10.98	37.07±9.37
DISCERN Part 3	**n (%)**	**n (%)**
Low	46 (23.4)	25 (12.7)
Moderate	141 (71.6)	164 (83.3)
High	10 (5.1)	8 (4.1)

Table 3. Comparison of the results of the evaluation of information medical materials according to participants' branch

Category	Branch	n	Mean±SD	p*
Reliability of the YouTube information source	IS	171	20.82±6.59	0.039
	SS	26	23.69±6.35	
Quality of the YouTube information source	IS	171	15.29±6.63	0.001
	SS	26	19.65±5.47	
Reliability of the newspaper information source	IS	171	19.50±7.99	0.081
	SS	26	22.46±70.92	
Quality of the newspaper information source	IS	171	15.35±7.38	0.015
	SS	26	19.19±7.67	

*: MannWhitney U test, IS: Internal Sciences, SS: Surgical Sciences.

Discussion

In our study, the mean scores obtained by the resident physicians from the critical thinking disposition scale and the scores obtained from its subscales were found to be higher than the mean values. Mehrpour et al. reported in their study with 284 resident physicians from internal and surgical branches that having the ability to think critically is a very valuable tool for resident physicians who assume serious responsibilities in the health system as health team leaders after graduation and that although there are efforts to increase critical thinking skills in medical programs in the country, the critical thinking scores of physicians in their study remained below the optimum average.[8]

In their study, Yurdal et al. found that medical education in Türkiye focuses on training physicians who can approach cases critically and reflect on the information they obtain, and that students' critical thinking tendencies and reflective learning understandings are generally they stated that it was high.[9]

In another study conducted in our country, Şahin investigated the critical thinking tendencies of medical students and found that 7.4% of the students had high critical thinking disposition, 51.9% had moderate critical thinking disposition and 40.7% had low critical thinking disposition.[10] In a research study conducted by Zia and Dar in Pakistan, it was found that medical students had a positive perception of the concept of critical thinking but were not predisposed to critical thinking.[11] Yurdal et al. reported that medical school students had high critical thinking dispositions and that there was a low, positive and significant relationship between the scores obtained from the sub-dimensions of critical thinking disposition and the overall total score of the critical thinking disposition scale.[9]

Huang et al. In their study with 1241 student participants including medical students in China and investigating critical thinking dispositions, they reported that the high mean scores obtained in the measurements decreased in the later years of medical education.[12] Similarly, in our study, critical thinking disposition scale scores decreased with increasing seniority and age. In their study with family physicians, Ross et al. reported that critical thinking disposition decreased with increasing age and family medicine residents had higher scores compared to family physicians. In another study by the same author, it was reported that family physicians with a high disposition for critical thinking were more successful in recertification exams.[13,14]

Although seniority was found to be unrelated to the disposition to think critically in our study, the results obtained in the studies in literature may be associated with the assumption that the need for critical thinking may decrease due to the high level of continuous learning and self-improvement efforts of residents with lower seniority and the automatized behaviors caused by experience as seniority increases.

In our study, there was no significant difference in critical thinking disposition according to gender in both the main scale and the two subscales. In a study conducted with medical school students, no gender-related difference in critical thinking disposition was observed, which is consistent with our study.[9] In a thesis study in which teachers participated, it was reported that the general scale score of critical thinking disposition did not show a significant difference according to gender.[15]

In our study, although it was assumed that there might be a difference in the critical thinking disposition of resident physicians according to the branches in which they worked, no statistically significant results were obtained. In a study conducted in Iran with 284 resident physicians

from internal and surgical branches, internal branch residents had higher critical thinking disposition scores.[8] The fact that the number of surgical branch residents was lower than the number of internal branch residents in our study may have led to this result.

Similarly, although it is thought that there may be a relationship between the parental education level of the participants and their critical thinking disposition scale scores, no significant relationship was found in the studies in the literature, similar to our study.[16]

Although there are studies in the literature reporting a positive relationship between academic achievement and critical thinking disposition[13,17] no statistically significant results were found when evaluated by comparing the three groups with, without undecided academic career plans in our study.

Considering that 70% of the world's population connects to the internet every day, internet-based sources of misinformation, biased news, disinformation cause serious problems in the field of health and endanger public health while degrading the quality of information in all fields. There are many studies that report that most of these data are of low quality by examining the sources of information provided in some sources such as YouTube.[18-21] In our study, the DISCERN tool, which is frequently preferred in the literature, was used to evaluate these information sources of physicians. Participants gave below-average scores to the reliability and quality sub-items of the newspaper news information source. The evaluation of the reliability sub-item of the information source of YouTube video was at the average score level, and the evaluation of the quality sub-item of the information source was below the average score.

Physicians should explain to their patients that the quality and reliability of educational materials that are open to everyone and have unlimited access are not always sufficient and that these educational materials should not be used in diagnosis and treatment.

A negative moderate relationship was found between the seniority of our participants in the profession and the evaluation scores of the quality of the educational material, the quality score of the YouTube information source and the reliability and quality scores of the newspaper information source. It may be due to the increase in their knowledge and experience in the profession as their seniority in their profession increases.

According to the branch differences of the participants, when evaluating the reliability and quality of the YouTube video information source and the quality of the newspaper news information source, residents working in surgical clinics gave higher scores and stated that the quality of the educational material was higher.

The fact that surgical branch residents gave higher scores to these educational materials may be due to the fact that they use these materials more in their daily practice, their familiarity with audio-visual learning materials and their higher perception of the direct usefulness of these materials in practice. These differences may explain their more positive perspective when evaluating such resources. Although it was thought that participants with high critical thinking tendencies would have lower scores in evaluating information sources with the DISCERN scale, there was no statistically significant difference.

The fact that our study was conducted with residents working in the same hospital was considered as a limitation. In addition, the low participation rate of surgical department residents similarly prevented generalization of the results.

Conclusion

The concept of critical thinking, which is essential for avoiding medical/clinical errors, identifying better alternatives for diagnosis and treatment, and better clinical decision-making skills, should be included more in the curricula of both educators and medical students. Both undergraduate and residency training in physicians is based on memorization of technical knowledge and application of what has been learned by rote. It is important to include in the curricula topics on critical thinking and the ability to distinguish between fake and real science. Heavy working conditions, an education system that is more oriented towards rote memorization, weak interactive teaching methods and low student motivation reduce students' ability to think critically. In order to prevent this, the number of case discussions should be increased, feedback should be received, education should be interactive and methods such as brainstorming should be used, and attention should be paid to the fact that workloads should not be too intense to allow students to think, especially during the residency training process.

Ethical approval

This study has been approved by the Adana City Training and Research Hospital Clinical Research Ethics Committee (approval date 29.02.2024, number 3195). Written informed consent was obtained from the participants.

Author contribution

Study conception and design: FG, MT; data collection: FG; analysis and interpretation of results: FG, MT; draft manuscript preparation: FG, MT. All authors reviewed the results and approved the final version of the article.

Source of funding

The authors declare the study received no funding.

Conflict of interest

The authors declare that there is no conflict of interest.

References

1. Alfaro LeFevre R. Critical thinking and clinical judgment: a practical approach. London: Saunders; 2004.
2. Tackett S, Grant J, Mmari K. Designing an evaluation framework for WFME basic standards for medical education. Med Teach. 2016;38(3):291-296. **[Crossref]**
3. Schwarz MR, Wojtczak A. Global minimum essential requirements: a road towards competence-oriented medical education. Med Teach. 2002;24(2):125-129. **[Crossref]**
4. Jantsch AG. Being a resident of family medicine in Africa in 2019: a picture from the 6th WONCA Africa Conference in Kampala. Rev Bras Med Fam Comunidade. 2020;15(42):2416. **[Crossref]**
5. Sosu EM. The development and psychometric validation of a Critical Thinking Disposition Scale. Think Skills Creat. 2013;9:107-119.**[Crossref]**
6. Akın A, Hamedoğlu A, Arslan S, et al. The adaptation and validation of the Turkish version of the Critical Thinking Disposition Scale (CTDS). International Journal of Educational Researchers. 2015;6(1):31-35.
7. Charnock D, Shepperd S, Needham G, Gann R. DISCERN: an instrument for judging the quality of written consumer health information on treatment choices. J Epidemiol Community Health. 1999;53(2):105-111. **[Crossref]**
8. Mehrpour SR, Hoseini Shavoun A, Kheiltash A, Masoomi R, Nasle Seraji R. Evaluating and comparing critical thinking skills of residents of Tehran University of Medical Sciences. BMC Med Educ. 2023;23(1):133. **[Crossref]**
9. Yurdal MO, Kıncal RY. Tıp fakültesi öğrencilerinin eleştirel düşünme eğilimleri, yansıtıcı öğrenme anlayışları ve akademik başarıları arasındaki ilişkisi. Tıp Eğitimi Dünyası. 2023;22(68):67-82.**[Crossref]**
10. Şahin HG. Tıp fakültesi öğrencilerinde eleştirel düşünme eğilimi ile depresyon eğilimi arasındaki ilişki ve etkileyen faktörler: Çukurova Üniversitesi örneği [master's thesis. Mersin: Çağ Üniversitesi; 2018.

11. Zia A, Dar UF. Critical thinking: perception and disposition of students in a Medical College of Pakistan. J Pak Med Assoc. 2019;69(7):968-972.

12. Huang L, Fan APC, Su N, Thai J, Kosik RO, Zhao X. Chinese medical students' disposition for critical thinking: a mixed methods exploration. BMC Med Educ. 2021;21(1):385. **[Crossref]**

13. Ross D, Morros M, Violato E. The critical thinking skills of practicing family physicians: a population-based cross-sectional study. Fam Med. 2020;52(9):635-641. **[Crossref]**

14. Ross D, Schipper S, Westbury C, et al. Examining critical thinking skills in family medicine residents. Fam Med. 2016;48(2):121-126.

15. Dalak O. Öğretmenlerin eleştirel düşünce eğilimlerinin araştırılması ve karşılaştırılması [master's thesis]. Aksaray: Aksaray Üniversitesi; 2019.

16. Öztürk N. Ulusoy H. Lisans ve yüksek lisans hemşirelik öğrencilerinin eleştirel düşünme düzeyleri ve eleştirel düşünmeyi etkileyen faktörler. Maltepe Üniversitesi Hemşirelik Bilim ve Sanatı Dergisi. 2008;1(1):15-25.

17. Seferoglu SS, Akbıyık C. Eleştirel düşünme ve öğretimi. Hacettepe Üniversitesi Eğitim Fakültesi Dergisi. 2006;30(30):193-200.

18. Yüksek A, Miniksar ÖH. Does the internet provide enough information about sepsis for the general public. Cukurova Anestezi ve Cerrahi Bilimler Dergisi. 2021;4(3):173-181. **[Crossref]**

19. Bayrak E. Global view on monkeypox epidemic: a Youtube study. Cukurova Anestezi ve Cerrahi Bilimler Dergisi. 2023;6(3):397-401.**[Crossref]**

20. Sacaklıdır R, Öztürk EC. Evaluating YouTube as a resource for postherpetic neuralgia patient education. Cukurova Anestezi ve Cerrahi Bilimler Dergisi. 2023;6(2):220-223. **[Crossref]**

21. Uluatar F, Uluatar CÜ. Kuru iğneleme ile ilgili Youtube videolarının kalitesinin ve geçerliliğinin değerlendirilmesi. Cukurova Anestezi ve Cerrahi Bilimler Dergisi. 2022;5(2):172-178. **[Crossref]**

Turk J Fam Pract 2025;29(2):87-97
DOI: 10.54308/TJFP.2025.833

Research Article

Evaluation of the nutritional status of patients hospitalized in palliative care and its relationship with depression

Neslihan Ergin[1], Bestegül Çoruh Akyol[1]

[1]Department of Family Medicine, Faculty of Medicine, Ordu University, Ordu, Türkiye

ABSTRACT

Objective: This study aims to assess the nutritional condition of patients hospitalized in palliative care and to determine the connection between their nutritional status, depression, and daily living activities.

Methods: This cross-sectional and descriptive study, carried out between November 20, 2023, and April 2024, questionnaires including sociodemographic characteristics, Mini Nutritional Assessment (MNA), Geriatric Depression Scale (GDS), and Barthel Index of Activities of Daily Living were administered to patients hospitalized in the Palliative Care Unit of Ordu University Training and Research Hospital. The data were analyzed using IBM SPSS V23, with a significance level set at $p<0.05$.

Results: A total of 169 individuals were included in the study. The average age of the participants was 81.26±8.96 years, with ages ranging from 65 to 100 years. The average score on the Mini Nutritional Assessment (MNA) scale was 16.77, and the average score on the Geriatric Depression Scale-Short Form (GDS-SF) was 7.08. The average score for the Barthel Index of Activities of Daily Living was 45.86. When examining the relationships between the Barthel Index and GDS-SF scores, Barthel Index and MNA scores, as well as MNA and GDS-SF scores, a statistically significant correlation was found (for all; $p<0.001$). As MNA scores decreased, GDS-SF scores increased, while Barthel Index scores decreased.

Conclusion: Patients in need of palliative care often face difficulties in meeting their own needs and tend to be dependent on their surroundings, with a predisposition to malnutrition and depression. A strong interrelationship exists between these three conditions. In our study, it was observed that as patients' susceptibility to malnutrition increased, their tendency towards depression also heightened, which in turn led to a parallel increase in their level of dependency. In line with the findings of our study, a thorough evaluation of both nutritional status and depression in every patient during clinical practice will not only improve patients' quality of life but also facilitate a quicker response to treatment and enhance overall health outcomes. Although our study has certain limitations, the similarities among these clinical conditions suggest that interpreting the results as a whole may serve as a critical strategy to enhance treatment success in palliative care and support improved patient follow-up and survival.

Keywords: Family practice, dependency, nutrition, depression, activities of daily living, palliative care

✉ Neslihan Ergin ▪ neslihan.ergin.37@hotmail.com
Received: 03.02.2025 **Accepted:** 16.05.2025 **Published:** 27.06.2025

Introduction

Palliative care is a multidisciplinary speciality which focuses on improving the standard of living of patients with incurable diseases. [1] Malnutrition is defined as a condition that reduces the patient's physical and mental functions and deteriorates the clinic as a result of a change in body composition due to inadequate intake or utilisation of nutrients. [2,3] Loss of physical strength due to nutritional deficiency can trigger depression by causing psychological weaknesses such as anxiety and sleep disorders.[4]

In a study, it was stated that depression findings in elderly individuals were associated with lower physical activity levels, and an inverse relationship was observed between mobility and depression, and it was recommended to be physically active to reduce the risk of depression.[5] In 2019, Keskin et al. examined the relationship between the risk of malnutrition and activities of daily living in geriatric patients, revealing that those with restrictions in daily activities had higher malnutrition rates.[6]

In our clinical experience, we found that the majority of patients described by their relatives as 'restless' had depressive moods. Additionally, the high level of concern expressed by the relatives of patients with poor nutrition, along with studies in the literature on nutrition and depression in the geriatric population, led us to the conclusion that similar studies should be conducted for palliative care patients as well. Therefore, we designed our study with the hypothesis that there might be a positive correlation between the MNA, GDS-SF, and Barthel indices, which are valid and reliable scales routinely applied to our patients in palliative care services. If such a correlation is found, identifying the need for variability in treatment modalities could potentially improve individuals' quality of life. Thus, by contributing to the early recognition and treatment of malnutrition and depression, this approach will support the improvement of the quality of life for both patients and their relatives.

Materials and Methods

The study was carried out over a 5 and a half month period between 20 November 2023 and April 2024 following the approval of the ethics committee. The sample size was calculated using the OpenEpi program. Accordingly, with a 95% confidence interval, a 5% margin of error, and a 95% confidence level, the minimum required sample size was determined to be 161 participants. In this study, it was aimed to reach approximately 200 individuals. The study included 169 volunteer individuals who consented to participate in the study after the patients hospitalised in the Palliative Service of Ordu University Training and Research Hospital were informed about the study.

The inclusion criteria for the study were being hospitalized in the palliative care unit, volunteering to participate in the study, and having no health condition preventing the completion of the questionnaire. The exclusion criteria were not being a patient in the palliative care unit, refusing to participate in the study, and having a health condition that prevented completing the questionnaire.

For this research, approval was granted by the Ordu University Faculty of Medicine Clinical Research Ethics Committee, as per the ethics committee decision dated 10.11.2023 and numbered 2023/287. After obtaining the necessary permissions, data collection began with participants who agreed to take part in the study. The questionnaire, administered through face-to-face interviews, included questions on participants' sociodemographic characteristics and utilized the MNA, GDS-SF, and Barthel scales.

The MNA was created in 1994 through a collaboration between the University of Toulouse, New Mexico Medical School and the Swiss Nestle Research Centre. For the first time, it was validated in three separate studies with the participation of more than 600 elderly people in total and these studies were published by Guigoz et al. in 1996.[7] A validation study for the Turkish population was conducted by Sarıkaya.[8] MNA includes 18 questions gathered in 4 sections. These four sections consist of questions regarding general health status, nutrition, anthropometric measurements and patient's self-assessment. The scale has a maximum score of 30 and a minimum score of 0. According to the score intervals; ≥24 is considered as normal nutritional status, 17-23.5 is considered as at risk of malnutrition and <17 is considered as malnutrition.[7]

The GDS-SF Scale was developed by Yesavage et al. in 1983.[9] The Turkish validity and reliability study was conducted by Durmaz in 2018.[10] The scale comprises 15 questions that require yes or no responses. When scoring, 1 point is assigned for each response indicating depression, while 0 points are given for other answers. According to the score ranges the scale is interpreted as follows: no depression for scores between 0-4, mild depression for scores between 5-8, moderate depression for scores between 9-11, and severe depression for scores between 12-15. The scale has a minimum score of 0 and a maximum score of 15.

The Barthel Activities of Daily Living Index was created by Dorothy Mahoney in 1965 and its Turkish validity and reliability were conducted by Yavuzer in 1996.[11] This scale includes 10 questions, with scores ranging from 0 to 15 points in 5-point increments, depending on the specific question. According to the score ranges, the scale is interpreted as follows: 0-20 indicates full dependence, 21-61 indicates high dependence, 62-90 indicates moderate dependence, 91-99 indicates mild dependence, and a score of 100 indicates full independence. The maximum score on the scale is 100, and the minimum score is 0.

The data were analyzed using IBM SPSS Version 23. The normality of distribution was assessed using the Kolmogorov-Smirnov and Shapiro-Wilk tests. Associations between categorical variables were examined using the Chi-square test, Yates' correction, Fisher's Exact test, and Fisher-Freeman-Halton test. The Mann-Whitney U test was used to compare non-normally distributed variables between two groups, while the Kruskal-Wallis test was used for comparisons among three or more groups, followed by the Dunn test for post-hoc multiple comparisons. Spearman's rho correlation coefficient was used to examine the relationship between non-normally distributed variables. Spearman correlation analysis was applied to assess the relationships between continuous variables that were ordinal or not normally distributed. Results were presented as mean±standard deviation and median (minimum–maximum) for quantitative data, and as frequency (percentage) for categorical data. A p-value of <0.050 was considered statistically significant.

Results

A total of 169 participants took part in the study, with an average age of 81.26±8.96 years (ranging from 65 to 100). The majority of the participants were female (n=96, %56.8).

Among the participants, 98 had a Body Mass Index (BMI) of 23 or above. According to the MNA scoring, 78 individuals were classified as malnourished. Based on the GDS-SF, 109 individuals were identified as having a depressive mood. A total of 64 participants were fully dependent in terms of care. Descriptive statistics regarding BMI categories, and the scores of the MNA, GDS-SF, and Barthel Index are presented in Table 1.

Table 1. Descriptive statistics of BMI classes, MNA, GDS-SF and Barthel scales

	Frequency (n) / Mean±SD	Percentage (%) / Median (Min. - Max.)
MNA Total Score	16.77±7.26	18 (1 - 30)
GDS-SF Total Score	7.08±4.20	7 (0 - 15)
Barthel Total Score	45.86±38.28	45 (0 - 100)
BMI		
BMI less than 19	19	11.2
BMI between 19 and 21	23	13.6
BMI between 21 and 23	29	17.2
BMI 23 and above	98	58
MNA Score		
Normal nutritional status	35	20.7
At risk of malnutrition	56	33.1
Malnourished	78	46.2
GDS-SF Score		
No depression	60	35.5
Mild depression	45	26.6
Moderate depression	28	16.6
Severe depression	36	21.3
GDS-SF (Depression is absent or present)		
No	60	35.5
Yes	109	64.5
Barthel Index Score		
Fully dependent	64	37.9
Highly dependent	43	25.4
Moderately dependent	25	14.8
Mildly dependent	7	4.1
Fully independent	30	17.8

Table 2. Examining the relationship between depression levels and degree of dependence

Barthel Index	No depression (n, %)	Mild depression (n, %)	Modarete depression (n, %)	Severe depression (n, %)	Total (n, %)	Test Statistic	p
Fully dependent	10 (16.7)	10 (22.2)	19 (67.9)	25 (69.4)	64 (37.9)		
Highly dependent	9 (15)	23 (51.1)	6 (21.4)	5 (13.9)	43 (25.4)		
Moderately dependent	14 (23.3)	6 (13.3)	1 (3.6)	4 (11.1)	25 (14.8)	60.629	< **0.001**[z]
Mildly dependent	6 (10)	0 (0)	0 (0)	1 (2.8)	7 (4.1)		
Fully independent	21 (35)	6 (13.3)	2 (7.1)	1 (2.8)	30 (17.8)		

[z]Fisher's Exact Test with Monte Carlo Correction; n (%)
Accordingly, as the severity of depression increased, the dependency status increased (p<0.001).

According to Barthel index, there was statistical significance between dependency status and depression level. Accordingly, as the severity of depression increased, the dependency status increased (p<0.001). The relationship between depression levels and dependency degree is presented in Table 2.

Individuals without depressive mood were most commonly in the normal nutritional status category, while almost all individuals with severe depression were malnourished. According to the MNA index, there was a statistically significant relationship between nutritional status and depression level (p<0.001). The relationship between depression levels and nutritional status is presented in Table 3.

The median total MNA score values differ according to the GDS-SF factor (p<0.001). The comparison of MNA average scores according to depression status is presented in Table 4. A statistically significant difference was found in the median total GDS-SF scores according to the MNA categories (p<0.001). The comparison of GDS-SF average scores with the presence of malnutrition is presented in Table 5.

According to the Barthel index, there was statistical significance between the nutritional level in fully dependent people. Accordingly, the dependency status increased as the severity of malnutrition increased. (p<0.001) The relationship between the presence of malnutrition and the levels of dependency is presented in Table 6.

According to the Spearman correlation test, a statistically significant relationship was found between the total scores of GDS-SF, Barthel, and MNA (for all, p<0.001). A negative correlation was observed between the MNA and GDS-SF scores. The results of the correlation analysis between the scale scores are presented in Table 7.

Table 3. The examination of the relationship between depression levels and nutritional status

	No depression (n, %)	Mild depression (n, %)	Modarete depression (n, %)	Severe depression (n, %)	Total (n, %)	Test statistics	p
MNA Score							
Normal nutritional status	26 (43.3)	6 (13.3)	1 (3.6)	2 (5.6)	35 (20.7)	63.756	**<0.001**[x]
At risk of malnutrition	24 (40)	22 (48.9)	7 (25)	3 (8.3)	56 (33.1)		
Malnourished	10 (16.7)	17 (37.8)	20 (71.4)	31 (86.1)	78 (46.2)		

[x]Pearson's chi-square test n (%)

Table 4. The comparison of average MNA scores based on depression status

	Mean±SD	Hydrangea (min. - max.)	Test Statistics	p
GDS-SF				
No depression	21.492±4.97	23 (8 - 30)	5114.500	**<0.001**[x]
Yes depression	14.22±7.041	15 (1 - 29)		

[x]Mann Whitney U Test; Median (minimum-maximum)

Table 5. The comparison of average GDS-SF scores with the presence of malnutrition

	Mean±SS	Hydrangea (min. - max.)	Test Statistics	p
MNA Score				
Normal nutritional status	3.941±3.402	3 (0 - 15)a	50.925	**<0.001**[x]
At risk of malnutrition	5.696±3.324	5.5 (1 - 14)a		
Malnourished	9.462±3.734	10 (1 - 15)b		

[x]Kruskal Wallis H Test; ^(a-b) there is no difference between groups with the same letter. Median (minimum-maximum)

Table 6. The examination of the relationship between the presence of malnutrition and the levels of dependency

	Normal nutritional status (n, %)	At risk of malnutrition (n, %)	Malnourished (n, %)	Total (n, %)	Test Statistics	p
Barthel Index						
Fully dependent	1 (2.9)	9 (16.1)	54 (69.2)	64 (37.9)	82.057	< **0.001**[z]
Highly dependent	7 (20)	20 (35.7)	16 (20.5)	43 (25.4)		
Moderately dependent	9 (25.7)	11 (19.6)	5 (6.4)	25 (14.8)		
Mildly dependent	4 (11.4)	2 (3.6)	1 (1.3)	7 (4.1)		
Fully independent	14 (40)	14 (25)	2 (2.6)	30 (17.8)		

[z]Fisher's Exact Test with Monte Carlo Correction; n (%)
Accordingly, as the severity of malnutrition increased, the level of full dependency also increased (p<0.001).

Table 7. Correlation analysis results between scale scores

	MNA Total Score		GDS-SF Total Score	
	r^x	p	r^x	p
GDS-SF Total Score	-0.614	< **0.001**		
Barthel Total Score	0.677	< **0.001**	-0.583	< **0.001**

[x]Spearman's rho correlation

While the median total MNA and GDS-SF scores did not differ according to gender, the median total Barthel scores showed a significant difference based on gender (p=0.005).

Discussion

Malnutrition is a significant clinical condition linked to higher rates of mortality and morbidity. Although it can be seen in all age groups, older adults are more susceptible to malnutrition due to various psychological, physiological, and social risk factors.[12] In Sarıkaya's study, it was determined that 15.0% of the elderly who underwent MNA were malnourished and 29.9% were at risk for malnutrition.[8]

In the literature, malnutrition is very high in palliative care patients. In Bekar's study evaluating the nutritional status of patients admitted to Home Health Care (HHC), 61.86% were malnourished, 31.16% were at risk of malnutrition, and 6.9% were in normal nutritional status.[13] According to the study conducted by Akan et al. in HHC, it was determined that 48.3% of 89 elderly people over the age of 65 were malnourished, 38.2% were at risk of malnutrition and 13.5% were in normal nutritional status.[14] Both HHC and palliative are units where individuals' care processes begin. We can attribute this to reasons such as individuals being dependent on the environment, not being able to reach adequate food intake, being exposed to loss of appetite due to many chronic diseases or psychological factors such as loneliness and depression.

Ranhoff et al. evaluated the nutritional status of 69 older individuals with MNA-SF and found that 30.0% of the older adults were malnourished and 74.0% were at risk for malnutrition and the mean MNA-SF score was 7.8±2.9.[15] Slee et al. found that the mean MNA-SF scores of hospitalised malnourished and at risk for malnutrition were 6.9±2.9 and 8.9±2.2, respectively[16]; Lilamand et al. found 9.8±2.4 in the elderly in nursing homes.[17] In our study, the mean MNA-SF scores of the elderly were found to be 16.77±7.26, which was higher than the studies in the literature.

The fact that elderly individuals in Türkiye live in a large family structure and have easier access to care services thanks to family support; at the same time, the fact that patients can have a regular and balanced diet thanks to the foods prepared at home by caregivers contributes to the adequate nutritional intake of elderly individuals.

Considering the studies evaluating the nutritional status of palliative care patients, malnutrition is frequently seen in palliative care patients both in our study and in most studies. Increased dependency level of palliative care patients, physical and psychosocial problems due to aging, impaired eating skills or difficulties in accessing food are considered among the causes of malnutrition. It is important to evaluate palliative care patients in terms of malnutrition at the time of hospitalisation and to establish a nutritional care plan in addition to medical treatment.

Depression is frequently seen in the elderly and is associated with morbidity. This condition leads to a decline in functionality, lowers the quality of life, and increases the risk of suicide among patients in palliative care.[18] In Yıldız's study on elderly individuals, Madeira et al.'s study on the elderly in Portugal, Şahin's study in Edirne and another study conducted in Bahrain with 517 participants, it was found that the participants had mild depression according to the depression score similar to our study.[19-22]

In the study conducted by Efendioğlu in a palliative care centre, 79.4% of the patients had a GDS-15 score of 5 or more.[23] Palliative care patients usually have serious and progressive diseases. Depression is more common due to reasons such as patients having to cope with symptoms such as constant pain, fatigue, nutrition and sleep problems, realising that they are approaching the end of their lives, withdrawing from their social environment, and becoming more dependent on daily life activities.

The rate of dependency is higher in patients hospitalised in palliative services due to their high age, having multiple chronic diseases and having a history of cerebrovascular disease. In our study, the mean Barthel score was 45.86±38.28. 37.9% of the patients were fully dependent, 25.4% were severely dependent and 14.8% were moderately dependent. In the study by Güdük et al. in patients receiving home health care services, 37% were identified as fully dependent, 20% were found to be severely dependent and 8% were found to be moderately dependent, and results close to our study were obtained.[24] In the study by Tüzün et al. Conducted with the patients they followed in HHC, they concluded that 32.8% were fully dependent.[25] In the study of Çatak et al. on individuals aged 65 and older registered in the home health unit, 27.8% of the patients were found to be fully dependent on the bed.[26]

In the study by Velázquez-Alva et al., the mean Barthel score was found to be 65.0± 35.0 and 20.6% were fully dependent, 19.2% were highly dependent, 25.2% were moderately dependent and 25.6% were fully independent.[4] Although dependency is considered to be a natural process of old age, it varies in studies depending on the average age of the patients and the accompanying chronic diseases. Therefore, closely monitoring the health status of bedridden individuals is crucial, provide access to appropriate treatment and rehabilitation programmes and provide support to improve the quality of their lives.

An inverse relationship between mobilisation and depression is known. It is recommended to be physically active to reduce the likelihood of depression or to treat it. In a study conducted in low-income countries, Vancampfort et al. reported that elderly people with depressive symptoms were less physically active.[5] Veronese et al. reported that the risk of depression is higher in the elderly who are not physically active and that physical activity has a determining effect

on depression.[27] In the research carry out by Velázquez-Alva et al. in elderly individuals, the BI score of people without depression was found to be 73.1 on average, and 52.3 in those with mild and severe depression.[4] In our study, we see that those without depression are more fully independent, while the rate of dependency increases as the severity of depression increases. Depression is characterised by symptoms such as low energy and withdrawal from life in general. This condition reduces the mobility of individuals by limiting their physical activities.

Poor nutrition of hospitalised geriatric patients increases the risk of depression, complicates the treatment of depression and other diseases, prolongs the length of hospital stay and reduces the quality of life of individuals.[28] For these reasons, early identification and management of malnutrition in geriatric patients is very important. Physical weakness caused by malnutrition in the elderly can cause various diseases, sleep disorders, anxiety and trigger depression and psychological sensitivity.[4] In our study, the mean depression score of those with normal nutritional status was 3.9±3.4, The average depression score malnourished patients was 9.462±3.734. As depression severity increased, the risk of malnutrition also increased. In a study carried out geriatric patients in Bangladesh, the median depression score of patients with normal nutritional status was 6.5, those at risk of malnutrition were 8.4, and those with malnutrition were 11.4.[29]

Keshavarzi et al. reported that both depression and malnutrition were common in geriatric population. In the study, GDS-SF scores of malnourished elderly people were found to be higher than normal ones, and a significantly worse nutritional status was found in individuals with depressive symptoms. It has also been reported that depressive symptoms and nutritional deficiencies have an adverse effect on quality of life.[30]

In the study conducted by Efendioğlu in a palliative care centre, it was found that most of the patients were malnourished and depressive symptom scores were high, and a relationship between the two conditions was found.[23] In the study conducted by Cansel and colleagues in geriatric patients, depression scores of those with malnutrition and malnutrition risk were found to be higher than adequate nutrition status, and a positive relationship was shown between malnutrition severity and depressive symptoms.[31] The relationship between depression and malnutrition is interactive. Examining the relationship between these factors is of significant importance such as nutrition and depression among patients hospitalised in palliative services, both in terms of improving the quality of life of patients and improving clinical approaches.

The connection between nutrition, depression symptom scores, and activities of daily living reinforces the idea that both depression and malnutrition can lead to functional loss. A study in Portugal revealed a correlation between MNA score, low appetite, depression, and addiction, while another study found a significant link between physical dependence and malnutrition.[20]

In a cross-sectional study involving elderly individuals living in the community complete physical dependence was found to have a strong association with malnutrition.[32] In addition, in a cross-sectional study on home care service recipients in Türkiye, a positive relationship was found between the Barthel Index and MNA scores, and as a result of multiple regression analysis; BI remained significant even after adjusting for depression, dementia, and anthropometric values.[33] In a cross-sectional study in China, full

physical functional dependence was found to have a strong association with malnutrition.[32]

According to our findings, consistent with the literature. it was concluded that the rate and severity of dependency increased as the susceptibility to malnutrition increased. Malnourished elderly individuals were found to have a significantly higher bed dependency status compared to those at risk for malnutrition and those with normal nutritional status. Malnutrition, depression and addiction form a vicious cycle that triggers and reinforces each other in elderly individuals. Malnutrition weakens the physical strength and general health of the individual, which limits mobility and leads to dependence.

Depression exacerbates malnutrition by negatively affecting eating habits through loss of appetite and lack of motivation. Dependency, on the other hand, exacerbates depression and worsens the health status of the individual through factors such as social isolation and physical inactivity. As a result, these three factors are closely interrelated and lead to worsening health outcomes in older people. Our duty as family physicians is to approach patients in a holistic manner from a biopsychosocial perspective, to evaluate patients before hospitalisation with appropriate screening methods and to provide the most appropriate treatment for patients and their relatives in line with the data we obtain.

Limitations of the study

The limitations of our study include the fact that it was conducted with patients from the palliative care unit of Ordu University Training and Research Hospital, designed as a cross-sectional study, and the absence of multivariate analyses for comorbidities. However, these limitations highlight the importance of our study in serving as a reference for larger-scale and multi-center research in the future.

Ethical approval

This study has been approved by the Ordu University Faculty of Medicine Clinical Research Ethics Committee (approval date 10.11.2023, number 2023/287). Written informed consent was obtained from the participants.

Author contribution

Study conception and design: NE, BÇA; data collection: NE; analysis and interpretation of results: NE; Draft manuscript preparation: NE, BÇA. All authors reviewed the results and approved the final version of the article.

Source of funding

The authors declare the study received no funding.

Conflict of interest

The authors declare that there is no conflict of interest.

References

1. Santiago-Palma J, Payne R. Palliative care and rehabilitation. Cancer. 2001;92(4 Suppl):1049-1052. **[Crossref]**
2. Cederholm T, Jensen GL, Correia MITD, et al. GLIM criteria for the diagnosis of malnutrition - A consensus report from the global clinical nutrition community. Clin Nutr. 2019;38(1):1-9. **[Crossref]**
3. Cimete G. Dünyada ve ülkemizde palyatif bakım uygulamaları. In: Cimete G, editör. Çocuklarda palyatif bakım; terminal dönemdeki çocuk ve aileye yaklaşım. 1. Baskı. Ankara: Türkiye Klinikleri; 2018. p. 1-6.

4. Velázquez-Alva MC, Irigoyen-Camacho ME, Cabrer-Rosales MF, et al. Prevalence of malnutrition and depression in older adults living in nursing homes in Mexico City. Nutrients. 2020;12(8):2429. **[Crossref]**

5. Vancampfort D, Stubbs B, Veronese N, Mugisha J, Swinnen N, Koyanagi A. Correlates of physical activity among depressed older people in six low-income and middle-income countries: a community-based cross-sectional study. Int J Geriatr Psychiatry. 2018;33(2):e314-e322. **[Crossref]**

6. Keskin Ş. Evde yaşayan yaşlılarda malnütrisyon riskleri ile günlük yaşam aktiviteleri arasındaki ilişki [master's thesis]. Aydın: Aydın Adnan Menderes Üniversitesi; 2019.

7. Guigoz Y, Vellas B, Garry PJ. Assessing the nutritional status of the elderly: the Mini Nutritional Assessment as part of the geriatric evaluation. Nutr Rev. 1996;54(1 Pt 2):S59-S65. **[Crossref]**

8. Sarıkaya D. Geriatrik hastalarda mini nütrisyonel değerlendirme (MNA) testinin uzun ve kısa (MNA-SF) formunun geçerlilik çalışması [medical specialization thesis]. Ankara: Hacettepe Üniversitesi; 2023.

9. Yesavage JA, Brink TL, Rose TL, et al. Development and validation of a geriatric depression screening scale: a preliminary report. J Psychiatr Res. 1982;17(1):37-49. **[Crossref]**

10. Durmaz B, Soysal P, Ellidokuz H, Isik AT. Validity and reliability of geriatric depression scale-15 (short form) in Turkish older adults. North Clin Istanb. 2018;5(3):216-220. **[Crossref]**

11. Yavuzer G. Nörorehabilitasyon hastalarının değerlendirimi ve izleminde fonksiyonel bağımsızlık ölçeği ve Modifiye Barthel İndeksi'nin yeri [medical specialization thesis]. Ankara: Ankara Üniversitesi; 1996.

12. Kansal D, Baliga SS, Kruthika K, Mallapur MD. Nutritional assessment among elderly population of rural Belagavi: a cross-sectional study. Int J Med Sci Public Health. 2016;5(7):1496-1499. **[Crossref]**

13. Bekar HA. Evde sağlık birimine başvuran yaşlı hastaların beslenme durumları ve dekübit yara durumlarının değerlendirilmesi [medical specialization thesis].İzmir: Sağlık Bilimleri Üniversitesi; 2020.

14. Akan H, Ayraler A, Hayran O. Evde sağlık birimine başvuran yaşlı hastaların beslenme durumları. Türkiye Aile Hekimliği Dergisi. 2013;17(3):106-112. **[Crossref]**

15. Ranhoff AH, Gjoen AU, Mowe M. Screening for malnutrition in elderly acute medical patients: the usefulness of MNA-SF. J Nutr Health Aging. 2005;9(4):221-225.

16. Slee A, Birch D, Stokoe D. The relationship of the skeletal muscle index and nutritional status in frail older hospital patients. Proc Nutr Soc. 2015;74(2):E154. **[Crossref]**

17. Lilamand M, Kelaiditi E, Demougeot L, Rolland Y, Vellas B, Cesari M. The Mini Nutritional Assessment-Short Form and mortality in nursing home residents-results from the INCUR study. J Nutr Health Aging. 2015;19(4):383-388. **[Crossref]**

18. Wilson KG, Chochinov HM, Skirko MG, et al. Depression and anxiety disorders in palliative cancer care. J Pain Symptom Manage. 2007;33(2):118-129. **[Crossref]**

19. Yıldız F. Yaşlı bireylerde depresyon ve anksiyetenin malnütrisyon ile ilişkisi [medical specialization thesis]. İstanbul: Sağlık Bilimleri Üniversitesi; 2024.

20. Madeira T, Peixoto-Plácido C, Sousa-Santos N, et al. Malnutrition among older adults living in Portuguese nursing homes: the PEN-3S study. Public Health Nutr. 2019;22(3):486-497. **[Crossref]**

21. Şahin E. Huzurevinde veya kendi evlerinde yaşayan yaşlılarda depresyon sıklıklarının karşılaştırması. Turk Geriatri Derg. 2003;6(1):10-13.

22. World Health Organization (WHO). WHO definition of palliative care. Available at: http://www.who.int/cancer/palliative/en/ (Accessed on March 30, 2016).

23. Efendioglu EM, Cigiloglu A, Turkbeyler IH. Malnutrition and depressive symptoms in elderly palliative care patients. J Palliat Care. 2022;37(4):503-509. **[Crossref]**

24. Güdük Ö, Güdük Ö, Sertbaş Y. Evde sağlık hizmeti alan hastaların sağlık ihtiyaçlarının değerlendirilmesi. Celal Bayar Üniv Sağlık Bilimleri Enstitüsü Derg. 2020;8(1):78-83. **[Crossref]**

25. Tüzün S, Hacıağaoğlu N, Dabak MR. Malnutrition in home care patients. Turk J Fam Med Prim Care. 2019;13(2):159-166. **[Crossref]**

26. Çatak B, Kılınç AS, Badıllıoğlu O, Sütlü S, Erkan Sofuoğlu A, Aslan D. Burdur'da evde sağlık hizmeti alan yaşlı hastaların profili ve evde verilen sağlık hizmetleri. Türkiye Halk Sağlığı Derg. 2012;10(1):13-21.

27. Veronese N, Stubbs B, Trevisan C, et al. Poor physical performance predicts future onset of depression in elderly people: Progetto Veneto Anziani longitudinal study. Phys Ther. 2017;97(6):659-668. **[Crossref]**

28. Pederson JL, Warkentin LM, Majumdar SR, McAlister FA. Depressive symptoms are associated with higher rates of readmission or mortality after medical hospitalization: a systematic review and meta-analysis. J Hosp Med. 2016;11(5):373-380. **[Crossref]**

29. Alam MR, Karmokar S, Reza S, Kabir MR, Ghosh S, Mamun MAA. Geriatric malnutrition and depression: evidence from elderly home care population in Bangladesh. Prev Med Rep. 2021;23:101478. **[Crossref]**

30. Keshavarzi S, Ahmadi SM, Lankarani KB. The impact of depression and malnutrition on health-related quality of life among the elderly Iranians. Glob J Health Sci. 2014;7(3):161-170. **[Crossref]**

31. Cansel N, Yakaryılmaz FD. The relationship between malnutrition, depressive symptoms, and cognitive impairment in geriatric patients. Med Records. 2022;4(2):217-223. **[Crossref]**

32. Ning H, Du Y, Ellis D, et al. Malnutrition and its associated factors among elderly Chinese with physical functional dependency. Public Health Nutr. 2021;24(6):1404-1414. **[Crossref]**

33. Baz S, Ardahan M. Relationship between malnutrition risks and functional abilities of the elderly in home care services. Int J Caring Sci. 2019;12(2):603-610.