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From the Editor

Dear Valued Readers,

We are delighted to bring you the third issue of 2024, featuring a range of articles curated specifically for healthcare professionals, particularly those in primary care. Our goal is to provide a valuable resource, and with this in mind, we have included 8 research articles and 2 reviews that focus on the latest advancements in key areas of healthcare.

As Turkey's leading journal in primary care, we are honored to serve as a vital resource for healthcare professionals in our region. We sincerely appreciate your ongoing interest in our publication and are dedicated to continuing to provide you with the latest evidence and research relevant to primary care.

We encourage you to dive into the engaging articles in this issue, confident that they will captivate and inspire you. Your involvement and support drive our mission to promote knowledge and innovation in primary care.

We look forward to sharing our next issue with you, designed to offer another enriching and stimulating experience.

Prof. Dr. Ahmet Keskin

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Research Article

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ANALYSIS OF SOCIODEMOGRAPHIC AND CLINICAL FEATURES OF EARTHQUAKE SURVIVORS SEEKING TREATMENT AT THE PSYCHIATRY OUTPATIENT CLINIC FOLLOWING THE KAHRAMANMARAŞ EARTHQUAKES ON FEBRUARY 6, 2023

Gülsüm Zuhal Kamış[1], Gözde Bolu[1], Esra Kabadayi Sahin[2]

[1]Department of Psychiatry, Ankara Bilkent City Hospital, Ankara, Türkiye

[2]Department of Psychiatry, Ankara Yıldırım Beyazıt University Faculty of Medicine, Ankara, Türkiye

Correspondence:

Gülsüm Zuhal Kamış (e-mail: gzuhalkamis@gmail.com)

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Ankara Yıldırım Beyazıt University Faculty of Medicine

Department of Family Medicine

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Abstract

Objectives: The aim of this study is to examine the clinical-sociodemographic characteristics of people who came to Ankara and applied to our hospital the earthquakes of Kahramanmaraş on February 6, 2023, and to examine the factors affecting early psychopathology and treatment initiation.

Materials and Methods: The data of earthquake victims who applied to Ankara City Hospital Adult Psychiatry Clinic as outpatients within one month after the earthquake were retrospectively scanned, and the obtained data were examined with descriptive statistics.

Results: Within a one-month period, 309 outpatients who were affected by the earthquake and applied to our hospital were identified, and the average age of the participants was 41.7±15. 69.3% of the participants were women, 69.3% were married. 55.3%(n=174) had their first psychiatric application, 37.5% had current psychiatric follow-up, 26.9% had other medical comorbidities, all with an acute stress reaction. When the groups in which treatment started and not started were evaluated in terms of sociodemographic clinical characteristics and earthquake damage, a difference was found between the two groups only in terms of psychiatric history, and those with a psychiatric history were found to have a lower rate of starting treatment($p<0.05$).

Conclusion: The findings of this study once again demonstrated the relationship between the magnitude of the trauma and post-traumatic stress symptoms and showed that treatment may be protective in terms of exacerbation of symptoms and acute stress symptoms in individuals with psychiatric diseases. Longitudinal follow-up studies are needed to examine the course of these early effects associated with the earthquake.

Keywords: Earthquakes, trauma and stressor related disorders, acute stress disorders, psychiatric disorders.

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Introduction

Natural disasters are life events that can have both immediate and long-term effects.[1,2] The enormous destruction caused by earthquakes causes loss of life, homes, and infrastructure. The impact of natural disasters on mental health depends on several pre-, peri-, and post-disaster factors.[3] Post-earthquake studies show that many victims have high rates of clinically significant symptoms as a result of exposure to stressful events, magnitude of loss, social disorganization, and lack of social support. Disaster psychiatry has regained importance after major earthquakes. It has been investigated what types of disorders are associated with the impact of the disaster, whether post-disaster psychopathology is temporary or long-lasting, and whether post-disaster psychological responses are universal in nature or whether they depend on social, cultural, and economic factors.

There are several studies about psychiatric morbidity and prevalence studies conducted after the earthquakes. The number of studies assessing the frequency of psychiatric disorders in the first month after the earthquake is limited. It was reported that in community-based studies, developing a psychiatric disorder among those who experience a disaster varies between 10-30% and, that 4-12 after an earthquake in Turkey months, the post-traumatic stress disorder (PTSD) rate was 25%.[4]

Studies focusing on post-earthquake psychopathology and epidemiological perspectives have suggested that early psychiatric intervention, including pharmacological treatment for the pathological acute stress response, is indicated in the early stages following a major earthquake.[5] The acute period after the disaster is the period when people are just confronting the traumatic event, different psychological reactions are observed against environmental and social changes due to the disruption of the flow of life, and society is just beginning to experience the long-term negative effects of the disaster. Including those affected by the disaster in the health system, determining their psychological needs, providing the necessary psychoeducation, and ensuring their adaptation to life and society are among the targeted goals during this period. A traumatic event, trauma-focused cognitive behavioral therapy is used when acute stress disorder develops, and in cases of psychiatric comorbidity, necessary psychopharmacological treatment is used. Although not recommended, one of the most commonly used agents in the early period after trauma is benzodiazepines. Depending on the symptoms, propranolol, sedative antidepressants, and other psychotropic drugs are also used. In cases of comorbidity, pharmacotherapy appropriate to the disorder is used. For example, antidepressants may be used in conditions where anxiety or depressive symptoms are prominent, antipsychotic agents or mood stabilizers may be used in mood disorders or antipsychotics are used in psychotic disorders. There are various factors affecting the course of these conditions, including the acute stress response that occurs in the early post-traumatic period.[6,7,8] Some studies have shown that, with interventions, the duration of the normal posttraumatic response can be shortened, PTSD symptoms can be reduced, the development of chronic PTSD can be

prevented, functionality can be regained, and impairment in functionality can be reduced.[9] Therefore, identifying risk groups in the acute post-traumatic period and understanding people's psychological complaints and needs can facilitate rapid and planned interventions in possible crises.

On 06.02.2023, two earthquakes of magnitude 7.7, centered in Pazarcık, and magnitude 7.6, centered in Elbistan, occurred in Kahramanmaraş province. After the earthquakes, around 33591 aftershocks occurred. According to the latest information received, 50783 people lost their lives.[10]

As the evacuation efforts of the region accelerated in the days following the earthquake, many earthquake victims were brought to Ankara by their means and through government agencies. During this period, there was a significant increase in the number of patients applying to Ankara Bilkent City Hospital Psychiatry outpatient clinic, and although some of this increase was due to acute exacerbations of existing follow-up patients, most of it was due to earthquake victims coming to the city. The number of studies on mental distress experienced after an earthquake with such large-scale effects is limited. Therefore, this study aimed to retrospectively examine the sociodemographic characteristics and trauma-related psychiatric symptoms of patients who directly experienced the February 6, 2023 Earthquakes and voluntarily applied to our hospital's psychiatry outpatient clinic in the acute period due to psychiatric complaints after the event.

Materials and Methods

Adults over the age of 18 who applied to Bilkent City Hospital Psychiatry Outpatient Clinic within a month after the February 6, 2023 Earthquake, who were in the earthquake zone during the earthquakes, and who were directly affected by the event were included in the study. The electronic records of the participants were examined by the researchers. Information regarding their sociodemographic information, past psychiatric illnesses and treatments, history of additional medical illnesses, situations of being trapped among the rubble and injuries during the earthquake, property and relatives' losses, and acute stress findings were evaluated retrospectively.

Analyses were made with IBM SPSS Statistics 26 for the Windows package program. Numerical descriptive statistics are expressed as mean and standard deviation and categorical variables are expressed as number and percentage, and simple descriptive statistical methods are used for these variables. Comparative analyses between groups were made with the Student-t test.

The ethics committee permission for the research was obtained from Bilkent City Hospital Ethics Committee No. 2 (Number: E2-23-4729).

Results

According to hospital records, 309 people who directly experienced the earthquake and had psychological complaints applied to the psychiatric outpatient clinics of our hospital within one month. The average age of the participants was 41.7±15. It was determined that 69.3% of the applicants were women and 69.3% (n=214) were married. The sociodemographic data of the participants are summarized in Table 1.

Psychiatric diagnosis and treatment history in the participants' histories were evaluated and it was found that 55.3% (n=174) had their first psychiatric application and 37.5% had a current psychiatric follow-up. Additionally, 26.9% of the participants were found to have another medical comorbidity (Table 1).

Material damage and physical injuries caused by the earthquake were examined: It was seen that there was no information on this subject in the records in 66.6% of the cases. It was determined that 28.8% (n=89) had material damage at home or work, 3.9% (n=12) had injuries, and two people (0.6%) had a history of inpatient treatment.

One of the applicants applied to obtain a medical report to obtain a shotgun license, one of them applied to get treatment (methylphenidate) for the diagnosis of Attention Deficit Hyperactivity Disorder, and the psychiatric evaluation of the other applicants showed that all of them had symptoms of acute stress reaction and outpatient clinic follow-ups were recommended.

It was determined that 20.4% (n=63) of the participants received only supportive psychotherapeutic interviews and psychoeducation, and no psychotropic treatment was initiated, 21.7% (n=67) were advised to continue using the psychotropic treatments they were using (38 only antidepressant, 11 antidepressant+additional medication, 10 mood-stabilizing treatments and additional medications, 3 methylphenidate±antidepressant/trazodone, 2 antipsychotic, 1 low dose antipsychotic+benzodiazepine), a new pharmacotherapy was started in 57.9% (n=179).

It was determined that of the people for whom a new drug treatment was recommended, 27.8% were given antidepressant drugs, 22.3% were given sedative doses of antidepressants (low dose mirtazapine or trazone), 4.9% were given antipsychotics, 0.6% were given benzodiazepines, 1.3% were given antidepressants+antipsychotics, 0.9% were given other drugs (antihistamine, mood stabilizer (lithium, aripiprazole), methylphenidate).

Table 1. Sociodemographic and Clinical Characteristics of Participants

		number (%)
Mean age (year±SD)*		41.7±15
Gender		
	Female	214 (%69.3 %)
	Male	95 (%30.7 %)
Marital Status		
	Married	214 (69.3 %)
	Unmarried	95 (30.7 %)
Educational Status		
	Uneducated	5 (1.6%)
	Primary education	21 (6.8%)
	High school	53 (17.2%)
	University	64 (20.7%)
	Associate degree	1 (0.3%)
	No information	165 (53.4%)
Working Status		
	Student	33 (10.7%)
	Housewife	33 (10.7%)
	Unemployed	22 (7.1%)
	Retired	17 (5.5%)
	Working	99 (32.0%)
	No information	105 (34.0%)
History of Previous Psychiatric Diagnosis		
	No	171 (55.3%)
	Yes	116 (37.5%)
	No information	22 (7.1%)
History of Chronic Medical Disease		
	No	76 (24.6%)
	Yes	83 (26.9%)
	No information	150 (48.5%)

*year±SD: year±standart deviation

Table 2. Medications used by participants

	number (n)	percent (%)
No medication was given	63	20.4
The current medication was continued	67	21.7
antidepressant	38	12.3
antidepressant+antipsychotic/other	12	3.9
mood stabilizer (+antipsychotic/other)	10	3.2
methylphenidate	4	1.3
antipsychotic	2	0.7
low dose antipsychotic + benzodiazepine	1	0.3
A new medication was recommended	179	57.9
antidepressant	86	27.9
sedative dose of antidepressant	69	22.3
antipsychotic	15	4.9
antidepressant+antipsychotic	4	1.3
benzodiazepine	2	0.6
antihistamine	1	0.3
other	2	0.6

The relationship between the applicants' treatment initiation status and their sociodemographic characteristics and trauma-related factors was examined. Accordingly, no statistically significant relationship was detected between the initiation of pharmacotherapy and marital status, loss of a relative, physical injury, or comorbidity ($p>0.05$). There was a difference between the treatment and non-treatment groups in terms of previous psychiatric illness and treatment history ($p > 0.05$); It was observed that 68.7% of those who started treatment had their first psychiatric application, and 26.9% had a history of a psychiatric diagnosis in their medical history. The comparison of the groups in which treatment was started and those that were not started in terms of sociodemographic and trauma-related factors is presented in Table 3.

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Table 3. Comparison of groups in which medication was started and not started

	medication not started		medication started		p
	number (n)	percent (%)	number (n)	percent (%)	
age (mean±SD)	40.4 ±15		42.7±16		0.195
gender					0.994
female	90	69,2	124	69,3	
male	40	30,8	55	30,7	
marital status					0.132
unmarried	46	35,4	49	27,4	
married	84	64,6	130	72,6	
educational status					0.82
above high school	25	19,2	39	21,8	
high school and below	34	26,2	48	26,8	
no information	71	54,6	92	51,4	
working status					0.189
working	35	26,9	64	35,8	
not working	46	35,4	62	34,6	
no information	49	37,7	53	29,6	
psychiatric follow-up					**0.000**
yes	**69**[a]	**53,1**[a]	**47**[b]	**26,9**[b]	
no	**48**[a]	**36,9**[a]	**123**[b]	**68,7**[b]	
no information	13	4,2	9	2,9	
non-psychiatric medical illness					0.214
yes	29	22,3	54	30,2	
no	31	23,8	45	25,1	
no information	70	53,8	80	44,7	
İnjury					0.315
yes	6	4,6	6	3,4	
no	74	56,9	117	65,4	
no information	50	38,5	56	31,3	
loss of any close relative					0.996
yes	29	22,3	40	22,3	
no	12	9,2	16	8,9	
no information	89	68,5	123	68,7	
home/workplace damage					0.745
yes	40	30,8	49	27,4	
no	5	3,8	9	5	
no information	85	65,4	121	67,6	

*Independent Samples-t test, Chi-square analysis, and Bonferroni correction were used.

Discussion

This is a comprehensive study that retrospectively screens acute stress disorder and related conditions in people who came to Ankara after two consecutive major earthquake disasters that affected 11 provinces in Turkey and applied to one of the state's major health institutions to seek psychiatric help. Although Ankara, the city where the study was conducted, was not a city directly affected by the earthquake, the high number of outpatient clinic applications in the first month following the earthquake shows how high the effects of the earthquake were in this early period. Although this study used only the data of outpatients, not patients referred to our hospital for inpatient treatment, the fact that there were 309 earthquake survivors in one month may give an idea about how big this impact is. The reasons for this impact include the negative impact of housing opportunities in the region due to the earthquake, hospitals being damaged in the earthquake, hospital employees being affected by the earthquake, and hospital employees in the region having housing problems and not being able to work. For these reasons, those living in the earthquake zone may not have received adequate health care.[11,12,13] Due to ongoing aftershocks, earthquake survivors may have migrated or settled in Ankara, a city they thought was safer, both to ensure their safety and for the feelings of fear and insecurity that emerged after the trauma.[11,14]

Although the findings of the study are difficult to compare with the results of community-based epidemiological studies, useful observations can be made regarding the psychological profile of help seekers. Identification of this profile is expected to be important for the early detection of acute stress reactions and the assessment of their severity by healthcare professionals. This may facilitate adequate case management, a prerequisite for the prevention of chronic stress-related disorders.

From a sociodemographic perspective, the findings obtained from our study are similar to previous findings. Various studies have reported that women seek help more than men.[15,16] It could be suggested that this may be because anxiety disorders and acute stress disorder are detected more frequently in women than in men and that men deny their problems more often than women or are reluctant to seek help. It is also claimed that women know their problems better and therefore benefit from all health services more than men.[17-19]

It has been observed that most of those who applied to the psychiatric outpatient clinic after the traumatic event were married. Although most studies on trauma victims report that being married is generally associated with lower psychosocial stressors,[20] there are also findings to the contrary.[21] Some studies in the literature have emphasized that acute stress symptoms may cause individuals with high responsibilities to seek help,[22] which may be why married people seek psychiatric help more often. Considering the average age of the applicants, another possibility is that the proportion of married people in the sample is similar to the population average.

All participants included in the study had acute stress symptoms. This gives an idea about the magnitude of the earthquake's impact and suggests that individuals with mental problems can evaluate their current situation or that they are noticed by their environment and apply it to psychiatry. Institutions and associations that emphasized the effects of trauma on mental health from the early period of the earthquake and organized assistance may have played an important role in this awareness. It is known that individuals with acute stress symptoms receive adequate social support and access to mental health services in the early period and benefit from the necessary treatment or intervention studies, reducing the traumatic effects of the event and psychopathologies that may occur in the long term.[23-24]. It is important to provide traumatized individuals with the opportunity to process the event in the early post-trauma period, to normalize post-trauma psychological reactions, to provide a safe environment that allows strong emotions to be expressed, to develop understanding, and to provide a safe environment where the experience can be made meaningful. [25]

The fact that 55.3% of the patients had their first psychiatric admission showed that the earthquake was a strong stressor in causing acute stress symptoms. When we look at the treatment initiation rates, it was seen that 58% of them started a new treatment, which is a very high rate compared to previous post-traumatic studies. It has been observed that the rate of treatment initiation is higher in those who first applied to psychiatry. The severity of symptoms may be higher in those who present to psychiatry for the first time with symptoms of acute stress disorder. In the screening and intervention study conducted after the 1999 earthquake among rural people in Taiwan, it was determined that the people of the region had no previous psychiatric history, but all patients required treatment.[5] It has been shown that the risk of suicide in individuals with chronic mental health diseases increases after traumatic events and their current illness worsens.[26] When considered together with these findings, acute stress symptoms may have occurred at a milder level in those who were under psychiatric treatment and continued treatment in our sample, and these patients under treatment may have been protected from exacerbation of their chronic psychiatric disease.

When the treatments applied in our clinic were reviewed, it was seen that slightly more than one-third of the patients were started on medication with a long-term treatment plan. It is known that the severity of trauma is associated with trauma-related disorders. Considering the severity and destructiveness of the Kahramanmaraş earthquakes, it is not surprising that people experience severe acute stress symptoms and that this is reflected in treatment initiation rates. Nevertheless, it was observed that sixty percent of the patients evaluated in our clinic received supportive psychotherapeutic interviews and psychoeducation, no changes were made to their current treatments, or a sedative dose of medication was recommended and they were called for a follow-up. These approaches are similar to intervention studies after similar disasters and traumas. Previous studies show trauma-focused cognitive behavioral therapy within 3 months after trauma as the most effective treatment method in the early post-traumatic period.[27] Psychological interventions, such as single-session psychoeducation and psychological first aid, are routinely recommended immediately after major traumatic

events and disasters, despite limited evidence of benefit.[27,28] According to the findings of this study, it was seen that the practice in our clinic was to provide psychoeducation and supportive psychotherapeutic interviews with patients at their first admission, to start temporary sedative treatment, and to start long-term treatment in about one-third of the patients and that the practice in our clinic was carried out in accordance with the recommendations in the literature.

It is known that studies focusing on psychopathology and epidemiological perspectives indicate that early psychiatric intervention for pathological acute stress response - including pharmacological treatment - is indicated in the early stages following a major earthquake.[5] When examined in terms of drug selection; It was observed that the majority of the applicants were prescribed antidepressants (Selective Serotonin Reuptake Inhibitors, serotonin-norepinephrine reuptake inhibitors) or drugs such as low-dose noradrenergic and selective serotonergic antidepressants, tricyclic antidepressants to benefit from their sedative effects, and only two patients were prescribed benzodiazepines. In the Practice Guidelines for the Treatment of Patients with Acute Stress Disorder and Post-Traumatic Stress Disorder, SSRIs have been among the drugs of choice because SSRI administration is advantageous in terms of effectiveness and tolerability. It is effective in the treatment of core symptoms such as hyperarousal, avoidance, anhedonia, and re-experiencing, and in the treatment of comorbid anxiety disorders and depression. It has been reported that these drugs increase the social and occupational functionality of patients and contribute to an improvement in their quality of life in the long term.[29] However, there are studies in the literature indicating that early and long-term use of benzodiazepines after trauma may increase the risk of developing PTSD,[30] and in our study, it was observed that benzodiazepines were prescribed to a very small number of patients. This has shown that medication use in our clinic is carried out in accordance with the principles of rational prescribing.

When we looked at the people for whom psychotherapy and pharmacotherapy were recommended, it was determined that demographic characteristics and losses related to the traumatic event didn't affect the status of receiving treatment. In addition, it was found that the patients for whom treatment was recommended had a statistically significantly less psychiatric history in their medical history than the group for which treatment was not recommended, and they had a first psychiatric admission. One of the reasons for this may be that people who have clinical psychological complaints for the first time need more treatment, such as their symptoms being more severe. Patients with a history of psychiatric treatment may be knowledgeable about symptoms such as acute stress symptoms, coping methods, and possible interventions due to their previous treatment experiences. For this reason, they may not have requested treatment interventions at an early stage. Patients who continue their treatment may have experienced milder symptoms due to the protective effect of the treatments they use. As a result, there may have been less need for treatment for those with psychiatric illnesses.

In conclusion, this study is a retrospective review study that aims to evaluate survivors from the Kahramanmaraş earthquakes who applied to the outpatient clinic of a city hospital in Ankara, a city that was not directly affected by this earthquake, in terms of acute stress symptoms, treatments started, and factors that led to the initiation of treatment in the acute period. As a result of this study, it was observed that all earthquake victims who applied had acute stress symptoms, that treatment initiation rates were lower in those with a psychiatric history and treatment, that psychiatric treatment may be protective against acute stress symptoms, and that rational drug use is common in our clinical practice. However, follow-up studies are needed to examine the longitudinal effects of the earthquake.

Study Limitations

This study has some limitations. First of all, the study was conducted in a single center and retrospectively. Another limitation is that the severity of the applicants' acute stress symptoms was not evaluated with any scale. In addition, the subject of this study is the patients admitted to the outpatient clinic; it does not provide information about the condition of injured patients referred to other services of the hospital for surgery or inpatient treatment. Nevertheless, the fact that the early psychiatric effects of a disaster that affected most of our country and the early clinical management of the applicants were evaluated with a relatively good number of participants can be considered as the prominent aspects of the study. Another limitation is that the study was cross-sectional and the effect of the trauma caused by the earthquake could not be evaluated longitudinally, and follow-up studies are needed in this respect.

Ethical Considerations: The ethics committee permission for the research was obtained from Ankara Bilkent City Hospital Ethics Committee No. 2 (Number: E2-23-4729).

Conflict of Interest: The authors declare no conflict of interest.

References

1. Baryshnikova NV, Pham NTA. Natural disasters and mental health: A quantile approach. Economics Letters. 2019;180(C):62-6 (doi:10.1016/j.econlet.2019.04.016).
2. Du B, Ma X, Ou X, Jin Y, Ren P, Li J. The prevalence of posttraumatic stress in adolescents eight years after the Wenchuan earthquake. Psychiatry Res. 2018;262:262-9 (doi:10.1016/j.psychres.2018.02.019).
3. Tang B, Deng Q, Glik D, Dong J, Zhang L. A Meta-Analysis of Risk Factors for Post-Traumatic Stress Disorder (PTSD) in Adults and Children after Earthquakes. Int J Environ Res Public Health. 2017;14(12):1537 (doi:10.3390/ijerph14121537).
4. Yildiz Mİ, Başterzi AD, Yildirim EA, et al. Preventive and Therapeutic Mental Health Care after the Earthquake- Expert Opinion from the Psychiatric Association of Turkey. Deprem Sonrası Erken Dönemde Koruyucu ve Tedavi Edici Ruh Sağlığı Hizmeti-Türkiye Psikiyatri Derneği Uzman Görüşü. Turk Psikiyatri Derg. 2023;34(1):39-49 (doi:10.5080/u27305).
5. Chen CC, Yeh TL, Yang YK, et al. Psychiatric morbidity and post-traumatic symptoms among survivors in the early stage following the 1999 earthquake in Taiwan. Psychiatry Res. 2001;105(1-2):13-22 (doi:10.1016/s0165-1781(01)00334-6).
6. Direk N, Yüksel Ş. Travma sonrası erken dönemde etkin tedaviler: Psikoterapi ve Psikofarmakoloji. Psikiyatride Güncel. 2018;8(1):37-52.
7. Yüksel Ş, Başterzi AD. Kitlesel Travmalar ve Afetlerde Ruhsal Hastalıkları Önleme, Müdahale ve Sağaltım Kılavuzu. 1st ed. Ankara, Türkiye Psikiyatri Derneği; 2021.
8. Aker TA, Tayvan O, Çelik F. Travma ve Stresörle İlişkili Bozukluklar. 2nd ed. Ankara, Türkiye Psikiyatri Derneği; 2023.
9. Marshall RD, Spitzer R, Liebowitz MR. Review and critique of the new DSM-IV diagnosis of acute stress disorder. Am J Psychiatry. 1999;156(11):1677-85. (doi:10.1176/ajp.156.11.1677).
10. AFAD, 2023. 06 Şubat 2023 Pazarcık-Elbistan (Kahramanmaraş) Mw:7.7–Mw:7.6 Depremleri Raporu. 140 s. (AFAD, 2023. 06 February 2023 Pazarcık-Elbistan (Kahramanmaraş) Mw:7.7–Mw:7.6 Earthquakes Report. 140 p.) [Internet]. 2023; https://deprem.afad.gov.tr/assets/pdf/Kahramanmara%C5%9F%20Depremi%20%20Raporu_02.06.2023.pdf. (Accessed: 30.03.2024).
11. Kiliç C, Aydin I, Taşkintuna N, et al. Predictors of psychological distress in survivors of the 1999 earthquakes in Turkey: effects of relocation after the disaster. Acta Psychiatr Scand. 2006;114(3):194-202 (doi:10.1111/j.1600-0447.2006.00786.x).
12. Saeed SA, Gargano SP. Natural disasters and mental health. Int Rev Psychiatry. 2022;34(1):16-25. (doi:10.1080/09540261.2022.2037524).

13. Türkiye Cumhuriyeti Cumhurbaşkanlığı Strateji ve Bütçe Başkanlığı. Kahramanmaraş ve Hatay Depremleri Raporu [Internet]. https://www.sbb.gov.tr/wp-content/uploads/2023/03/2023-Kahramanmaras-ve-Hatay-Depremleri-Raporu.pdf (Accessed:01.02.2024).
14. Tiryaki Yenilmez D. Deprem ve göç ilişkisi üzerine bir değerlendirme, Akademik Düşünce Dergisi 2023; 7:39-52. (doi: 10.53507/akademikdusunce.1282303).
15. Bhugra D. Attitudes towards mental illness. A review of the literature. Acta Psychiatr Scand. 1989;80(1):1-12 (doi:10.1111/j.1600-0447.1989.tb01293.x).
16. Leaf PJ, Bruce ML, Tischler GL, Holzer CE 3rd. The relationship between demographic factors and attitudes toward mental health services. J Community Psychol. 1987;15(2):275-84 (doi:10.1002/1520-6629(198704)15:2<275::aid-jcop2290150216>3.0.co;2-j).
17. Bekaroğlu M (1995) Çare arama davranışı ve kültür. IV Anadolu Psikiyatri Günleri. Bilimsel Çalışmalar, Konya. (Help-seeking behavior and culture. Fourth Anatolian Psychiatry Days. Scientific Studies, Konya).
18. George LK, Blazer DG, Hughes DC, Fowler N. Social support and the outcome of major depression. Br J Psychiatry. 1989;154:478-85 (doi:10.1192/bjp.154.4.478).
19. Rogler LH, Cortes DE. Help-seeking pathways: a unifying concept in mental health care. Am J Psychiatry. 1993;150(4):554-61 (doi:10.1176/ajp.150.4.554).
20. Lima BR, Chavez H, Samaniego N, et al. Disaster severity and emotional disturbance: implications for primary mental health care in developing countries. Acta Psychiatr Scand. 1989;79(1):74-82 (doi:10.1111/j.1600-0447.1989.tb09236.x).
21. Brooks N, McKinlay W. Mental health consequences of the Lockerbie disaster. J Trauma Stress. 1992;5:527–43.
22. Soldatos CR, Paparrigopoulos TJ, Pappa DA, Christodoulou GN. Early post-traumatic stress disorder in relation to acute stress reaction: an ICD-10 study among help seekers following an earthquake. Psychiatry Res. 2006;143(2-3):245-53 (doi:10.1016/j.psychres.2005.05.018).
23. Hoiberg A, McCaughey BG. The traumatic aftereffects of collision at sea. Am J Psychiatry. 1984;141(1):70-3 (doi:10.1176/ajp.141.1.70).
24. Kabadayı Şahin E, Sevil F. From Trauma to Post-Traumatic Stress Disorder: Identification of the Risk Factors. Ankara Med J. 2023; 23(2): 241-55.
25. Yılmaz B. Psikolojik İlk Yardım. In: Yüksel Ş, Başterzi AD, eds. Kitlesel Travmalar ve Afetlerde Ruhsal Hastalıkları Önleme, Müdahale ve Sağaltım Kılavuzu. 1st ed. Ankara Türkiye Psikiyatri Derneği; 2021:177-91.
26. Morishima R, Ando S, Araki T, et al. The course of chronic and delayed onset of mental illness and the risk for suicidal ideation after the Great East Japan Earthquake of 2011: A community-based longitudinal study. Psychiatry Res. 2019;273:171-7 (doi:10.1016/j.psychres.2018.12.151).

27. Kavakçı Ö, Yılmaz N, Yelboğa Z. Akut Stres Bozukluğu. In:Aker TA, Taycan O, Çelik F eds. Travma ve Stresörle İlişkili Bozukluklar. 2nd ed. Ankara, Türkiye Psikiyatri Derneği; 2023:117-34.
28. Birur B, Math SB, Fargason RE. A Review of Psychopharmacological Interventions Post-Disaster to Prevent Psychiatric Sequelae. Psychopharmacol Bull. 2017;47(1):8-26.
29. Benedek DM, Friedman MJ, Zatzick D, Ursano RJ Guideline Watch (March 2009): Practice Guideline for the Treatment of Patients with Acute Stress Disorder and Posttraumatic Stress Disorder. Focus (Am Psychiatr Publ). 2009;7(2):153-290.
30. Gelpin E, Bonne O, Peri T, Brandes D, Shalev AY. Treatment of recent trauma survivors with benzodiazepines: a prospective study. J Clin Psychiatry. 1996;57(9):390-4.

ANKARA MEDICAL JOURNAL

Research Article

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PREDICTING THE MENTAL HEALTH OF MEDICAL SCIENCES STUDENTS' THROUGH SPIRITUAL INTELLIGENCE

Marzeyeh Soleymani Nejad[1], Mahmoud Abbasi[1], Fatemeh Estebsari[2], Marzieh Latifi[1]

[1]Medical Ethics and Law Research Center, Shahid Beheshti University of Medical Sciences, Tehran, Iran

[2]Anesthesia Department, School of Nursing and Midwifery, Shahid Beheshti University of Medical Sciences, Tehran, Iran

Correspondence:
Marzieh Latifi (e-mail: marziye_latifi@yahoo.com)

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Ankara Yıldırım Beyazıt University Faculty of Medicine
Department of Family Medicine

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Abstract

Objectives: Mental health is vital for individuals to effectively cope with stress, perform academically, and contribute to society. This study aimed to examine the relationship between the mental health and spiritual intelligence of medical students.

Materials and Methods: The study was conducted on 226 medical students from Shahid Beheshti University of Medical Sciences in 2022. Convenient sampling was used to select participants. Data collection involved the use of demographic, spiritual intelligence, and mental health questionnaires.

Results: The mean age of the participants was 24.87 ± 2.24. Regression test results indicated that spiritual intelligence could predict somatic symptoms (p=0.021), anxiety and insomnia (p=0.012), social dysfunction (p=0.018), and severe depression (p=0.022). There is a significant relationship between marital status and mental health (p=0.031), as well as between gender and spiritual intelligence (p=0.048). However, there was no significant relation observed between marital status and spiritual intelligence (p=0.839), and between gender and mental health (p=0.560). Pearson's correlation test demonstrated a direct and significant relationship between mental health and spiritual intelligence (R=0.211; p=0.012).

Conclusion: The discussion of the findings emphasizes the importance of spiritual intelligence as a determining factor for the mental health of medical students. Recognizing the significance of mental health in this group, interventions that aim to enhance their spiritual intelligence should be considered. It is recommended that educational institutions and healthcare professionals implement interventions and programs that foster the spiritual intelligence of medical students.

Keywords: Spiritual intelligence, general health, mental health.

Introduction

The mental well-being of individuals plays an important role in their overall health and sense of well-being. It helps them cope with stress, perform well in their learning and work, and contribute positively to their community. [1] Poor mental health is associated with issues such as suicidal thoughts and fatigue, drug abuse, and even thoughts of leaving medical sciences students. [2] The World Health Organization (WHO) predicts that depression will become the second leading cause of disease burden in the near future .[3]

Medical students face various stressors that can potentially threaten their mental health. These include a heavy workload, sleep deprivation, dealing with difficult patients, financial concerns, overwhelming amounts of information, career planning, and adjusting to the medical school environment,[4] Additionally, they face pressure from studying, high expectations, exposure to the suffering and deaths of others, and a lack of supportive. [5]

Studies have indicated that stressful conditions have a positive correlation with physical and mental health problems among medical students at various stages of their education .[6]

Mental health problems are a significant issue among students in higher education, with depression being prevalent among around 30% of medical students .[7]

It is worth noting that the prevalence of mental health disorders in both rural and urban areas of Iran is estimated to be around 21.3% and 20.9%, respectively. [8]

Health improvement has a significant relationship with spirituality. Spiritual intelligence goes beyond one's cognitive perceptions of their surroundings and encompasses a higher vision and perspective .[9]

Spirituality is considered a crucial multicultural domain that promotes well-being and healthy coping with conditions such as major depressive disorder. Recognizing the importance of spirituality as an integral part of a holistic approach is essential. [6] Spirituality provides individuals with knowledge that enhances their adaptability to the environment and includes five essential abilities for adaptive behaviors: the ability to align their actions with the integration of the world, self-awareness, exploring and understanding their daily experiences with different emotions, solving life problems using spiritual resources, and engaging in virtuous deeds. [10] Studies conducted on mental health in Iran have highlighted the significant issues faced by adolescents, particularly in urban areas. An increased incidence of mental health problems among adolescents and youth has been observed.[11] The findings of these studies can be valuable in identifying the factors

associated with mental health and developing preventative interventions aimed at promoting the mental well-being of medical students.

Materials and Methods

This cross-sectional study was conducted in 2022 at Shahid Beheshti University of Medical Sciences (SBMU). A convenience sampling method was used to select nursing, midwifery, and pharmacy students who had completed at least two semesters of their academic courses. The sample size was estimated to be 226, considering a confidence level of 95%, an estimated proportion of 0.5, and an error of 0.05 units. To collect data, three questionnaires were utilized:

Demographic Information Questionnaire

This questionnaire included questions on age, gender, major, marital status, and level of education.

General Health Questionnaire (GHQ28): The GHQ28 is a self-administered screening questionnaire designed to detect probable psychiatric disorders. It was originally developed by Goldberg[12] for an international WHO study of psychological disorders in primary health care .[13]

The GHQ28 consists of four subscales: somatic symptoms (items 1–7), anxiety and insomnia (items 8–14), social dysfunction (items 15–21), and severe depression (items 22–28). [12] Each item is scored dichotomously, with "0" indicating the absence of the symptom and "1" indicating the presence of the symptom. [14] The total scores range from 0 to 28, with higher scores indicating worse psychological health. Subjects with a GHQ28 score of 5 or higher were classified as having probable psychological distress, while those with a score below 5 were classified as not having clinically significant psychiatric symptoms .[15]

Prior research has evaluated the reliability and validity of the Persian version of the GHQ-28, yielding acceptable ranges between 0.73 and 0.89.[16]

Spiritual Intelligence Questionnaire: Badie's 42-item spiritual intelligence questionnaire was used in this study. The questionnaire measures four components: beliefs (12 questions), problem-encountering ability (14 questions), moral virtue (9 questions), and self-consciousness (7 questions). The reliability of the questionnaire, assessed using Cronbach's alpha, was found to be 0.69 overall. The alphas for the components of beliefs, problem-encountering ability, moral virtue, and self-consciousness were 0.58, 0.62, 0.72, and 0.64, respectively. [17]

The questionnaires were prepared electronically on the Google Docs platform, and the link was shared with the students through social media channels and platforms supported by the university. Participants were instructed to answer the questions honestly and were assured of the confidentiality of their information. Prior to answering the research questions, they were required to approve an informed consent form.

This study was registered at Shadid Beheshti University Medical Ethics and Law Research Centre with the ethical code IR.SBMU.RETECH.REC.1401.678.

Statistical Analysis

Data were analyzed using SPSS software version 18. After evaluating the normality of the data using the Kolmogorov-Smirnov test, the student's t-test was used to compare the quantitative variables. Pearson's correlation coefficient was used to examine the correlation among variables. Linear regression was used to investigate the predictors of general health. In all analyses, a significance level of less than 0.05 was considered.

Results

The mean age of the participants was 24.87±2.24, with other demographic specifications provided in Table 1.

Table 1. The participants' demographic characteristics (n=226)

	Number (n)	Percentage (%)
Age		
≤20	52	23.00
21-25	123	54.41
26-30	43	19.00
>31	8	3.59
Gender		
Female	104	46.00
Male	122	54.00
Marital status		
Single	188	83.20
Married	38	16.80
Major		
Nursing	128	56.70
Midwifery	72	31.90
Pharmacy	25	11.40
Education		
Bachelor (BS)	166	73.50
Master (MSc)	48	21.20
Doctor of Philosophy (Ph.D.)	12	5.30

The mean score for general health was 12.22±5.10, while spiritual intelligence scored an average of 102.26±14.22

The coefficient for spiritual intelligence predicting somatic symptoms is 0.161. This means that for every one-unit increase in spiritual intelligence, there is a 0.161-unit increase in somatic symptoms. The t-value of 2.180 suggests that this relationship is statistically significant (p=0.021). The coefficient for spiritual intelligence predicting anxiety and insomnia is 0.783. This means that for every one-unit increase in spiritual intelligence, there is a 0.783-unit increase in anxiety and insomnia. The t-value of 1.24 indicates that this relationship is statistically significant (p=0.012). The coefficient for spiritual intelligence predicting social dysfunction is 0.64, for every one-unit increase in spiritual intelligence, there is a 0.64-unit increase in social dysfunction. The t-value of 2.38 suggests that this relationship is statistically significant (p<0.001). The coefficient for spiritual intelligence predicting severe depression is 0.15, for every one-unit increase in spiritual intelligence, there is a 0.15 unit increase in severe depression. The t-value of 2.20 suggests that this relationship is statistically significant (p=0.022).

Overall, the findings indicate that higher levels of spiritual intelligence are associated with increased somatic symptoms, social dysfunction, and severe depression. However, there is no significant relationship between spiritual intelligence anxiety and insomnia (Table 2).

Table 2. Regression analysis summary for spiritual intelligence predicting somatic symptoms, anxiety and insomnia, social dysfunction, and severe depression (n=226)

Variable	B	t	P
Somatic symptoms	0.160	2.181	0.021
Anxiety and insomnia	0.781	1.242	0.012
Social dysfunction	0.642	2.381	0.018
Severe depression	0.151	2.200	0.022

Analysis using independent t-tests revealed a significant relationship between marital status and mental health (p<0.031), as well as between gender and spiritual intelligence (p<0.048). However, there was no significant relationship observed between marital status and spiritual intelligence (p<0.839), and between gender and mental health (p=0.560). Similarly, no significant relationship was found between living situation (living in a dormitory vs living with family) and mental health (p=0.744), or spiritual intelligence (p=0.184). Pearson's correlation test demonstrated a direct and significant relationship between mental health and spiritual intelligence (R=0.211; p=0.012). However, this correlation can be considered weak (Table 3).

Table 3. Correlation between components of mental health and spiritual intelligence (n=226)

Variables	1	2	3	4	5	6
1- Somatic symptoms	1	R=0.611 P<0.001	R=0.312 P<0.001	R=0.344 P<0.001	R=0.763 P<0.001	R=0.261 P=0.040
2-Anxiety and insomnia		1	R=0.25 P=0.003	R=0.500 P<0.001	R=0.820 P<0.001	R=0.011 P=0. 860
3-Social dysfunction			1	R=0.400 P<0.001	R=0.630 P<0.001	R=0.220 P=0.008
4-Severe depression				1	R=0.75 P<0.001	R=0.190 P=0.021
5- Over all mental health					1	R=0.211 P=0.012
6-Spiritual intelligent						1

Discussion

The concept of spiritual intelligence involves contemplating the significance of personal events and conditions and generating meaning and purpose in life. According to the findings of this study, there is a positive and significant relationship between students' spiritual intelligence and their mental health components. Higher spiritual intelligence scores were associated with fewer symptoms of mental illness. Additionally, spiritual intelligence may act as a protective factor against risky behaviors that could threaten mental health. Spiritual intelligence involves understanding one's purpose, values, and beliefs, which guide decision-making and interactions. By fostering self-awareness and empathy, spiritual intelligence shapes behaviors, promoting personal growth, ethical choices, and deeper connections with others, ultimately enhancing overall well-being and life satisfaction.

These results are consistent with previous studies conducted by Chamratrithirong et al [18]. Yousaf et al also emphasized the important role of spiritual intelligence in shaping individual behaviors. [19]

Park et al found that higher levels of spirituality were associated with increased happiness, satisfaction with finances, and reduced psychological distress. [20] Bahrami et al discovered a significant relationship between religious orientation, better self-esteem, and lower likelihood of mental disorders. [21] Numerous studies have also indicated that adults who reported religious beliefs and practices had better mental and physical health compared to those who did not. [22-24]

Our study did not identify any difference between women and men in this regard. Garima et al have reported that marital status has an impact on women's mental health, with unmarried women displaying better mental health than married women. [3] While some studies suggest that women have higher levels of spirituality compared to men [25,26] other studies have presented contradictory results. Males and females have similar levels of spirituality. This difference could be attributed to the gender socialization process and the various social roles held by individuals. [27]

While the study conducted by Dyrbye LN et al., [28] found no significant differences between genders and mental health, Farahangiz S et al.[16] reported a higher prevalence of mental morbidity in males. Furthermore, the mental health of women may be more susceptible to the impact of social and cultural changes in community structure, complexities in social communication networks, and the extensive availability of information resources in societies.

This research demonstrates that married students have lower levels of depression, psychological distress, and psychiatric disorders, as well as higher levels of life satisfaction and subjective well-being. Similar to our study, the research conducted by Al Khatib et al. in the UAE revealed a significant prevalence of depressive symptoms among college students, with female students exhibiting higher levels than their male counterparts. Additionally, single students displayed greater depressive symptoms compared to those who were married.[29]

In conclusion, higher levels of spiritual intelligence could aid medical students in coping with mental disorders. Spiritual coping has the potential to promote mental health and facilitate positive changes in their lives.

Limitation: The use of convenience sampling in this study restricts the generalizability of the results to all students.

Ethical Considerations: This study was registered at Shadid Beheshti University Medical Ethics and Law Research Centre with the ethical code IR.SBMU.RETECH.REC.1401.678.

Conflict of Interest: The authors declare no conflict of interest.

References

1. WHO. World Health Organization. Mental health: strengthening our response. [Internet]. https://www.who.int/news-room/fact-sheets/detail/mental-health-strengthening-our-response. (Accessed: 2024.07).
2. Dyrbye LN, Thomas MR, Power DV, et al. Burnout and serious thoughts of dropping out of medical school: a multi-institutional study. *Academic Medicine.* 2010;85(1):94-102.
3. Garima M, Kiran U. Impact of marital status on mental health of working women. *Journal of medical science and clinical research.* 2014;2(10):2594-605.
4. Dyrbye LN, Thomas MR, Shanafelt TD. Medical student distress: causes, consequences, and proposed solutions. Paper presented at: Mayo Clinic Proceedings2005.
5. Dyrbye L, Shanafelt T. A narrative review on burnout experienced by medical students and residents. *Medical education.* 2016;50(1):132-49.
6. Ahmadi M, Estebsari F, Poormansouri S, Jahani S, Sedighie L. Perceived professional competence in spiritual care and predictive role of spiritual intelligence in Iranian nursing students. *Nurse Education in Practice.* 2021;57:103227.
7. Mao Y, Zhang N, Liu J, Zhu B, He R, Wang X. A systematic review of depression and anxiety in medical students in China. *BMC medical education.* 2019;19(1):1-13.
8. Noorbala AA, Yazdi SB, Yasamy M, Mohammad K. Mental health survey of the adult population in Iran. *The British Journal of Psychiatry.* 2004;184(1):70-3.
9. Bolghan-Abadi M, Ghofrani F, Abde-Khodaei MS. Study of the spiritual intelligence role in predicting university students' quality of life. *Journal of religion and health.* 2014;53(1):79-85.
10. Ebrahimi A, Keykhosrovani M, Dehghani M, Javdan M. Investigating the Relationship between Resiliency, Spiritual Intelligence and Mental Health of a group of undergraduate Students. *Life Science Journal.* 2012;9(1):67-70.
11. Masia-Warner C, Nangle DW, Hansen DJ. Bringing evidence-based child mental health services to the schools: General issues and specific populations. *Education and Treatment of Children.* 2006;29(2):165-72.
12. Goldberg DP. User's guide to the General Health Questionnaire. *Windsor.* 1988.
13. Üstün TB, Sartorius N. *Mental illness in general health care: an international study.* John Wiley & Sons; 1995.
14. Jackson C. The general health questionnaire. *Occupational medicine.* 2007;57(1):79-.
15. Tugnoli S, Spadaro S, Dalla Corte F, Valpiani G, Volta CA, Caracciolo S. Health Related Quality of Life and Mental Health in ICU Survivors: Post-Intensive Care Syndrome Follow-Up and Correlations between

the 36-Item Short Form Health Survey (SF-36) and the General Health Questionnaire (GHQ-28). *Health.* 2022;14(5):477-506.

16. Farahangiz S, Mohebpour F, Salehi A. Assessment of Mental Health among Iranian Medical Students: A Cross-Sectional Study. *International journal of health sciences.* 2016;10(1):49-55 (doi:10.12816/0031216).
17. Koohbanani SE, Dastjerdi R, Vahidi T, Ghanifar M-H. The Relationship Between Spiritual Intelligence and Emotional Intelligence with Life Satisfaction Among Birjand Gifted Female High School Students. *Procedia - Social and Behavioral Sciences.* 2013;84:314-20.
18. Chamratrithirong A, Miller BA, Byrnes HF, et al. Spirituality within the family and the prevention of health risk behavior among adolescents in Bangkok, Thailand. *Social science & medicine.* 2010;71(10):1855-63.
19. Yousaf H. The impact of spiritual intelligence in reducing job stress. *Pollster Journal Academic Research.* 2015;2(02):111-21.
20. Park NS, Lee BS, Sun F, Klemmack DL, Roff LL, Koenig HG. Typologies of religiousness/spirituality: Implications for health and well-being. *Journal of religion and health.* 2013;52(3):828-39.
21. Bahrami E, Tashk A. Aspects of Relationship between Religious Orientation and Mental Health & Assessment of Religious Orientation Scale. 2004.
22. Wong YJ, Rew L, Slaikeu KD. A systematic review of recent research on adolescent religiosity/spirituality and mental health. *Issues in mental health nursing.* 2006;27(2):161-83.
23. Koenig H, McCullough M, Larson D. Handbook of Religion and Health Oxford: Oxford University Press. 2001.
24. Johnstone B, Franklin KL, Yoon DP, Burris J, Shigaki C. Relationships among religiousness, spirituality, and health for individuals with stroke. *Journal of clinical psychology in medical settings.* 2008;15(4):308-13.
25. Bailly N, Martinent G, Ferrand C, et al. Spirituality, social support, and flexibility among older adults: a five-year longitudinal study. *International Psychogeriatrics.* 2018;30(12):1745-52.
26. Rodrigues LR, Nader ID, Silva ATdM, Tavares DMdS, Assunção LMd, Molina NPFM. Spirituality and religiosity related to socio-demographic data of the elderly population. 2017.
27. McFarland MJ. Religion and Mental Health Among Older Adults: Do the Effects of Religious Involvement Vary by Gender? *The Journals of Gerontology: Series B.* 2009;65B(5):621-30 (doi:10.1093/geronb/gbp112).
28. Dyrbye LN, Thomas MR, Shanafelt TD. Systematic review of depression, anxiety, and other indicators of psychological distress among US and Canadian medical students. *Academic medicine.* 2006;81(4):354-73.

29. Al Khatib SA. Satisfaction with life, self-esteem, gender and marital status as predictors of depressive symptoms among United Arab Emirates college students. *International Journal of Psychology Counselling.* 2013;5(3):53-61.

ANKARA MEDICAL JOURNAL

Research Article

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DISASTER AWARENESS AND ASSOCIATED FACTORS AMONG 3RD AND 6TH YEAR STUDENTS OF ANKARA UNIVERSITY FACULTY OF MEDICINE

Zeynep Irmak[1], Zehra Çakıl[1], Seher Çayar[1], Cemal Koçak[1], Meltem Çöl[1]

[1]Department of Public Health, Ankara University Faculty of Medicine, Ankara,Turkey

Correspondence:
Zeynep Irmak (e-mail: zeynp91011@gmail.com)

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Ankara Yıldırım Beyazıt University Faculty of Medicine
Department of Family Medicine

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Abstract

Objectives: This study assessed disaster awareness among 3rd and 6th-year medical students at Ankara University and explored factors influencing their awareness. Understanding this is crucial for preparing future healthcare professionals for emergencies. The study investigates how different stages of medical education and receiving disaster education affect disaster awareness.

Materials and Methods: This cross-sectional study at Ankara University Faculty of Medicine from August to October 2023 assessed disaster awareness among third and sixth-year students. Data were collected via Google Forms using a 20-item questionnaire covering demographics, disaster experiences, and medical school education and a 36-item 'Disaster Awareness Scale'.

Results: A total of 352 participants, 210 in 3rd grade and 142 in 6th grade were included in the study. The mean disaster awareness score was 148.4. Disaster awareness was found to be higher in sixth-grade students who received disaster education at the medical faculty and those who participated in disaster drills. The scale scores of the participants who had experienced an earthquake and had a disaster experienced in their close circle were also higher.

Conclusion: The study revealed that the disaster awareness of the sixth-grade students those who received disaster education at the medical faculty, those who had experienced an earthquake, those whose close circle had experienced a disaster, and those who had participated in a disaster drill were significantly higher. These results emphasize the importance of formal education and drills in disaster preparedness. Therefore, it is recommended that disaster preparedness education should be disseminated and developed in all faculties.

Keywords: Disasters, awareness, students, medical.

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Introduction

Disasters are significant events that severely disrupt the normal functioning of a society and exceed its capacity to cope with the situation using its resources. Disasters can arise from natural or human-made hazards, as well as from various factors affecting a community's exposure and vulnerability.[1] In recent years, factors such as rapid population growth worldwide, environmental degradation, and global climate change have increasingly amplified the social, biological, and economic impacts of natural disasters.[2,3] According to a 2023 report by the United Nations Office for Disaster Risk Reduction (UNDRR), climate change-related disasters are threatening global economic and development gains. These disasters disproportionately impact poorer communities. Extreme weather events, such as the 2022 floods in Pakistan and droughts in the Horn of Africa, displaced 12 million children in countries with some of the lowest literacy rates in the world.[4] At the same time, disasters are a serious public health issue that disrupts physical, mental, and social well-being, leading to high morbidity and mortality. They strain health and social care services and impose a heavy burden on socioeconomic and political systems.[5]

Disaster awareness is not limited to taking action during or after a disaster; it also includes taking necessary precautions and making comprehensive preparations before disasters occur. This proactive approach is critical for minimizing disaster risk and making the community resilient to potential catastrophes. The measures taken and effective interventions during a disaster can play a significant role in reducing its impacts and enabling the community to recover more quickly.[6]

Due to its geographical location and geological structure, Turkey is exposed to various natural disasters. It is situated in a region that can be considered 'high risk' globally in terms of earthquakes. On average, large-scale earthquakes causing significant loss of life and property occur every five years. In addition to earthquakes, disasters such as landslides, floods, rockfalls, and avalanches frequently occur in various regions and seasons.[7] The major earthquake centered in Kahramanmaraş on February 6, 2023, which affected eleven provinces, once again highlighted that Turkey is a country with a high earthquake risk. The earthquakes, which turned into disasters as a result of a chain of negligence, remind us of the necessity to increase the measures and preparations that need to be taken in our country. Adopting more comprehensive and effective strategies to minimize the impacts of natural disasters will enhance the community's resilience against them.

It is important for physicians, who play a critical role during disasters, to recognize, understand, and be prepared for natural disasters in an informed manner. Medical schools are the primary places where physicians acquire the knowledge and skills related to disasters. The education provided by medical schools enables students, as future health professionals, to act effectively during disasters and contribute to the mission of protecting public health. During the medical school education process, lectures related to disasters, drills,

practices, emergency patient care, and other studies are included, and it is necessary to determine the impact of these trainings on disaster awareness.

Disaster-related lectures, drills, practical applications, and emergency patient care are part of the medical school curriculum. The importance of enhancing education in disaster medicine is widely recognized.[8] Assessing the impact of this training on disaster awareness can help shape future educational programs. Therefore, this study aims to evaluate disaster awareness and influencing factors among third and sixth-year students at Ankara University Faculty of Medicine.

Materials and Methods

The study was conducted as a cross-sectional research at Ankara University Faculty of Medicine between August and October 2023. At Ankara University Faculty of Medicine, the "Health Services Management in Disasters" lecture is provided in the fifth year. Third-year medical students represent a group in the preclinical period who have not yet taken many practical, clinical lectures, and lectures related to disasters, while sixth-year students represent a group who have taken various clinical and practical lectures, including lectures related to disasters, and have also learned how to approach emergencies. Therefore, these two groups were included in the study, particularly to measure the impact of the education provided. The disaster education received outside the medical faculty is based on the statements of the participants. The source and content of the education were not questioned. The sample size was calculated using the Epi-Info program in a population of 768 individuals consisting of third and sixth-year students. The minimum sample size was determined as 257. A total of 352 individuals, 210 from the third year and 142 from the sixth year consented to participate in the study. Due to incomplete responses from 14 participants to the scale questions, the responses of 338 participants were included in the univariate and multivariate analyses.

Data were collected via Google Forms using a 20-item questionnaire covering demographics, disaster experiences, and medical school education and a 36-item 'Disaster Awareness Scale'. The Disaster Awareness Scale, developed by Dikmenli Y, Yakar H, and Konca AS. (2018), consists of 36 items and is scored on a five-point Likert scale ranging from 1 to 5. The items in the scale are scored as follows: (1) 'strongly disagree', (2) 'disagree', (3) 'neutral', (4) 'agree', and (5) 'strongly agree'. It comprises 27 positive and 9 negative statements, with the lowest possible score being 36 and the highest score being 180. A high score on the scale indicates a high level of disaster awareness among students.

The research received approval from the Ankara University Scientific Research Ethics Committee (protocol no: 2023000442-1). Necessary permissions were obtained from the Ankara University Faculty of Medicine Dean's Office for implementation and from Assoc. Prof. Dr. Yurdal Dikmenli, the developer of the scale.

Statistical analysis

The analysis was performed using SPSS 26.0 for Windows (SPSS, Inc.; Chicago, USA). Descriptive statistics are presented as frequency (n), percentage (%), mean (M), standard deviation (SD), median, minimum (min), and maximum (max) values. Categorical variables were compared using chi-square tests. The normal distribution of continuous variables was examined visually (histograms and probability plots) and analytically (Kolmogorov-Smirnov and Shapiro-Wilk tests). Due to the continuous variables not adhering to a normal distribution, nonparametric tests (Mann-Whitney U and Kruskal-Wallis tests) were utilized for comparison. The relationship between continuous variables was assessed using the Spearman correlation test. The Disaster Awareness Scale was grouped according to the median value (below 150 points, 150 points, and above), and logistic regression analysis was performed with the grouped scale as the dependent variable. Variables with $p<0.25$ in univariate analyses were taken as independent variables in the regression analysis. A significance level of $p<0.05$ was considered for all analyses.

Results

The sociodemographic and disaster-related characteristics of the total 352 participants, including 210 from the third year and 142 from the sixth year, are presented in Table 1. According to this, 191 of the participants are female and 160 are male. Looking at the educational status of the students' parents, it is observed that 75.56% of mothers and 84.37% of fathers are at least high school graduates. Additionally, 10.22% of students' families reside in one of the 11 provinces affected by the Kahramanmaraş earthquake. 65.05% of students have encountered a disaster at least once, with the majority of these disasters (58.88%) being earthquakes. Moreover, 72.15% of participants reported that their close surroundings have also experienced a disaster. In the study, 21.30% of students stated that they received education on disasters from the medical faculty, and 70.73% participated in disaster drills. The main sources of information for participants were the internet/social media (95.45%) and TV (47.44%), while the proportion of participants receiving education on disasters outside of the medical faculty was 35.79%.

When comparing third-year and sixth-year students (Table 2), the proportion of third-year students whose families reside in earthquake-affected provinces ($p=0.024$), those who have encountered a disaster at least once ($p<0.001$), those who have encountered earthquakes specifically among disaster types ($p=0.001$), and those who express knowledge about earthquakes ($p=0.036$) is significantly higher. On the other hand, the rate of receiving disaster education at the medical faculty was found to be higher among sixth-year students compared to third-year students (35.91% versus 11.42%; $p<0.001$). No significant difference was observed between the two groups in terms of participation in drills and receiving education on disasters outside of the medical faculty ($p>0.05$).

Table 1. Socio-demographic Characteristics and Disaster Status of the Students

Variable	Categories	n	%
Gender	Female	191	54.26
	Male	161	45.73
Mother's Education Level	Primary school or below	59	16.76
	Middle school	27	7.67
	High school	94	26.70
	University or above	172	48.86
Father's Education Level	Primary school or below	26	7.38
	Middle school	29	8.23
	High school	62	17.61
	University or above	235	66.76
Location of Family Residence	Earthquake-prone areas*	36	10.22
	Other areas	316	89.77
Encounter with Disasters (earthquake, flood, fire, etc.)	Never experienced	123	34.94
	Experienced at least once	229	65.05
Type of Disaster Encountered**	Earthquake	207	58.88
	Flood	37	10.51
	Fire	36	10.22
	Other (landslide, storm, etc.)	8	2.27
Disaster Experience in the Close Circle	Yes	254	72.15
	No	98	27.84
Receiving Disaster Education in Medical School	Yes	75	21.30
	No	277	78.69
Participation in Disaster Drill	Yes	249	70.73
	No	103	29.26
Sources Used for Information**	Internet/Social Media	336	95.45
	TV	167	47.44
	Seminars and Training	81	23.01
	Books	50	14.20
	Radio	11	3.12
Receiving Education on Disasters Outside of Medical Faculty	Yes	126	35.79
	No	226	64.20

n: frequency, %: column percentage *: Cities affected by the February 6 Kahramanmaraş earthquake (Adana, Adıyaman, Diyarbakır, Gaziantep, Hatay, Kahramanmaraş, Kilis, Malatya, Osmaniye, Şanlıurfa, Elâzığ)
**: Questions that can be marked with more than one option.

The comparison of responses provided by participants who completed the questionnaire items without missing responses, based on the scores obtained from the scale is presented in Table 3. The total mean score obtained from the disaster awareness perception scale for all participants was 148.4±15.3, with a median of 150 and a distribution ranging from 71 to 180. When looking at the distribution of the disaster awareness perception scale, scores based on certain characteristics, the median scale score of sixth-year students (153.0) is significantly higher than that of third-year students (148.0) (p=0.001); the scores of those who express knowledge about any disaster (p=0.025), those who received education on disasters at the medical faculty (p=0.048), and those who participated in disaster drills are statistically significantly higher (p=0.002). No

significant difference was observed in the scale scores based on gender, parents' educational status, family's place of residence, type of encountered disaster, personal and close surroundings' encounter with disasters, and receiving education on disasters outside of the medical faculty.

Table 2. Comparison of Disaster-Related Experiences and Education of 3rd and 6th-Year Students

		Class				p*
		3rd Year		6th Year		
		n	%	n	%	
Location of Family Residence	Earthquake-prone areas**	28	12.85	8	5.63	**0.024**
	Other areas	182	86.66	134	94.36	
Encounter with Disasters (earthquake. flood. fire. etc.)	Never	58	27.61	65	45.77	**<0.001**
	At least once	152	72.38	77	54.22	
Type of encountered disasters* **	Earthquake	138	65.71	69	48.59	**0.001**
	Flood	27	12.85	10	6.71	0.117
	Fire	22	10.47	14	9.85	0.993
Type of Disaster Students Have Knowlege About* **	Earthquake	204	97.14	131	92.25	**0.036**
	Flood	78	37.14	59	41.54	0.406
	Fire	121	57.61	84	59.15	0.774
	Landslide	46	21.90	38	26.76	0.294
Receiving disaster-related Education at the medical faculty	Yes	24	11.42	51	35.91	**<0.001**
	No	186	88.57	91	64.08	
Participation in Disaster Drill	Yes	149	70.95	100	70.42	0.915
	No	61	29.04	42	29.57	
Received Disaster-related Education Outside of Medical School	Yes	82	39.04	44	30.98	0.101
	No	128	60.95	98	69.01	

*Pearson chi-square test. ** Cities affected by the February 6 Kahramanmaraş earthquake (Adana, Adıyaman, Diyarbakır, Gaziantep, Hatay, Kahramanmaraş, Kilis, Malatya, Osmaniye, Şanlıurfa, Elâzığ) *** Questions that can be marked with more than one option.

Logistic regression analysis was conducted to evaluate the impact of certain characteristics of students who participated in the study and provided complete responses on the disaster awareness scale score (Table 4). The scale score was 1.88 times higher in sixth-year students compared to third-year students (95% CI 1.19-2.97, p=0.007); 1.79 times higher in those who had previously encountered earthquakes compared to those who had not (95% CI 1.07-2.99, p=0.027); and 2.25 times higher in those whose close circle had encountered disasters compared to those whose close circle had not (95% CI 1.29-3.93, p=0.005). There was no significant difference in other variables (p>0.05). It was observed that knowing disasters did not have a significant effect compared to those without knowledge.

Table 3. Distribution of Disaster Awareness Scores According to Some Characteristics of Students

		n	Mean±SD	Median	Min-Max	p
Disaster Awareness Scores	**Total**	338	148.4±15.3	150	71-180	-
Characteristics						
Class	3rd Year	199	146.0±16.0	148.0	71-180	**0.001**
	6th Year	139	151.1±14.0	153.0	97-177	
Gender	Female	185	149.6±12.4	150	108-180	0.433
	Male	152	146.3±18.3	149	71-174	
Mother's Education Level	Primary school or below	59	149.2±17.0	149	71-177	0.563
	Middle school	27	146.0±17.0	150	97-171	
	High school	93	149.3±15.0	151	71-180	
	University or above	159	147.4±14.9	149	87-178	
Father's Education Level	Primary school or below	26	153.0±11.4	150	131-172	0.525
	Middle school	28	151.0±13.2	150	119-177	
	High school	62	149.3±14.0	150	71-173	
	University or above	222	147.0±16.4	149	71-180	
Location of Family Residence	Earthquake-prone areas*	33	144.0±20.4	147	71-174	0.185
	Other areas	303	149.0±14.3	150	71-180	
Encounter with Disasters (earthquake, flood, fire, etc.)	Never	117	149.7±13.7	151	97-180	0.218
	At least once	221	147.3±16.2	149	71-178	
Encounter with Earthquake	Yes	199	146.8±16.7	148.0	71-178	0.109
	No	139	149.9±13.1	151.0	97-180	
Encounter with Flood	Yes	35	147.9±20.9	152.0	71-174	0.479
	No	303	148.1±14.7	149.0	71-180	
Encounter with Fire	Yes	34	148.0±20.9	150.5	71-172	0.422
	No	304	148.1±14.7	149.5	71-180	
Disaster Experience in the Close Circle	Yes	244	149.0±15.1	150	71-180	0.099
	No	94	146.0±16.0	147	87-173	
Knowledge about disasters	Yes	325	148.4±15.3	150	71-180	**0.025**
	No	13	139.9±16.8	141	97-167	
Receiving Disaster Education in Medical School	Yes	72	151.1±13.7	152	107-178	**0.048**
	No	266	147.2±15.7	149	71-180	
Education on disaster other than medical faculty	Yes	119	149.8±14.0	152	90-178	0.201
	No	218	147.2±16.1	148.5	71-180	
Participation in a disaster drill	Yes	238	149.7±15.3	150	71-180	**0.002**
	No	100	144.3±15.4	147	87-174	

n: frequency. SD: standard deviation. *Provinces affected by the February 6 Kahramanmaraş earthquake (Adana, Adıyaman, Diyarbakır, Gaziantep, Hatay, Kahramanmaraş, Kilis, Malatya, Osmaniye, Şanlıurfa, Elâzığ)

Table 4. Logistic Regression Analysis Results to Evaluate the Impact of Some Characteristics of Students Participating in the Study on Disaster Awareness Score

	OR	%95 CI		p
		Lower Limit	Upper Limit	
Class 6th Year (ref.: 3rd Year)	1.88	1.19	2.97	**0.007**
Encounter with Earthquake Yes (ref.: No)	1.79	1.07	2.99	**0.027**
Disaster Experience in the Close Circle Yes (ref.: No)	2.25	1.29	3.93	**0.005**
Knowledge about disasters Yes (ref.: No)	3.42	1.00	11.70	0.051

* The regression analysis was conducted using the backward LR method. The final model was reached in 4 steps. Ref.: reference. OR: odds ratio. CI: confidence interval. p: significance level

Discussion

A total of 352 students. including 210 third-year and 142 sixth-year students. participated in this study conducted to assess the disaster awareness of medical students and the factors influencing this awareness at Ankara Faculty of Medicine.

The median score obtained by students from the scale was determined to be 150.0, with a mean score of 148.4. In the study conducted by Yakar and Dikmenli with teacher candidates, the average score of students' disaster awareness level was found to be 121.69.[6] In a study conducted by Tozun et al. with medical faculty students, disaster awareness levels of students were found to be high.[7] This situation may be attributed to medical students generally receiving comprehensive education in the field of health, as well as specific competencies gained through medical education to cope with emergencies and effectively respond to crises.

In this study, it was observed that 10.22% of the students' families resided in the regions affected by the Kahramanmaraş earthquake. It has been determined that 65.05% of the students have encountered a disaster at least once. The most common disaster encountered by the students was an earthquake (58.88%). The rate of encountering a disaster in the close circle of the students is 72.15%. In a similar study conducted by Şekerci et al., 89% of university students had experienced an earthquake.[9] According to the Turkey Disaster Awareness and Preparedness Study conducted by the Disaster and Emergency Management Authority in 2014, 56.5% of participants reported having experienced an earthquake. The high percentage is a predictable outcome given Turkey's location in an earthquake zone and the frequent occurrence of earthquakes in the region.[10] The fact

that Turkey is located in a seismic belt and experiences frequent earthquakes indicates that these high percentages are an expected outcome.

In this study, only 21.30% of medical students reported receiving disaster education at the medical faculty, whereas participation in drills was notably high at 70.73%. However, the proportion of students who reported receiving disaster education outside of the medical faculty was 35.79%. In a study conducted with nursing students, it was reported that 20.5% participated in drills related to disasters and/or emergencies.[11] Additionally, Şen and Ersoy's (2017) study found that 27.1% of hospital disaster team members participated in drills.[12] These findings suggest that education received by the medical faculty enhances awareness and participation in practical applications. They also highlight the need to increase disaster education and drills in other healthcare disciplines.

In our study, the internet/social media and television were the most frequently used sources of information. with percentages of 95.45% and 47.44%, respectively. In a study by Avcı et al. (2020) with nursing students, it was found that 66.4% of participants preferred using the Internet as their primary source for disaster-related information, while 64.9% relied on television as a source of information.[11] Similarly, a study conducted with middle school students found that social media was the most commonly used source of information for disaster preparedness, with 78.8% of students relying on it.[13] These results indicate that students and young people frequently use accessible media such as social media and TV as information sources. The findings emphasize the need to strengthen disaster information strategies through both digital and traditional media channels.

When comparing third and sixth-semester students, although third-semester students indicated that their families had lived in areas affected by earthquakes more frequently, they had encountered disasters, especially earthquakes, more often, and had more knowledge about earthquakes, the rate of receiving disaster education in medical school was higher among sixth-semester students. The proportion of students receiving disaster education at the medical faculty is, as expected, higher among sixth-year students. There was no significant difference between the two groups in terms of participation in drills and receiving education outside of medical school.

The median scale score of sixth-semester students (153.0) is significantly higher than that of third-semester students (148.0) in both univariate and multivariate analyses. The higher level of awareness among sixth-semester students may be attributed to their completion of disaster-related lectures, as well as their opportunities to translate theoretical knowledge into practice and develop skills in emergency management. Similarly, in a study conducted by Tozun et al. among medical faculty students, it was found that the preparedness levels for disasters were higher in upper-class students compared to first-year students.[7]

In our study, there was no significant difference in disaster awareness between male and female students (p=0.433). Similarly, in a study conducted by Nofal et al., the average scores of disaster and emergency preparedness knowledge did not vary according to gender.[14] On the other hand, Tozun et al.'s study found that disaster awareness levels were higher among women. These differing results suggest that individual knowledge and experience may be more influential than gender in determining disaster awareness.[7]

Students who reported receiving disaster education at the medical faculty had significantly higher disaster awareness scale scores in univariate analysis. Similarly, Ayvazoğlu et al.'s study with university students, using the 'Disaster Risk Perception and Preparedness Scale,' highlighted a significant difference between disaster risk perception levels and receiving disaster education.[15] Another study with university students found a significant difference between disaster awareness knowledge scores and receiving disaster education.[16] However, in our study, participants who took part in disaster drills had significantly higher scale scores in univariate analysis. Similarly, Şen and Ersoy's study (2017) also found that those who had previously participated in drills had significantly higher disaster awareness.[12] Additionally, Kapucu and Khosa's research (2013) also indicated a positive relationship between education and drills and disaster resilience and preparedness.[17] These findings demonstrate that disaster education and drills have a significant positive impact on individuals' disaster awareness and preparedness levels. They emphasize the critical importance of education and drills in enhancing disaster awareness and improving preparedness.

In multivariate analysis, individuals who had experienced earthquakes and those whose close circles had encountered disasters had significantly higher scale scores compared to those who had not. This may be attributed to the more devastating and traumatic effects of earthquakes compared to other types of disasters in our country. Additionally, sharing experiences of disasters within one's close circle may increase sensitivity to the issue. Research also indicates that disaster experiences serve as a primary driver for disaster awareness and preparedness.[18]

Our study indicates that disaster awareness among medical students, particularly among sixth-year students who received disaster education is high. Multivariate analysis revealed that disaster education, personal experience with earthquakes, and having close relatives affected by disasters were significant factors influencing awareness. These findings highlight the need for comprehensive disaster education programs that begin in the preclinical years, equipping students with the knowledge and skills to effectively prepare for and respond to disasters.

Further research should explore the long-term impact of disaster education on students' preparedness and response in real-life situations. Additionally, investigating the effectiveness of various educational methods, such as simulations or hands-on drills, can provide valuable insights for improving disaster preparedness

programs in medical education. Expanding these programs to include more diverse disaster scenarios and incorporating feedback from students can further enhance their effectiveness.

Limitations

Since the study was conducted only among students from Ankara University Faculty of Medicine in the 3rd and 6th terms, it represents only this specific group and can not be generalized to all medical faculties or other faculties. Additionally. limitations of online surveys can also impact the results.

Ethical Considerations: The research received approval from the Ankara University Scientific Research Ethics Committee (protocol no: 2023000442-1). Necessary permissions were obtained from the Ankara University Faculty of Medicine Dean's Office for implementation and from Assoc. Prof. Dr. Yurdal Dikmenli, the developer of the scale.

Conflict of Interest: The authors declare no conflict of interest.

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References

1. IFRC What is a disaster? [Internet]. https://www.ifrc.org/our-work/disasters-climate-and-crises/what-disaster. (28.10.2023).
2. Rogayan DJ, Dollete L. Disaster Awareness and Preparedness of Barrio Community in Zambales, Philippines: Creating a Baseline for Curricular Integration and Extension Program. *Review of International Geographical Education Online.* 2020;10(2):92-114. (https://doi.org/10.33403/rigeo.634564
3. Varol N, Kaya, Ç. M. Transdisciplinary Approach in Disaster Risk Management. *Journal of Disaster and Risk*. 2018;1 (1):1-8.
4. UNDRR GAR Special Report 2023: Mapping resilience for the sustainable development goals [Internet]. https://www.undrr.org/gar/gar2023-special-report (Accessed: 15.08.2024).
5. Çöl M, Çebi E. Acil Durumlar ve Afetlerle İlgili Genel Bilgiler: Acil Durumlar ve Afetlerde Halk Sağlığı Hizmetleri [Internet]. 2023; http://www.medicine.ankara.edu.tr/wp-content/uploads/sites/121/2023/08/Acil-Durumlar-ve-Afetlerde-Halk-Sagligi-Hizmetleri.pdf. (Accessed: 13.05.2024).
6. Dikmenli Y, Yakar H, Konca AS. Development of Disaster Awareness Scale: A Validity and Reliability Study. *Review of International Geographical Education Online*.2018;8(2):206–20.
7. Tozun M, Zengi I, Kart BC, Ugur E, Cumen M, Kalender S, et al. Assessment of Disaster Preparedness Level of Medical Students of a University, Turkey. *European Journal of Environment and Public Health* 2022;6(1):em0107. (https://doi.org/10.21601/ejeph/11834)
8. Ingrassia PL, Ragazzoni L, Tengattini M, Carenzo L, Della Corte F. Nationwide Program of Education for Undergraduates in the Field of Disaster Medicine: Development of a Core Curriculum Centered on Blended Learning and Simulation Tools. *Prehospital and Disaster Medicine.* 2014;29(5):508-515. (https://doi.org/10.1017/S1049023X14000831)
9. Gümüş Şekerci Y, Ayvazoğlu G, Çekiç M. Determination of Basic Disaster Awareness and Awareness Levels of University Students. Gümüşhane University Journal of Health Sciences. 2023;12(1):74-81.(doi:10.37989/gumussagbil.1136227)
10. Disaster Management and Natural Disaster Statistics in Turkey [Internet]. https://www.afad.gov.tr/kurumlar/afad.gov.tr/35429/xfiles/turkiye_de_afetler.pdf (Accessed:10.11.2023).
11. Avcı S, Kaplan B, Ortabağ T. The Level of Knowledge and Awareness of Nursing Students about Disasters. *Resilience.* 2020;4(1), 89-101. (https://doi.org/10.32569/resilience.619897)
12. Şen G, Ersoy G. Evaluating the Level of Knowledge of a Hospital Disaster Relief Team about Disaster Preparedness. *Gümüşhane University Journal Of Health Sciences*. 2017;6(4):122-30.

13. Alkalash SH, Alhashmi Alamer EH, Allihyani AM, Alhazmi AS, Alharthi RM, Bugis AM. Knowledge of and Attitude Toward Disaster Preparedness Among Secondary School Students in the Western Region of Saudi Arabia. *Cureus.* 2023; 18;15(1):e33926. (doi: 10.7759/cureus.33926.)
14. Nofal A, Alfayyad I, Khan A, Aseri Z Al, Abu-Shaheen A. Knowledge, attitudes, and practices of emergency department staff towards disaster and emergency preparedness at tertiary health care hospital in central Saudi Arabia. *Saudi Med J*. 2018;39(11):1123–9.
15. Ayvazoğlu G, Çekiç M, Yücel H. Evaluatıon Of Dısaster Rısk Perceptıon And Dısaster Preparedness Of Hatay Mustafa Kemal Unıversıty Students. *Electronic Journal of Social Sciences.* 2020;7(7):85–96.
16. İnal E, Kocagöz S, Turan M. Basic Disaster Consciousness and Preparation Levels. *Turk J Emerg Med.* 2012;12(1):15–9.
17. Kapucu N, Khosa S. Disaster Resiliency and Culture of Preparedness for University and College Campuses. *Administration & Society*. 2013;45(1):3–37. (https://doi.org/10.1177/0095399712471626)
18. Hoffmann R, Muttarak R.Learn from the past, prepare for the future: Impacts of education and experience on disaster preparedness in the Philippines and Thailand. World Development, 2017;96:32-51.(https://doi.org/10.1016/j.worlddev.2017.02.016)

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EVALUATION OF PREGNANT AND POSTPARTUM WOMEN'S PERSPECTIVES ON FAMILY PLANNING METHODS

Ayşe Yağmahan[1], Emre Erdem Taş[2]

[1]Erzincan Community Health Center, Erzincan, Türkiye

[2] Department of Gynecology and Obstetrics, T.C. Health Sciences University, Ankara Bilkent City Hospital, Ankara, Türkiye

Correspondence:

Ayşe Yağmahan (ayseyns9323@hotmail.com)

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Ankara Yıldırım Beyazıt University Faculty of Medicine

Department of Family Medicine

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Abstract

Objectives: This study aimed to assess family planning (FP) method preferences in pregnant and postpartum women, identify influencing factors, and emphasize the role of family medicine in FP counseling.

Materials and Methods: This cross-sectional study included 206 pregnant women in Antenatal Clinics and 206 postpartum women from the Newborn Clinic in Ankara Bilkent City Hospital. Data collection used a 52-item questionnaire. Descriptive statistics were presented as numbers, percentages, means ± standard deviations, and medians. Comparative statistics employed Kruskal-Wallis, Mann-Whitney U, and Chi-square tests, with $p<0.05$ considered significant.

Results: Most participants had completed high school or university education. Most patients had a single pregnancy and were aware of at least one modern FP method. Many patients with multiple pregnancies had an interpregnancy interval of <2 years. Approximately 21.2% of patients experienced unplanned pregnancies, mainly despite contraception, often using withdrawal. A total of 66.7% knew about FP counseling in family medicine. As education levels increased, total pregnancies, unplanned pregnancies, and intervals of <2 years decreased. A significant relationship existed between the total number of pregnancies and postpartum FP method choice. Age was also statistically related to the usage rate of the pre-pregnancy contraceptive method.

Conclusion: Awareness and use of modern FP methods in the community were below the desired level. Factors contributing to this include low education levels and a lack of awareness about obtaining FP counseling from family physicians. Family physicians, as providers of preventive services, play a crucial role in providing accurate information regarding FP during pregnancy and the postpartum period.

Keywords: Family medicine, family planning, pregnant, postpartum.

Introduction

Family planning (FP) encompasses practices that support individuals in achieving desired parenthood based on age, health, and economic conditions, ensuring planned pregnancies. It is a holistic concept addressing social, psychological, economic, and religious factors.[1-2] FP services are essential to reproductive health, viewed as a societal issue encompassing basic human rights and health rights.[3] The 2030 Sustainable Development Agenda incorporates specific goals related to reproductive health and FP, placing increased emphasis on sexual and reproductive health in national initiatives and programs.[4]

Thanks to FP, individuals can avoid untimely and unplanned pregnancies. According to data from the World Health Organization (WHO) in 2017, modern contraceptive methods prevented around 308 million unintended pregnancies.[5] Furthermore, WHO reported that around 50% of yearly pregnancies are unintended, and 60% of these unintended pregnancies result in voluntary abortions, which constitutes about 30% of all pregnancies.[6]

FP reduces maternal and infant mortality by addressing fertility practices, such as early or late childbirth, excessive pregnancies, and short birth intervals. WHO research indicates that infants born with intervals under two years have a 45-60% higher mortality rate than those with intervals over two years.[7] In a study based on 2001 data from the United Nations Development Program, the infant mortality rate was significantly higher for women giving birth in their 40s compared to those in their 20s and 30s.[7]

In the year 2020, it was estimated that approximately 1.9 billion women aged 15 to 49 (reproductive age) worldwide required family planning (FP) services.[8] Out of these, the percentage of women using any FP method during the period between 2000 and 2020 increased from 47.7% to 49%.[8] Additionally, the proportion of women using modern FP methods rose from 73.6% in 2000 to 76.8% in 2020, to reach 80% by 2030.

Among women who utilize family planning methods, 28% discontinue their use within the first year, largely because of their desire to become pregnant or experience pregnancy while using the method. Furthermore, 12% of married women do not employ any contraceptive methods, even though they intend to space or restrict the number of children they have. Over the past 30 years, there has been an increase in the use of modern methods from 31% to 49%, while the use of traditional methods has decreased from 32% to 21%.[9]

Successful implementation of family planning (FP) programs relies heavily on the provision of FP counseling services. Comprehensive FP counseling not only benefits couples but also has a broader impact on the community, improving reproductive health management. Moreover, individuals who receive counseling services are better informed when selecting an FP method that aligns with their sociocultural and obstetric characteristics.[10-11] Family medicine serves as the initial point of contact with the healthcare system, utilizing

a biopsychosocial approach to provide comprehensive health services in easily accessible community locations, regardless of individual factors such as gender, age, or illness, and offering continuous care.[12] As a trusted and accessible source for individuals seeking advice on medical matters, family medicine effectively provides accurate information about FP methods, preventing misuse.[13]

Materials and Methods

Sample

The sample size for the study was determined using G*Power Ver. 3.1.9.4 Software® (Germany) power analysis program. This study evaluated two groups, pregnant and postpartum, and involved 412 cases, with 206 cases in each group. The type 1 error (α) was set at 0.05, the effect size was 0.2, and the chi-squared test was used. The power of this study was 90%.

Data Collection

The study comprised 412 individuals, including 206 pregnant women from the Obstetrics Clinic and 206 postpartum women from the Neonatology Clinic of the X Hospital. These individuals were recruited between December 23, 2022, and January 31, 2023.

This was an observational, cross-sectional survey that utilized a form developed by the researcher. The survey consisted of three sections, with a total of 52 questions. The sections included questions regarding sociodemographic, obstetric, and FP characteristics. The survey was administered face-to-face voluntarily to participants who met the inclusion criteria.

Ethical Considerations

This study was approved by the Ethics Committee of Ankara Bilkent City Hospital on December 23, 2022.

Statistical Analysis

The Statistical Package for Social Sciences 23.0 (SPSS Inc., Chicago, USA) was used for statistical analysis of the research data. In the descriptive statistics section, categorical variables were presented as numbers and percentages, whereas numerical variables were presented as means ± standard deviations. For the comparison of numerical data, the Student's t-test was used for two groups, and the One-way ANOVA test was used for comparisons involving three or more groups. Categorical variables were compared using the chi-squared test.

A post-hoc Bonferroni correction was applied for meaningful differences in comparisons other than 2×2 in categorical data. In this study, the significance level was set at $p<0.05$.

Results

Sociodemographic Characteristics

This study includes 412 participants: 206 pregnant women (average age: 27.36 ± 5.06 years, marriage age: 22.52 ± 4.02 years, marriage duration: 4.88 ± 4.32 years) and 206 postpartum women (average age: 28.46 ± 5.07 years, marriage age: 22.87 ± 4.04 years, marriage duration: 5.60 ± 4.77 years). There were no significant differences between the groups in terms of age, age at marriage, or marriage duration (p values were <0.05, respectively).

The vast majority of the participants had graduated from high school (39.8% of pregnant women and 38.8% of postpartum women) or university (35.0% of pregnant women and 36.9% of postpartum women). Housewives comprised 72.3% of the pregnant women and 71.4% of the postpartum women. Additionally, 91.7% of the pregnant women and 87.9% of the postpartum women had health insurance (Table 1). The groups did not differ in terms of educational status, occupation, or health insurance (p values were <0.05, respectively).

Table 1. The Pregnant and Postpartum groups' characteristics on educational status, occupation, and health insurance

		Pregnant		Postpartum		X^2	P
		Number (n)	Percent (%)	Number (n)	Percent (%)		
Educational Status	**Elementary School**	11	5,3	17	8,3	3,61	0,46
	Middle School	41	19,9	33	16,0		
	High School	82	39,8	80	38,8		
	University	72	35,0	76	36,9		
Occupation	**Housewife**	149	72,3	147	71,4	0,04	0,82
	Employee	57	27,7	59	28,6		
Health Insurance	**Exist**	189	91,7	181	87,9	1,69	0,19
	Not Exist	17	8,3	25	12,1		

Obstetric Characteristics

A total of 44.2% of pregnant women and 42.2% of postpartum women had a single pregnancy. Moreover, 48.1% of the pregnant women had never given birth, while 50.5% of the postpartum women had one childbirth. In total, 53.4% of the pregnant women and 63.1% of the postpartum women used contraception before their first pregnancy. Among them, 52.7% of the pregnant women and 57.7% of the postpartum women chose modern contraceptive methods.

A total of 49.0% of the pregnant women had no living children, whereas 52.4% of the postpartum women had two or more children. Among the pregnant women, 24.5% had an age difference of less than 2 years between their last two children and 75.5% had an age difference of more than 2 years. Among postpartum women, 16.7% had an age difference of less than 2 years and 83.3% had an age difference of more than 2 years.

A total of 21.4% of pregnant women had a miscarriage and 18.0% had an abortion. Among postpartum women, 17.5% experienced a miscarriage, and 13.1% had an abortion.

In total, 23.8% of the pregnant women and 18.9% of the postpartum women reported unwanted pregnancies. Among them, 28.6% of the pregnant women and 33.3% of the postpartum women indicated that they did not use contraceptive methods. Among contraceptive users, 45.7% of the pregnant women and 42.3% of the postpartum women used modern methods. Regarding the outcomes of unwanted pregnancies, 35.7% of pregnant women had spontaneous miscarriages, 10.2% had induced abortions, and 55.1% had live births. Among the postpartum women, 20.5% had spontaneous miscarriages, 10.3% had induced abortions, and 69.2% had live births.

Of the pregnant women, 23.8% reported an unplanned current pregnancy and 24.8% of postpartum women mentioned that their last pregnancy was unplanned.

In total, 51.0% of the pregnant women and 48.1% of the postpartum women used contraception before pregnancy. Furthermore, 16.0% of pregnant women and 21.1% of postpartum women received FP counseling during pregnancy.

During pregnancy or the postpartum period, 23.3% of pregnant women and 28.6% of postpartum women did not consider receiving FP counseling. Among those considering FP counseling, the majority expressed the intention to receive it from healthcare professionals such as midwives or nurses.

Of the pregnant women, 4.9% reported unintended pregnancies and 19.4% expressed a desire for future pregnancies rather than at the current moment. In the postpartum group, 3.4% of women had unintended pregnancies, and 19.4% expressed a desire for future pregnancies.

The Pregnant and Postpartum groups did not differ in terms of obstetric characteristics (Table 2), without considering the total number of births and total number of living children (p values were 0.01).

Family Planning Characteristics

A total of 91.7% of pregnant women and 87.9% of postpartum women considered FP practice necessary. Moreover, 64.6% of pregnant women and 68.9% of postpartum women were aware that they could receive FP counseling from family physicians. The pregnancy and postpartum groups did not differ in terms of FP characteristics (Table 3).

Comparison Data

Among all participants, there was a significant correlation between their education level and the age difference between the last two children (p=0.001). Individuals who had completed middle school or a lower level of education tended to have a childbearing interval of less than two years between their last two children. Additionally, a statistically significant relationship was observed between the participants' educational level and total number of pregnancies (p=0.001). As the educational level increased, the likelihood of experiencing four or more pregnancies decreased. Furthermore, there was a significant association between the educational level of pregnant and postpartum women and the occurrence of unplanned pregnancies (p=0.014). As the educational level increased, the rate of unplanned pregnancies decreased (Table 4).

There was a significant correlation between the type of FP method that the participants planned to use after birth and total number of pregnancies (p<0.001). The majority of individuals who chose alternative family planning methods, such as tubal ligation, İmplant/Norplant, or vasectomy, had four or more pregnancies. Conversely, those who did not use any family planning methods were mostly individuals who had only a single pregnancy (Table 5).

There was a significant correlation between participants' age and the use of the FP method before pregnancy (p=0.023). The rate of FP method use was lower in those aged ≤ 19 years (Table 6).

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Table 2: The obstetric characteristics of the Pregnant and Postpartum groups

		Pregnant		Postpartum			
		Number (n)	Percent (%)	Number (n)	Percent (%)	X^2	p
Total Number of Pregnancies	1	91	44,2	87	42,2	2,85	0,41
	2	55	26,7	65	31,6		
	3	33	16,0	36	17,5		
	≥ 4	27	13,1	18	8,7		
Total Number of Births	0	99	48,1	-	-	128,41	0,01
	1	69	33,5	104	50,5		
	2	26	12,6	70	34,0		
	3	10	4,9	27	13,1		
	≥ 4	2	1,0	5	2,4		
Contraceptive Use Until the First Pregnancy		110	53,4	130	63,1	3,99	0,46
Contraceptive Method	Modern Methods	58	52,7	75	57,7	0,59	0,44
	Traditional Methods	52	47,3	55	42,3		
Number of Living Children	0	101	49,0	-	-	130,38	0,01
	1	72	35,0	98	47,6		
	≥ 2	33	16,0	108	52,4		
Age Difference Between the Last Two Children	≤ 2 years	23	24,5	18	16,7	1,89	0,16
	≥ 2 years	71	75,5	90	83,3		
Spontaneous Miscarriage (Abortion) Status		44	21,4	36	17,5	0,99	0,31
Induced Abortion (Termination) Status		37	18,0	27	13,1	1,85	0,17
Reason for Induced Abortion	Due to Personal Health Problems	2	5,3	-	-	2,17	0,53
	Due to Health Issues of The Fetus/Embryo	20	52,6	17	63,0		
	Unintended Pregnancy	3	7,9	1	3,7		
	Other	o	34,2	9	33,3		
Unintended Pregnancy Status		49	23,8	39	18,9	1,23	0,26
Unintended Pregnancy Status While Using Contraception		35	71,4	26	66,7	0,04	0,95
Contraceptive Method	Modern Methods	16	45,7	11	42,3	0,07	0,79
	Traditional Methods	19	54,3	15	57,7		
Result of Pregnancy	Spontaneous Miscarriage (Abortion)	17	34,7	8	20,5	2,24	0,32
	Induced Abortion (Termination) Status	5	10,2	4	10,3		
	Birth	27	55,1	27	69,2		
Planned Nature of The Current/Latest Pregnancy		157	76,2	155	75,2	0,05	0,81
Use of Contraceptive Method Before Becoming Pregnant		105	51,0	99	48,1	0,24	0,62
Receiving Family Planning Counseling During Pregnancy		33	16,0	36	21,1	1,58	0,20
Postpartum Family Planning Counseling Resource	Healthcare Worker (Midwife, Nurse)	68	33,0	61	29,6	4,51	0,34
	Obstetrician and Gynecologist	24	11,7	20	9,7		
	Family Physician	54	26,2	46	22,3		
	Other (Media, Book, Brochure)	12	5,8	20	9,7		
	Not Contemplating Counseling	48	23,3	59	28,6		
Planning Status of The Last Pregnancy	Become Pregnant Despite Not Wanting More Children	10	4,9	7	3,4	0,55	0,75
	Wanting Pregnancy at a Later Time	40	19,4	40	19,4		
	Those Who Believe Their Pregnancy Happened at The Right Time	156	75,7	159	77,2		

Table 3. The family planning characteristics of the Pregnant and Postpartum groups

	Pregnant		Postpartum		X^2	p
	Number (n)	Percent (%)	Number (n)	Percent (%)		
Family Planning requirements according to Pregnancy/Postpartum	189	91,7	181	87,9	1,69	0,25
Awareness of the possibility to receive Family Planning counseling from family medicine	133	64,6	142	68,9	0,88	0,40

Table 4. Participants' age difference between their last two children, the total number of pregnancies, and the occurrence of unplanned pregnancies according to educational levels

		Educational Status			
		Elementary and Middle School n (%)	High School n (%)	University n (%)	Total n (%)
Age Difference Between the Last Two Children	**≤ 2 years**	22 (53,7)	9 (22,0)	10 (24,4)	41 (100)
	≥ 2 years	44 (27,3)	68 (42,2)	49 (30,4)	161 (100)
	Single Pregnancy	36 (17,1)	85 (40,5)	89 (42,4)	210 (100)
Unintended Pregnancy Status	**Exist**	32 (36,8)	28 (32,2)	27 (31,0)	87 (100)
	Not Exist	70 (21,6)	134 (41,4)	120 (37,0)	324 (100)
Total Number of Pregnancies	**1**	28 (15,7)	72 (40,4)	78 (43,8)	178 (100)
	2	24 (20,0)	50 (41,7)	46 (38,3)	120 (100)
	3	25 (36,2)	29 (42,0)	15 (21,7)	69 (100)
	≥ 4	25 (55,6)	11 (24,4)	9 (20,0)	45 (100)

Table 5. The relationship between the total number of pregnancies and the type of Family Planning method that the participants planned to use after birth

		Type of Family Planning Method						
		Pill n (%)	**IUD n (%)**	**Preservative n (%)**	**Withdrawal n (%)**	**Other n (%)**	**Not considering use n (%)**	**Total n (%)**
Total Number of Pregnancies	**1**	12 (6,7)	26 (14,6)	65 (36,5)	25 (14,0)	9 (5,1)	41 (23,0)	178 (100)
	2	11 (9,2)	38 (31,7)	31 (25,8)	22 (18,3)	4 (3,3)	14 (11,7)	120 (100)
	3	5 (7,2)	23 (33,3)	24 (34,8)	8 (11,6)	6 (8,7)	3 (4,3)	69 (100)
	≥ 4	3 (6,7)	11 (24,4)	12 (26,7)	8 (17,8)	8 (17,8)	3 (6,7)	45 (100)

*IUD: Intrauterine device.

Table 6. Participants' age and the use of the Family Planning method before pregnancy

		The use of the Family Planning method		
		Exist n (%)	**Not Exist n (%)**	**Total n (%)**
Age range (years)	**18-19**	2 (20,0)	8 (80,0)	10 (100)
	20-24	43 (40,6)	63 (59,4)	106 (100)
	25-29	80 (51,9)	74 (48,1)	154 (100)
	30-34	55 (59,8)	37 (40,2)	92 (100)
	≥ 35	23 (46,0)	27 (54,0)	50 (100)

Discussion

FP counseling is crucial for individuals to adopt appropriate fertility behaviors. While women can receive FP counseling at any stage of their reproductive years, it is particularly effective during pregnancy and the postpartum period. During these times, women typically have fewer concerns about birth control, and frequent check-ups offer more opportunities for consistent communication with healthcare providers. Thus, the pregnancy and postpartum periods are optimal times for women to make informed decisions about contraception.[14]

The average age of pregnant women in the study was 27.36 years (SD = 5.06), while postpartum women had an average age of 28.46 years (SD = 5.07). This aligns with findings from a study by Eryılmaz et al., where postpartum women had an average age of 26.30 years (SD = 5.60), similar to our results.[15] In the present study, educational attainment varied: 24.8% completed middle school or below, 39.3% completed high school, and 35.9% graduated from university. A study by Tuğal in Ankara found different levels of FP awareness: 67.6% completed primary school, 15% completed high school, and 13.3% graduated from university.[16] The findings from these studies diverge from ours, likely due to sample-related factors. In our study, 71.8% of participating women were housewives, and 89.8% had health insurance. In Tuğal's report, 85.5% of participants were housewives.[16] According to the Turkey Demographic and Health Survey 2018 (TDHS 2018), 90.3% of women aged 15-49 years had health insurance, which is consistent with our research.[9] Education levels, occupations, and health insurance coverage not only impact general health behaviors like healthcare institution visits but also influence reproductive health behaviors, including family planning method choices.[9]

In this study, approximately 42% of participants reported no contraceptive use before their first pregnancy, and 10% had less than a two-year interval between their last two children. Among women with multiple pregnancies, 20.2% had less than a two-year interval between their last two children. These findings are consistent with the TDHS 2018 report, which indicates that 21% of births in Turkey occur within a very short birth interval of less than 24 months.[9] Birth intervals significantly affect maternal and child health. Infants born within intervals of less than two years are 45% more likely to die than those born with a 2-3 year interval and 60% more likely to die than those born with an interval of 4 years or more.[7] Considering these risks, it's vital to offer critical information about the potential hazards of short birth intervals during counseling sessions for all women of reproductive age and to enhance awareness about this issue.

In our study, 80.6% of participants reported no history of miscarriage, while 84.5% stated they had never had an abortion. Among those who had abortions, 6.2% cited it as the reason for an unwanted pregnancy. Additionally, 21.2% reported unintended pregnancies, with 66.3% becoming pregnant despite contraceptive use. The rate of elective abortions in our study aligns with the Sexual Health and Reproductive Health Services

Research Report.[17] In Tuğal's report, 33.5% of participants experienced unwanted pregnancies, with 72.4% using contraceptives before conception. Among these unintended pregnancies, 81% resulted in live births.[16] Unintended pregnancies, leading to both voluntary and unsafe abortions, present a substantial risk to the health and well-being of reproductive-aged women. Factors such as limited access to contraceptives, incorrect or inconsistent usage, and non-utilization contribute to high rates of unintended pregnancies. Ensuring correct, proper, and effective use of family planning methods is critical for decreasing unwanted pregnancies and subsequently reducing abortion rates. The significance of research in these domains is apparent, given the intricate interplay of these factors.

Our research revealed that a notable portion of women experiencing unintended pregnancies despite contraceptive use relied on the withdrawal method. A comparable study conducted at a maternity center in Manisa found that the withdrawal method, with a prevalence of 38.1%, was the most frequently used among women facing unintended pregnancies.[18] Although the withdrawal method is widely recognized and practiced, its reliance on male cooperation can lead to incorrect use. The effectiveness of the withdrawal method is approximately 96% when used correctly, but drops to approximately 73% when used incorrectly.[19] It is crucial for individuals to choose this method to receive accurate information on its proper application. In cases of difficulty, options for modern contraceptive methods should be suggested as alternatives.

Our study found that the intention to use postpartum family planning methods among pregnant and postpartum women correlated with their total number of pregnancies, births, and living children. Those without children mostly did not consider using any method and had the lowest intrauterine device (IUD) usage rate. Conversely, women with three or more children often preferred tubal ligation, implants, or vasectomy. Previously, Kutlu et al. discovered a higher frequency of using modern methods in the group with parity and living child numbers ranging from 1 to 2.[20] Similarly, the TDHS 2018 found that FP method usage increases with the number of living children, consistent with our study's outcomes.[9] This could be due to individuals reaching their desired ideal number of children. Those with fewer living children had lower demands for FP methods.

In the present study, the participants' age was significantly correlated with contraceptive method use. The rate of contraceptive use was lower in the age group of less than 24 years than in other age groups. Similarly, in Kutlu, et al.'s study, the rate of non-use of contraceptives among women aged 15-19 and 45-49 was higher than other age groups.[20] On the other hand, there was a statistically significant relationship between participants' educational levels and the age difference between their last two children. Those with elementary school or lower education had a shorter time than the last two children. According to TDHS 2018, the average birth interval was 34 months for women with no education or incomplete primary education, and 51 months for those with high school and above.[9] In another study, Yavuz found that the rate of short birth intervals was

highest among the literate (53.3%) and lowest among college graduates (13.8%).[21] Our results were similar to those of previous studies.

A statistically significant relationship was discovered between the participants' educational level and the age interval between their last two children. The average birth interval was 34 months for women with no education or incomplete primary education, and 51 months for those with high school and above. Yavuz's study also found that the rate of short birth intervals was highest among literate (53.3%) and lowest among college graduates (13.8%). Our findings are consistent with those of the previous studies.

There was a statistically significant relationship between the educational level of the pregnant and postpartum women and the total number of pregnancies. As the level of education increased, the rate of those with four or more pregnancies decreased. According to TDHS 2018 data, the fertility rate for women with primary school education is 3.6 per thousand for three years, while for those with high school and above education, this rate is 1.89.[9] In a previous study, Gökseven et al. found that the level of education increases, the number of pregnancies decreases, which is consistent with our results.[2]

The relationship between the educational attainment of pregnant and postpartum women and the occurrence of unintended pregnancies was found to be statistically significant. As education levels increased, the incidence of unintended pregnancies decreased. According to the TDHS 2018 data, women aged 15-49 with high school education or higher had a smaller difference between their actual fertility rate and desired fertility rate than those with lower levels of education.[9] In Yavuz's study, 51.2% of illiterate women reported unintended pregnancies, compared to 24.4% of university graduates.[21] In a previous report, Kitapçıoğlu et al. showed that the rate of intended pregnancies increased significantly as participants' education levels increased, similar to our findings.[18] Education not only influences individuals' awareness of society and development but also affects their fertility characteristics and preferences. Therefore, promoting family planning counseling among individuals with lower levels of education is crucial.

Ethical Considerations: Ethical approval was obtained from the Ankara Bilkent City Hospital Ethics Committee.

Conflict of Interest: The authors declare no conflict of interest.

References

1. Türk A. *Ondokuz Mayıs Üniversitesi Tıp Fakültesi Pelitköy Eğitim Aile Sağlığı Merkezi'ne Başvuran Evli Kadınların Aile Planlaması Hakkındaki Bilgi, Tutum ve Davranışları*. Medical Specialty Thesis; Ondokuz Mayıs University Faculty of Medicine, Department of Family Medicine, Samsun; 2022:2.
2. Küçük T. *Dokuz Eylül Üniversitesi 10 No'lu Gaziemir Eğitim ASM'de Kayitli 15-49 Yaş Arası Evli Kadınların Aile Planlaması Konusundaki Tutumlarının Doğurganlık Düzeyleri ile İlişkisi*. Medical Specialty Thesis; Dokuz Eylül University Faculty of Medicine, Department of Family Medicine, İzmir; 2019:1-53.
3. Ostaali DB. *Filistin Batı Şeria'da 15-49 Yaş Evli Kadınlar Arasında Karşılanmayan Aile Planlaması Gereksinimi Prevalansı ve İlişkili Faktörler: Toplum Tabanlı Kesitsel Çalışma*. Medical Specialty Thesis; Karabük University Institute of Graduate Programs, Department of Midwifery, Karabük; 2022:4.
4. United Nations Department of Economic and Social Affairs, Population Division (2020). World Family Planning 2020 Highlights: Accelerating action to ensure universal access to family planning (ST/ESA/SER.A/450); 2020:3.
5. World Health Organization. Contraception [Internet]. https://www.who.int/health-topics/contraception#tab=tab_1. (Accessed: 25.02.2023).
6. World Health Organization. Abortion [Internet]. https://www.who.int/health-topics/abortion#tab=tab_1. (Accessed: 25.02.2023).
7. Donovan P, Wulf D. *Family planning can reduce high infant mortality levels*. Issues in Brief (Alan Guttmacher Institute). 2002;2:1-4.
8. United Nations Population Division Data Portal (Data Range: 2020). [Internet]. https://population.un.org/dataportal/home?df=1f703059-959d-4da6-84c5-68088d6a317. (Accessed: 28.02.2023).
9. Hacettepe University Institute of Population Studies (2019). *Turkey Demographic and Health Survey 2018*. Hacettepe University Institute of Population Studies, Presidency of the Republic of Turkey, Directorate of Strategy and Budget and TÜBİTAK, Ankara, Türkiye.
10. Ercan EP. *Yetişkin Üreme Çağındaki Kadınların Kullandıkları Aile Planlaması Yöntemlerinden Memnuniyeti ve Etkileyen Faktörlerin Değerlendirilmesi*. Medical Specialty Thesis; Health Sciences University Haseki Health Application and Research Center; 2019:42.
11. Çifci A, Özkara A, Tursun S, Demirel B, Kekilli M. *Kontraseptif Yöntemler*. In: *Bütüncül Tıp*. 1.st ed. Ankara Nobel Tıp Kitabevleri; 2020:2824-31.
12. Allen J, Gay B, Crebolder H, Heyrman J, Svab I. *Aile Hekimliği Avrupa Tanımı*. Türkiye Aile Hekimleri Uzmanlık Derneği Yayınları. 2011;4:1-48.

13. Yazıcıoğlu B. *Kontrasepsiyonda Aile Hekimliğinin Rolü*. 13. Aile Hekimliği Güz Okulu, Antalya; 2019:146-7.
14. Gül R, Yakut Y, Örs S, Tüzer T. *Ulusal Aile Planlaması Hizmet Rehberi*. TCSB Ana Çocuk Sağlığı ve Aile Planlaması Genel Müdürlüğü. 4th ed. Ankara; 2005;2:67.
15. Eryılmaz N, Ege E. *Doğum Sonu Dönemdeki Kadınların Aile Planlaması Konusundaki Tutumları ve Ilişkili Faktörler*. Medical Specialty Thesis; Selçuk University Health Sciences Institute, Department of Nursing, Konya; 2016:16. (doi:10.14687/jhs.v13i2.3812).
16. Yılmaz Tuğal Z. *Eğitim Aile Sağlığı Merkezine Kayıtlı Kadınların Aile Planlaması Hakkında Farkındalıklarının İncelenmesi*. Medical Specialty Thesis; Health Sciences University, Ankara Health Application and Research Center, Department of Family Medicine; Ankara; 2018:15-23.
17. *6 İl Özelinde Cinsel Sağlık ve Üreme Sağlığı (CSÜS) Hizmetleri Araştırma Raporu.* Türkiye Aile Sağlığı ve Planlaması Vakfı; 2022:11.
18. Kitapçıoğlu G, Yanıkkerem E. *Manisa Doğumevinde Doğum Yapan Kadınların Doğurganlık Öyküleri, Aile Planlaması Davranışı ve Doğum Sonrası Aile Planlaması Danışmanlığı*. Ege Tıp Dergisi. 2008;47(2):87-92.
19. Özaydın N. Debay M. *Aile Planlaması Katılımcı El Kitabı.* Ana Çocuk Sağlığı ve Aile Planlaması Genel Müdürlüğü; 2009:295.
20. Kutlu R, Sayın S, Uçar M, et al. *Kadınların Sosyodemografik Özelliklerine göre Kontraseptif Yöntem Kullanma Durumları ve Bu Yöntemleri Tercih Nedenleri.* Türkiye Aile Hekimliği Dergisi. 2014;18(3):134-141. (doi:10.15511/tahd.14.03134).
21. Yavuz D. *Sağlık Bilimleri Üniversitesi Diyarbakır Gazi Yaşargil Eğitim Araştırma Hastanesi Aile Planlaması Polikliniğine Başvuran 15-49 Yaş Arası Kadınların Aile Planlaması Hakkındaki Bilgi Düzeyleri ve Tutumları*. Medical Specialty Thesis; Dicle University Faculty of Medicine, Department of Family Medicine; Diyarbakır; 2018:51-2.
22. Gökseven Y. *Üreme Çağındaki Kadınlarda Kontrasepsiyon Bilgi Düzeyinin, Tutum ve Davranışlarının Değerlendirilmesi*. Türk Aile Hek Derg. 2020;24(4):203-12. (doi:10.15511/tahd.).

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Research Article

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EVALUATION OF POLYPHARMACY AND INAPPROPRIATE MEDICATION USE IN PATIENTS RECEIVING HOME HEALTH CARE SERVICES: A CROSS-SECTIONAL STUDY

Cagdas Emin Mac[1], Yagmur Gokseven Arda[2], Guzin Zeren Ozturk[2], Cuneyt Ardic[3]

[1]Uskudar No.16 Family Medicine Center, Istanbul, Türkiye

[2]Family Medicine Clinics, Health Sciences University Sisli Hamidiye Etfal Training And Research Hospital, Istanbul, Türkiye

[3]Department of Family Medicine, Recep Tayyip Erdogan University, Rize, Türkiye

Correspondence:

Yagmur Gokseven Arda (e-mail: yagmurgokseven@hotmail.com)

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Ankara Yıldırım Beyazıt University Faculty of Medicine

Department of Family Medicine

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Abstract

Objectives: Polypharmacy is an important condition that causes adverse outcomes such as drug-drug interactions, falls, increased hospitalizations and mortality. In our study, we aimed to evaluate polypharmacy and inappropriate medication use according to two different criteria in home care patients.

Materials and Methods: Our observational and cross-sectional, single-center study included all patients who receive home health care service from our unit and agree to participate. A face-to-face information form was carried out to measure the patients' socio-demographic characteristics, drug use, and level of knowledge about the use of drugs. Inappropriate medication use was evaluated using Beers and STOPP criteria.

Results: 179 individuals, most of whom were female (n=124; 69.2%), participated in this study. The mean age was 83,54 ± 7.53. The mean number of chronic diseases was 2.14. The average number of drugs was 5.80 ± 3.18. There was a relationship between polypharmacy and high education level and being married (p=0.005; p=0.007). There was a statistically significant relationship between the number of chronic diseases and the number of drugs used (p>0.001). Inappropriate medication use was present in 66 (36.8%) patients and the most frequently used inappropriate drugs were antipsychotics (n=38; 21.2%) according to Beers criteria. According to the STOPP criteria, inappropriate medication use was present in 33 (18.4%) patients, and the most common inappropriate drug use was NSAIDs (n=5; 2.7%).

Conclusion: Rates of polypharmacy and inappropriate medication use according to both criteria were found to be high. Physicians should plan the drugs used in this group carefully.

Keywords: Polypharmacy, potentially inappropriate medication, home care service.

Introduction

Home health care (HHC) service is defined as offering health care and follow-up services to patients in a home setting where they live with their families to meet their medical needs including rehabilitation, physiotherapy, and psychological treatment, in line with the recommendations of physicians.[1]

HHC recipients, nursing home residents, and hospitalized individuals are more likely to be ill, have more chronic diseases, and are therefore more exposed to increased drug use.[2]

Although many studies have been carried out on polypharmacy, which is defined as "multiple drug use", there is no consensus on its scientific definition. However, the most commonly used definition of polypharmacy is the use of five or more drugs.[3]

When we look at the rates of polypharmacy; studies that resulted in 64.7% in Brazil and 52.3% in Japan were reported.[4-5]In a study covering seven European countries (Czech Republic, England, Finland, France, Germany, Italy, Netherlands) and Israel, the rate of polypharmacy was reported as 49.7%.[6]Polypharmacy causes adverse consequences such as mortality, falls, fractures, adverse drug reactions, drug-drug interactions, prolonged hospital stay and re-hospitalization immediately after discharge. Drug interactions are an important problem for elderly patients. Drugs that may cause problems for elderly patients are grouped under the heading of “potentially inappropriate medication (PIM)”. So scanning medicine about PIM is important for polypharmacy patients. Various scanning tools have been developed to help identify PIMs.[7] The most commonly used one is the Beers criteria, which was first developed by the American Geriatrics Society in 1991.[8] Despite its widespread use, the Beers criteria were found to be inadequate due to its limitations, such as including drug lists that are not available in countries other than the United States of America. To eliminate these deficiencies, STOPP criteria were developed and put into use in Ireland in 2008.[9] Both groups of criteria maintain their reliability by being updated for reasons such as new studies in the medical world, new developments, and the addition of newly licensed drugs.

In our study, we aimed to take a holistic approach to HHC patients by examining the frequency of polypharmacy, sociodemographic characteristics that may influence polypharmacy (such as marital status, dependents, etc.), and other external factors in detail, and to compare PIM use according to both criteria in this patient group.

Materials and Methods

Study universe and sample

This study was conducted between 15/09/2019 and 15/11/2019 in the Recep Tayyip Erdoğan University Faculty of Medicine, Department of Family Medicine, Home Health Care Unit. Our study is single-center, observational, and cross-sectional. Between these dates, the number of people affiliated to our unit was 352 and our sample size was 179. G power was calculated as 5.2 with 95% confidence.

Home health care (HHC) services in Türkiye are provided by HHC units. These units consist of at least one responsible physician (general practitioner or specialist physician) and two assistant health personnel. Patients who need HHC services apply to the HHC units by calling them directly. These units register the patients who will receive service and organize the visit program. Arranging the treatment plans and medications of the patients is the duty of the responsible physician of the HHC services unit. In addition, patients are also followed up by specialist doctors for various diseases.

The study was initiated by obtaining verbal consent from the patient/patient relatives who received service from our unit and agreed to participate in the study. Interviews were completed with the person responsible for the care of the patients who could not answer the questions for various reasons (dementia, hearing problems, etc.) during the study. In the study, an information inquiry form with 37 questions was used to measure the sociodemographic characteristics, drug use status, chronic diseases, knowledge level of the patients, and who their caregivers are. In the evaluation of the caregiver, groupings were made as family members (parent, children), non-family relatives, and paid private caregivers. Then, all drugs used by the patients were noted, and the presence of polypharmacy and PIM use were examined. Patients under the age of 65 were not included in our study.

The study was approved by the Recep Tayyip Erdoğan University Faculty of Medicine, Non-Invasive Clinical Research Ethics Committee, on 09/09/2019 with the decision number 2019/121.

Data collection tools

In this study, the use of five or more drugs was considered polypharmacy. Beers (2012) and STOPP criteria were used in the assessment of PIM.

Beers Criteria (2012):

It was created in 1991 by Dr. Mark Beers and colleagues based on the result of a nursing home study to identify criteria for inappropriate drug use in the elderly [8]. The expert committee established by the American Geriatrics Association (AGS) in 2012 defined the "2012 AGS Beers Criteria". The final update of the AGS expert committee involved 53 medications or medication classes, which are divided into three categories: "potentially inappropriate medications", "potentially inappropriate medications due to drug-disease or drug-syndrome interactions", and "potentially inappropriate medications to be used with caution".[10]

STOPP Criteria (Screening Tool of Older Persons' Potentially Inappropriate Prescriptions):

Due to the deficiencies in the Beers criteria and the incompatibility of these criteria with the nature of drug use in European countries, alternative criteria were needed. Therefore, a committee was established by Gallagher P. et al. in 2008, and STOPP criteria were constituted.[9]

STOPP and START (Screening Tool to Alert to Right Treatment) criteria were updated in 2015. The final list encompasses 81 STOPP criteria of potentially inappropriate medications in the elderly, and 34 START criteria of PIMs that should be used frequently in the elderly but may not be used.11 A descriptive analysis of the results for each criterion was performed by not only determining the number of subjects with PIM identified by each tool but also measuring the number of inappropriateness criteria identified in each patient.

Statistical analyses

All statistical analyses were carried out using SPSS statistical software version 22.0 [IBM Corp released 2012. IBM SPSS Statistics for Windows, IBM Corp, Armonk, NY]. Descriptive statistics of evaluation results are given as numbers and percentages for categorical variables, and mean, standard deviation, minimum, and maximum for numerical variables. If there was a normal distribution, the student-t test was performed to compare numerical variables between two independent groups, otherwise the Mann-Whitney U-test was used. If difference scores are normally distributed, comparisons of numerical variables between dependent groups were done using the Paired-T test, otherwise, the Wilcoxon test was used. Pearson Correlation Analysis was performed when the parametric test condition was met for relationships between numerical variables, and otherwise, Spearman Correlation Analysis was used. A statistical significance level of alpha was considered as $p < 0.05$.

Results

Evaluation of the relationship between polypharmacy and sociodemographic data of the participants

Of the 179 people included in the study 69.2% (n=124) were female. The mean age was 83.5 ± 7.5 years. The oldest age was 104 years. The mean value of the number of chronic diseases was 2.14 and the median value was 2. The most common chronic disease was hypertension (n=111; 62.0%). The distribution of the most common chronic diseases is shown in Figure 1.

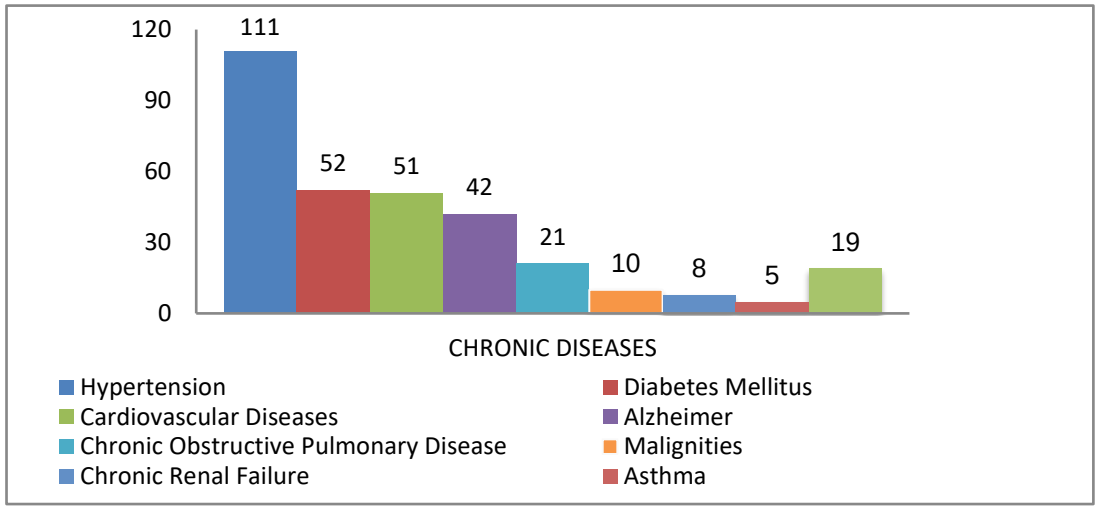

Figure 1. Distribution of common chronic diseases (n)

The relationship between sociodemographic characteristics and polypharmacy is given in detail in Table 1. There was no relationship between age and polypharmacy (p=0.110). We found a relationship between having a high education level and being married and polypharmacy (p=0.005; p=0.007). In addition, as the number of chronic diseases of the participants increased, the number of drugs they used increased, and this relationship was statistically significant (p<0.001). The rate of polypharmacy, which was 52.6% in patients with up to 2 chronic conditions, increased to 84.1% in those with at least 3 chronic conditions. When the diseases were examined separately, a significant relationship was found only with diabetes mellitus, hypertension, and ischemic heart disease (p=0.002; p=0.008; p=0.010).

Table 1. Evaluation of the relationship between polypharmacy and sociodemographic data of the participants

		Polypharmacy According to the Number of Drugs Used				
		No		Yes		
		n	%	n	%	p
Gender	Female	49	39,5%	75	60,4%	0,181
	Male	16	29,0%	39	71,0%	
Age	65-84	29	30,9%	65	69,1%	0,110
	≥85	36	42,4%	49	57,6%	
Education Status	Illiterate	27	52,9%	24	47,1%	0,005
	Up to High school	36	31,9%	77	68,1%	
	High School and above	2	13,3%	13	86,7%	
Marital status	Married	16	23,9%	51	76,1%	0,007
	Single	49	43,8%	63	56,3%	
Care Provider	Family	35	34,6%	66	65,4%	0,412
	Private Caregiver	17	33,3%	34	66,6%	
	Other (Non-family relatives)	13	48,1%	14	51,9%	
Number of Chronic Diseases	≤2	55	47,4%	61	52,6%	0,000
	≥3	10	15,9%	53	84,1%	

Evaluation of the relationship between polypharmacy and drug use of the participants

The average number of drugs used by the patients was 5.80 ± 3.18. Polypharmacy was observed in 114 (63.6%) patients. 52.5% (n=94) of the patients were using 5-9, 36.3% (n=65) 0-4, and 11.2% (n=20) 10 and more drugs. Medications of the patients were mostly prepared (59.2%; n=106) and given (69.3%; n=124) by the caregiver. The majority were taking their medication regularly (89.9%; n = 161). Most of the patients could recognize their medication (76.5%; n=137) and were aware of how much to take (73.2%; n=131), and side effects (64.2%; n=115). In 45.8% of the patients (n=82), it was observed that their medications weren't revised by any physician for 1 year or more. Most of the patients (69.3%; n=124) were taking their medication with the help of someone else. There were 18 patients (10.1%) who stated that they didn't take their medication regularly. 20 (11,1%) patients were using medication without the physician's recommendation. It was seen that individuals without polypharmacy tend to take their medication more regularly (p=0.021). The evaluation of the relationship between the drug use status of the participants and polypharmacy is given in Table 2.

22.9% (n=41) of the patients were taking additional vitamin/mineral supplements and most of them (85.3%; n=35) were recommended by the physician. Again, most of the vitamin users (82.9%; n=34) had polypharmacy and this was statistically significant (p=0.004). There were 52 (29.1%) people using herbal products. Most of these patients had polypharmacy (67.3%; n=35), but there was no statistically significant difference (p≥0.05).

Table 2. Evaluation of the relationship between polypharmacy and drug use of the participants

		Polypharmacy According to the Number of Drugs Used				p
		No		Yes		
		n	%	n	%	
Who Prepares the Medicines?	Patient	9	31,0%	20	69,0%	0,705
	Care Provider	41	38,7%	65	61,3%	
	Other (pharmacy etc.)	15	34,1%	29	65,9%	
How does the patient take the drugs?	Patient	17	30,9%	38	69,1%	0,317
	With the help of a care	48	38,7%	76	61,3%	
Do the patients take the drugs regularly?	Yes	54	33,5%	107	66,5%	0,021
	No	11	61,1%	7	38,9%	
Does the patient recognize the drugs used?	Yes	47	34,3%	90	65,7%	0,313
	No	18	42,9%	24	57,1%	
Does the patient know how much medicine to take?	Yes	45	34,4%	86	65,6%	0,367
	No	20	41,7%	28	58,3%	
Does the patient know the side effects of medications?	Yes	43	37,4%	72	62,6%	0,688
	No	22	34,4%	42	65,6%	
Time elapsed since the last date drugs were revised	3 months and below	24	29,6%	57	70,4%	0,151
	3 months - 1 year	5	31,3%	11	68,8%	
	1 year and above	36	43,9%	46	56,1%	
Warfarin Sodium Use	Yes	13	31,0%	29	69,0%	0,409
	No	52	38,0%	85	62,0%	
Use of Vitamins and Minerals	Yes	7	17,1%	34	82,9%	0,004
	No	58	42,0%	80	58,0%	
Herbal Product Use	Yes	17	32,7%	35	67,3%	0,519
	No	48	37,8%	79	62,2%	

Evaluation of Inappropriate Medication Use

We examined PIM use in our patients according to Beers and STOPP criteria. PIM use and the list of breached criteria are given in Figure 2. 66 (36.8%) patients had PIM use according to Beers criteria, and there were 93 instances of PIM in total (Figure 2). The most frequently used PIM according to Beers criteria were antipsychotics (n=38; 21.2%) (Table 3).

Table 3. Beers criteria-distribution by inappropriate drugs

A- Drug Groups	**Inappropriate Drug**	**Number of Patients (n)**	**Patient Percentage (%)**
Anticholinergic Drugs	First generation antihistamines	3	1,6
Cardiovascular Drugs	Alpha 1 Blockers	8	4,4
	Anti-arrhythmic Drugs	2	1,1
	Nifedipine	7	3,9
	Spironolactone	5	2,7
Central Nervous System Drugs	Tertiary tricyclic antidepressants	2	1,1
	Antipsychotics	38	21,2
Pain medications	Non-steroidal anti-inflammatory drugs (NSAID)	10	5,5
B- Disease or Syndrome	**Inappropriate Drug**	**Number of Patients (n)**	**Patient Percentage (%)**
Heart failure	Cilostazol	1	0,5
Dementia and cognitive impairment	Antipsychotics	17	9,4

The STOPP criteria identified 33 (18.4%) patients with PIM use, and 42 instances of PIM use were determined in total (Figure 2). The most common PIM use based on the STOPP criteria was the use of NSAID and antiplatelet therapy in combination without PPI prophylaxis (n=5; 2.7%). Instances of PIM use defined by STOPP criteria are detailed in Table 4.

In the use of PIM, violations were observed more frequently according to Beers criteria compared to STOPP criteria (Figure 2).

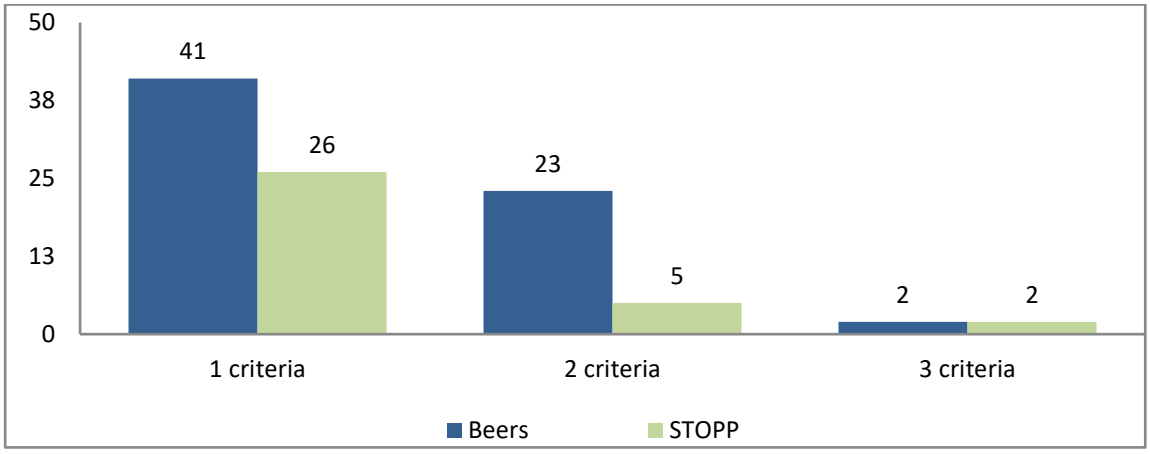

Figure 2. Instances of inappropriate medication use and breached criteria (n)

Table 4. List of Breached Criteria According to STOPP Criteria

Criterion	Medicine	Number of Patients (n)	Patient Percentage (%)
Cardiovascular System Criteria	Use of beta blockers and verapamil/ diltiazem	4	2,2
	Loop diuretic use as the first-line HT treatment	3	1,6
	Use of thiazide in those with a history of gout	2	1,1
	Use of diuretics for HT in those with urinary	1	0,5
Antiplatelet / Anticoagulant Drugs	Use of NSAID and vitamin K antagonists in combination	1	0,5
	NSAID with concurrent antiplatelet agent(s)	5	2,7
Central Nervous System and Psychotropic Drugs	TCA is used as a first-line antidepressant treatment	1	0,5
	Neuroleptic use in dementia patients	2	1,1
	Use of first-generation antihistamines	3	1,6
Renal System Criteria	NSAID use in patients with glomerular filtration rate <50 ml/min/1.73 m2	4	2,2
Gastrointestinal System Criteria	Use of verapamil in chronic constipation	2	1,1
Respiratory System Criteria	Theophylline alone in Chronic Obstructive Pulmonary Disease	2	1,1
	Non-selective beta-blocker use in patients with asthma	3	1,6
Musculoskeletal System Criteria	Use of NSAIDs in patients with severe Hypertension or Heart Failure	1	0,5
Endocrine System Criteria	Use of glimepiride in patients with Type-2 Diabetes Mellitus	4	2,2
Analgesic Drugs	Opiate use in the first-line treatment of mild pain	2	1,1
Antimuscarinic/Antic holinergic Drug Burden	Concurrent use of two or more anticholinergic/antimuscarinic drugs	2	1,1

Discussion

In our study, the rate of patients using 5 or more drugs was 63.6%. In the study of patient groups aged 65 years and older conducted by S. Giovanini et al., the rate of patients using 5 or more drugs was 62.1% and Hamano and Tokuda found the rate of patients using 6 or more drugs to be 60.7%.[12-13]

In the literature, we see that different results were obtained in different studies in terms of gender. While the rate of polypharmacy was higher in women in the study of Onder *et al.*[6], it was higher in men in the study by Komiya *et al.*.[5] In our study, the rates were close to each other and weren't statistically significant.

In their study, Ramos LR et al. found that polypharmacy was higher in the group with a higher education level.[14] In our study, the rate of polypharmacy was the highest in the group with a high education level, and this difference was statistically significant. When marital status was examined, in the study by Komiya et al., the rate of polypharmacy was higher in those who were married, similar to our study.[5] In our study, it was observed that being married and having a high education level had a negative effect in terms of polypharmacy, but it would be appropriate to support this outcome with studies with a larger sample size. As the education level increases, the health awareness, expectations, and demands of individuals increase. This may be the reason why this group benefits from health services more, and it may also lead to increased use of supplements by these individuals.[15] Indeed, in our study, similar to that of J. Peklar et al., the rate of polypharmacy was significantly higher in those who use vitamin supplements.[16]

The rate of polypharmacy was also higher in patients with a high number of chronic diseases in our study and in the literature[6, 12] As in our study, chronic diseases increase the risk of polypharmacy since chronic diseases are conditions that require regular, ongoing, and sometimes use of several medications in combination.

In the literature, the distribution of rates of PIM according to Beers and STOPP criteria varies. In a study conducted in Spain, PIM rates identified by Beers/STOPP were 22.9% and 38.5%, and in a Nigerian study, these values were 30.3% and 15.7%.[17-18] In an Indian-based study PIM rates by Beers/STOPP were 27.73% and 48.71%.[19] And in a Brazil study, these rates were 51.8% and 33.8%.[4] In our study, PIM rates identified by the Beers/STOPP were 36.8% and 18.4%. We think that clinical practices vary from country to country and differences between patient groups selected in studies affect PIM rates.

The Beers criteria cover a broader range of drugs that may lead to higher PIM rates than the STOPP criteria. Recent studies have highlighted that STOPP criteria may be more effective in identifying clinically significant adverse drug events compared to Beers criteria, particularly in European settings. This suggests that STOPP

criteria could offer a more tailored approach for assessing PIMs in Turkish populations, potentially leading to more accurate and relevant findings.[20,21]

While the most frequently used PIMs were antipsychotics according to Beers criteria (n = 38; 21.2%), STOPP criteria identified NSAIDs as the most common PIM (n: 5; 2.7%). In a study conducted in China, the most common PIM was benzodiazepines with 34.4% according to Beers, and calcium channel blockers used in chronic constipation with 18.5% according to STOPP.[22] In the study of Amelia Ubeda et al., the most frequently used PIM was long-acting benzodiazepine according to Beers (33.3%), while it was long-acting neuroleptic use according to STOPP.[23] The most common PIM was NSAIDs (diclofenac) by Beers (40.9%) and furosemide by STOPP (23.6%) in the study by Akande-Sholabi *et al.*.[24]Again, the differences in practices and patient groups between countries are also reflected in these results. The fact that the patient group we examined in our study consisted of patients who had difficulties in admission to the hospital, and received HHC services and that we didn't exclude them according to their cognitive functions influenced these results. The higher incidence of Alzheimer's disease (23.4%) in our study compared to the normal geriatric patient population (8%) is an indicator of this difference.[25] In addition to memory loss, behavioral changes, and psychiatric symptoms are observed in Alzheimer's patients and these should also be controlled.[26] Due to both old age and Alzheimer's as well as due to the dependence on living at home, our patients' need for psychiatric treatment increased, and therefore the rate of antipsychotic drug use may have been high. The data in Turkiye show that the rate of prescription NSAIDs is over 30% in patients over 65 years of age.[27] Apart from the side effects of NSAIDs, their interactions with other drugs are also important. Thus, as in all patients, patients who receive HHC services should be evaluated with a holistic approach and their treatment should be carefully planned.

The rate of polypharmacy has also been found to be high in HHC patients. The most frequently used PIM in our study were antipsychotics according to Beers criteria and NSAIDs according to STOPP criteria. The study shows that the two different PIM criteria yield different results in HHC patients aged 65 and over. Since the STOPP criteria cover a more specific group of medications and are more suitable for the European healthcare system, the use of STOPP criteria may be a more appropriate approach for our country. However, considering the advantages of both criteria, using both criteria together could be beneficial for patient safety and treatment quality. Future studies applying the STOPP criteria to larger patient groups in our country may provide more accurate data.

HHC patients are a vulnerable group of patients who are mostly elderly and need special care. PIM use should be considered while prescribing drugs in this patient group. It would be beneficial to develop warning systems and mobile applications that can be used in daily practice in the follow-up of HHC patients and outpatient clinics.

In addition, the majority of patients receiving HHC services take their medications with the help of their caregivers and a significant portion of them are not aware of drug side effects. Educating patients and caregivers about medications and their side effects will improve the quality of care and treatment for these patients. Online maintenance courses can be arranged for this.

Limitations of the study

Differences in social behavior and differences arising from the payment of the insurance system may have affected the results of our study.

Although our study is limited due to its single-center nature, we think that it'll shed light on future studies in terms of revealing the situation of HHC patients regarding polypharmacy, PIM use, and drug use practices.

Ethical Considerations: The study was approved by the Recep Tayyip Erdoğan University Faculty of Medicine, Non-Invasive Clinical Research Ethics Committee, on 09/09/2019 with the decision number 2019/121.

Conflict of Interest: The authors declare no conflict of interest.

References

1. Karakaş N, Bentli R, Firinci B, Zabci B. Investigation of the relationship between depression and nutritional status of elderly patients in homecare. J SurgMed. 2019;3(12):829-32
2. Fog, A., Mdala, I., Engedal, K., & Straand, J. Variation between nursing homes in drug use and in drug-related problems. *BMC Geriatrics*. 2020:20;336. https://doi.org/10.1186/s12877-020-01745-y.
3. Masnoon N, Shakib S, Kalisch-Ellett L, Caughey GE. What is polypharmacy? A systematic review of definitions. BMC Geriatr. 2017;17(1):230. doi:10.1186/s12877-017-0621-2
4. Oliveira MG, Amorim WW, de Jesus SR, et al. A comparison of the Beers and STOPP criteria for identifying the use of potentially inappropriate medications among elderly patients in primary care. J Eval Clin Pract. 2015;21(2):320-5. doi:10.1111/jep.12319
5. Komiya H, Umegaki H, Asai A, et al. Factors associated with polypharmacy in elderly home-care patients. Geriatr Gerontol Int. 2018;18(1):33-41. doi:10.1111/ggi.13132
6. Onder G, Liperoti R, Fialova D, et al. Polypharmacy in nursing home in Europe: results from the SHELTER study. J Gerontol A Biol Sci Med Sci. 2012;67(6):698-704. doi:10.1093/gerona/glr233
7. Demircan, C., Hasanzade, U., Tatar, M., & Büyükuysal, M. (2023). Evaluating Potentially Inappropriate Medications in the Elderly with Seven Different Screening Tools. *Turk J Geriatr*. 2023; 26(4):413−23. https://doi.org/10.29400/tjgeri.2023.369.
8. Beers MH, Ouslander JG, Rollingher I, Reuben DB, Brooks J, Beck JC. Explicit criteria for determining inappropriate medication use in nursing home residents. Arch Intern Med. 1991;151(9):1825-32. PMID:1888249
9. Gallagher P, O'Mahony D. STOPP (ScreeningTool of OlderPersons' potentially inappropriate Prescriptions): application to acutely ill elderly patients and comparison with Beers' criteria. Age Ageing. 2008;37(6):673-9. doi:10.1093/ageing/afn197
10. Campanelli CM. American Geriatrics Society updated beers criteria for potentially inappropriate medication use in older adults: the American Geriatrics Society 2012 Beers Criteria Update Expert Panel. J Am Geriatr Soc. 2012;60(4):616. doi:10.1111/j.1532-5415.2012.03923.x
11. O'Mahony D, O'Sullivan D, Byrne S, et al. STOPP/START criteria for potentially inappropriate prescribing in older people: version 2. Age Ageing. 2015;44(2):213-18. doi:10.1093/ageing/afu145
12. Giovannini S, van der Roest HG, Carfì A, et al. Polypharmacy in homecare in Europe: cross-sectional data from the IBenC study. Drugs Aging. 2018;35(2):145-52. doi:10.1007/s40266-018-0521-y
13. Hamano J, Tokuda Y. Inappropriate prescribing among elderly homecare patients in Japan: prevalence and risk factors. J Prim Care Community Health. 2014;5(2):90-6. doi:10.1177/2150131913518346
14. Ramos LR, Tavares NUL, Bertoldi AD, et al. Polypharmacy and Polymorbidity in Older Adults in Brazil: a public health challenge. Rev Saude Publica. 2016;50:9s. doi:10.1590/S1518-8787.2016050006145

15. Şayir ÇT, Toprak DE, Karaoğlu SA. Evaluation of polypharmacy and complementary therapy use in patients ≥ 65 years, attending to Family Medicine Outpatient Clinic of Şişli Etfal Training and Research Hospital. Turk J FamPract. 2014;18(1):35-41. doi:10.2399/tahd.14.35220
16. Peklar J, Henman MC, Kos M, Richardson K, Kenny RA. Concurrent use of drugs and supplements in a community-dwelling population aged 50 years or more: potential benefits and risks. Drugs Aging. 2014;31(7):527-40. doi:10.1007/s40266-014-0180-6
17. Hudhra K, García-Caballos M, Jucja B, et al. Frequency of potentially inappropriate prescriptions in older people at discharge according to Beers and STOPP criteria. Int J Clin Pharm. 2014;36(3):596-603. doi:10.1007/s11096-014-9943-8
18. Fadare JO, Desalu OO, Obimakinde AM, et al. Prevalence of inappropriate medication prescription in the elderly in Nigeria: A comparison of Beersand STOPP criteria. IntJ Risk Saf Med. 2015;27(4):177-89. doi:10.3233/JRS-150660
19. Keche, Y., Gaikwad, N., Wasnik, P., Siddiqui, S., Nagpure, K., & Dhaneria, S. Usefulness of STOPP/START criteria and Beers criteria for prescribing in geriatric patients in a tertiary health care center, Raipur, Central India. *J Fam Med Prim Care.* 2022:11;7064 -71. https://doi.org/10.4103/jfmpc.jfmpc_733_22.
20. Falemban A H. Medication-Related Problems and Their Intervention in the Geriatric Population: A Review of the Literature. Cureus. 2023:15(9): e44594. DOI 10.7759/cureus.44594
21. Perpétuo C, Plácido AI, Rodrigues D, Aperta J, Piñeiro-Lamas M, Figueiras A, Herdeiro MT and Roque F. Prescription of Potentially Inappropriate Medication in Older Inpatients of an Internal Medicine Ward: Concordance and Overlap Among the EU(7)-PIM List and Beers and STOPP Criteria. Front. Pharmacol. 2021:12;676020. doi: 10.3389/fphar.2021.676020
22. Li H, Pu S, Liu Q, et al. Potentially inappropriate medications in Chinese older adults: The Beers criteria compared with the screening tool of older persons' prescriptions criteria. Geriatr GerontolInt. 2017;17(11):1951-8. doi:10.1111/ggi.12999
23. Ubeda A, Ferrándiz L, Maicas N, et al. Potentially inappropriate prescribing in institutionalised older patients in Spain: the STOPP-START criteria compared with the Beers criteria. PharmPract (Granada). 2012;10(2):83. doi:10.4321/s1886-36552012000200004
24. Akande-Sholabi, W., Ajilore, O., Showande, S., & Adebusoye, L. Potential inappropriate prescribing among ambulatory elderly patients in a geriatric centre in southwestern Nigeria: Beers criteria versus STOPP/START criteria. *Trop J Pharm Res*. 2020:19;1105-11. https://doi.org/10.4314/tjpr.v19i5.29.
25. Turkish Neurological Society. Alzheimer's Disease. Available at: https://www.noroloji.org.tr/menu/94/alzheimer-hastaligi. Accessed July 12, 2024.
26. Teixeira, A., Rocha, N., & Gatchel, J. Behavioral or neuropsychiatric symptoms of Alzheimer's disease: from psychopathology to pharmacological management. *Arq Neuropsiquiatr*. 2023: 81:1152 – 62. https://doi.org/10.1055/s-0043-1777774.

27. Baspınar MM, Basat O. Evaluation of the rational analgesic use in elderly adults: A cross-sectional study. Pak J Med Sci. 2020;36(5):1063-8. doi:10.12669/pjms.36.5.2331

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RELATIONSHIP BETWEEN NUTRITIONAL STATUS, SARCOPENIA, MALNUTRITION AND APPETITE IN COMMUNITY-DWELLING ELDERLY

Rahime Evra Karakaya[1], Emine Elibol[1]

[1]Department of Nutrition and Dietetics, Ankara Yıldırım Beyazıt University Faculty of Health Sciences, Ankara, Türkiye

Correspondence:
Rahime Evra Karakaya (e-mail: evracakir1@gmail.com)

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Ankara Yıldırım Beyazıt University Faculty of Medicine
Department of Family Medicine

Abstract

Objectives: This study aims to examine the relationship between nutritional status, sarcopenia, and malnutrition in community-dwelling elderly.

Materials and Methods: In the study conducted with 198 elderly, the Mini Nutritional Assessment (MNA) and Short Nutritional Assessment Questionnaire 65+ (SNAQ65+) screening tools were used to determine the risk of malnutrition. The SARC-F screening tool was used to identify the risk of sarcopenia. The 24-hour dietary recalls of the individuals were taken by the researcher.

Results: According to MNA 30.3% and according to SNAQ65+ 23.7 (%) of elderly individuals are at risk of malnutrition and 44.4% are at risk of sarcopenia. Females have lower MNA scores than males ($p=0.036$) and higher SARC-F scores ($p<0.001$). Elderly individuals who reported that dental problems prevent them from consuming solid foods are 2.881 times more likely to be at risk of malnutrition compared to those who did not report such problems ($p=0.010$). In addition, perceived appetite status didn't affect malnutrition risk/malnutrition. Dietary folate and vitamin B1 intake of elderly at malnutrition risk/malnourished were lower than normal nutritional status ($p=0.011$, $p=0.038$, respectively).

Conclusion: Elderly individuals living in the community with dental health problems may be at risk of malnutrition. Dietary insufficient folate intake may be a risk factor for malnutrition. Therefore, strategies developed to address dental health and adequate nutrition in the elderly are important in reducing the risk of malnutrition.

Keywords: Aged, malnutrition, sarcopenia, nutritional status, appetite, oral health.

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Introduction

Aging, a natural process of life, is both an inevitable and predictable biological phenomenon, and the elderly population is increasing worldwide day by day. Appetite loss/anorexia, associated with nutritional insufficiency in old age, is a significant risk factor. With aging, acute and chronic illnesses, physiological changes, psychological conditions, and medications can affect appetite mechanisms.[1] Decreased energy and nutrient intake due to appetite loss/anorexia results in an increased risk of protein-energy malnutrition, sarcopenia, bone fragility, and mortality.[2]

Elderly individuals are an important risk group for the development of malnutrition due to decreased physiological capacity, appetite loss/anorexia, reduced access to healthy foods, and the presence of accompanying diseases.[3] Malnutrition in the elderly is a highly significant health issue that affects quality of life, including increased risk of sarcopenia, chronic disease, bone fragility, and mortality.[4] Therefore, clinical guidelines recommend regular screening for malnutrition, assessment of nutritional status, and personalized nutrition support for at-risk groups among all elderly adults.[3]

Sarcopenia is a widespread and advancing disorder that affects skeletal muscles, leading to a decline in muscle mass and strength. Aging is closely associated with progressive and general loss of muscle mass and strength. When comparing healthy elderly individuals aged 60-80 years with younger adults, muscle strength loss ranges from 20% to 40%, while this difference exceeds 50% in those aged over 80 years.[5] Inadequate and/or imbalanced nutrition is commonly observed in the elderly, especially in underweight individuals. Improving diet and nutrition in these individuals plays a significant role in both the prevention and treatment of sarcopenia.[6]

The interaction between appetite, nutritional status, sarcopenia, and inadequate nutrition creates a vicious cycle in elderly individuals. Decreased appetite and inadequate nutrient intake in the elderly lead to malnutrition, resulting in weight loss, muscle wasting, and increased risk of disease. Additionally, deteriorating functional status due to sarcopenia exacerbates in elderly individuals, leading to loss of appetite and paving the way for malnutrition.[7,8] Therefore, understanding the relationship between appetite, nutritional status, sarcopenia, and malnutrition is crucial to improving the health status and preventing mortality in the elderly. Considering the increasing elderly population worldwide, it is believed that the findings of this research will make a significant contribution to the literature to enhance their health outcomes and quality of life. This study was conducted to investigate the relationship between appetite, nutritional status, sarcopenia, and malnutrition in the elderly.

Materials and Methods

This study is a cross-sectional and descriptive community study conducted on 198 elderly individuals aged 65 and over. The research was conducted using a survey form through a face-to-face interview technique. Individuals diagnosed with psychiatric disorders by a physician and those with alcohol or drug dependency were not included in the study. Ethical approval for the study was obtained from the Ankara Yıldırım Beyazıt University Ethics Committee, with approval number 06-304 and date 14/06/2023.

Demographic Characteristics

The survey aims to gather information from participants on topics such as , age, education level, occupation, meal consumption frequency, and oral and dental health.

Mini Nutritional Assessment (MNA)

The MNA (Mini Nutritional Assessment) is a screening tool used to determine the risk of malnutrition in patients. It consists of two parts: the MNA-short form (SF) (screening) and the MNA-long form (assessment). The MNA-SF can be used alone as a screening test or as part of the MNA long form. It is recommended that the MNA-SF be applied primarily to community-dwelling elderly individuals. The MNA-SF section includes 6 questions that assess body weight loss, body mass index (BMI) or calf circumference, mobility, food intake, psychological stress or acute illness, and the presence of neuropsychological problems. When the MNA-SF is used alone, patients are classified as having normal nutritional status (scores between 11-14), at risk of malnutrition (scores between 7-11), or malnourished (scores below 7).[9]

Short Nutritional Assessment Questionnaire 65+ (SNAQ65+)

SNAQ65+ is a screening tool developed by Wijnhoven et al.[10] to identify the risk of malnutrition in community-dwelling elderly individuals. The questionnaire assesses individuals' weight loss, mid-upper arm circumference, appetite, and functional status. Based on the results, the green color indicates normal nutritional status, the orange color indicates malnutrition risk, and the red color indicates malnutrition. The Turkish validity and reliability of the questionnaire were established by Evci et al.[11]

SARC-F Sarcopenia Screening Tool

SARC-F is a screening tool developed for the diagnosis of sarcopenia. The scale consists of 5 main components: strength, assistance in walking, rising from a chair, climbing stairs, and falls. The scale score ranges from a

minimum of 0 to a maximum of 10; a score of 0-3 indicates a healthy status, while a score of 4 or above indicates a symptomatic condition[12]. The validity and reliability of the scale in Turkey were established by Kiş.[13]

24-Hour Dietary Recall

The data obtained from 24-hour food consumption record questionnaires were analyzed using the BeBiS program, which has an international database, and the individuals' average daily energy and nutrient intakes were calculated[14].

Statistical Analyses

Descriptive statistics and frequency tables were utilized to interpret the findings. The Kolmogorov-Smirnov Test was applied to determine if the data conformed to a normal distribution. To compare quantitative data between two independent groups, either the parametric Independent Samples t-test or the non-parametric Mann-Whitney U test was employed. The Spearman Correlation Coefficient was used to explore relationships between quantitative variables when the data did not follow a normal distribution. Correlation coefficients were interpreted as follows: less than 0.2 indicated a very weak relationship, 0.2 to 0.4 weak, 0.4 to 0.6 moderate, 0.6 to 0.8 high, and greater than 0.8 very high. A logistic regression model was utilized to assess multivariate associations between variables. Statistical significance was defined as $p<0.05$. Data analysis was conducted using IBM SPSS Statistics v26.

Results

The average age of individuals is 71.36±6.19 years, with 57.1% being female and 42.9% male. When examining their education levels, it is found that 41.9% are primary school graduates. Among the individuals, 49.0% are retired, and 65.2% are married. The majority (98.5%) live at home, and 63.6% live with their spouses. A significant portion (83.8%) has reported having a disease, with hypertension (46.0%), diabetes (29.3%), musculoskeletal system diseases (28.8%), and cardiovascular diseases (23.7%) being the most common conditions (Table 1).

Among the elderly, 52.0% reported that they prepare their meals at home themselves, 22.7% stated that dental problems prevent them from eating solid foods, and 35.9% indicated that their appetite is moderate. The frequency of those who eat three main meals a day is 58.1%, and the main reasons for skipping main meals are lack of appetite (69.9%) and having no one to prepare the meals (30.1%).Most individuals have two snacks per day (52.0%), do not smoke (86.4%), and do not consume alcohol (99.0%) (Table 2).

Table 1. Descriptive Characteristics of the Individuals

			n=198	%
Age (years)	***Mean±SD***	71.36±6.19		
Sex	Female		113	57.1
	Male		85	42.9
Education level				
	Illiterate		35	17.7
	Literate		16	8.1
	Primary school		83	41.9
	Secondary school		19	9.6
	High school		25	12.6
	Undergraduate		20	10.1
Marital status				
	Married		129	65.2
	Single		69	34.8
Working status				
	Not working		88	44.4
	Retired		97	49.0
	Labourer		3	1.5
	Self-employed		10	5.1
Place of residence				
	Home		195	98.5
	Nursing home		3	1.5
Whom do they live with				
	Alone		32	16.2
	Spouse		126	63.6
	Child		39	19.7
	Carer		1	0.5
Disease status				
	Not present		32	16.2
	Present		166	83.8
Diseases*				
	Hypertension		91	46.0
	Diabetes		58	29.3
	Respiratory diseases		31	15.7
	Endocrine diseases		11	5.6
	Psychiatric disorders		11	5.6
	Musculoskeletal system diseases		57	28.8
	Cardiovascular diseases		47	23.7
	Gastrointestinal system diseases		21	10.6
	Neurological diseases		20	10.1
	Vitamin mineral deficiencies		31	15.7

*More than one answer was given.

Table 2. Characteristics of Individuals' Lifestyles and Eating Habits

		n=198	%
Individuals preparing food at home			
	Him/herself	104	52.5
	Spouse	56	28.3
	Child	35	17.7
	Caregiver-nursing home	3	1.5
Denture tooth			
	Present	95	48.0
	Not present	103	52.0
Missing tooth			
	Present	109	55.1
	Not present	89	44.9
Tooth problem prevents eating			
	Does not prevent	147	74.3
	Only in solid foods	45	22.7
	In all foods	6	3.0
Perceived appetite			
	Poor	5	2.5
	Average	71	35.9
	Good	85	42.9
	Very good	37	18.7
Number of main meals			
	1	2	1.0
	2	81	40.9
	3	115	58.1
Reason for skipping main meals*			
	Loss of appetite	58	69.9
	Lack of preparer	25	30.1
Number of snacks			
	Not snacking	5	2.5
	1	74	37.4
	2	103	52.0
	3	16	8.1
Tobacco smoking			
	Yes	27	13.6
	No	171	86.4
Alcohol consumption			
	Yes	2	1.0
	No	196	99.0

*Less than 3 main meals were evaluated as skipping main meal

According to the MNA screening score, 30.3% of elderly individuals are at risk of malnutrition (female: 31.0%, male: 29.4%) and 1.5% are malnourished. The MNA screening score is higher in male compared to female (p=0.036). It was determined that 44.4% of individuals are at risk of sarcopenia. The total SARC-F score is

significantly higher in male than in female (<0.001), and 29.4% of male and 55.8% of female are at risk of sarcopenia (Table 3).

Table 3. Risk of malnutrition and sarcopenia in elderly individuals

		Female (n=113)	Male (n=85)	P#	Total (n=198)
MNA-SF	Mean±SD	11.78±1.76	12.24±1.83	**0.036***	11.97±1.79
		n (%)	**n (%)**		**n (%)**
	Normal nutritional status	76 (67.3)	59 (69.4)		135 (68.2)
	At risk of malnutrition	35 (31.0)	25 (29.4)		60 (30.3)
	Malnourished	2 (1.7)	1 (1.2)		3 (1.5)
SNAQ65⁺					
	Normal nutritional status	81 (71.7)	61 (71.8)		142 (71.7)
	At risk of malnutrition	29 (25.7)	18 (21.2)		47 (23.7)
	Malnourished	3 (2.6)	6 (7.0)		9 (4,6)
SARC-F	Mean±SD	3.93±2.42	2.49±2.38	**<0.001**	3.31±2.51
	No sarcopenia risk	50 (44.2)	60 (70.6)		110 (55.6)
	Sarcopenia risk	63 (55.8)	25 (29.4)		88 (44.4)

*p<0.05, #Mann-Whitney U test MNA-SF: Mini Nutritional Assessment-Short Form, SNAQ65⁺: Short Nutritional Assessment Questionnaire 65⁺, SARC-F: Sarcopenia screening tool

In Table 4, a weakly significant negative correlation was found between the total MNA screening score and the total SARC-F score (p<0.001).

Age, sex, education level, marital status, disease status, and appetite status were not found to have a significant effect on the risk of malnutrition (p>0.05). Elderly individuals who reported that dental problems hinder their consumption of solid food were found to be 2.881 times more likely to be at risk of malnutrition compared to those who did not report such hindrance (p<0.05) (Table 5).

The dietary intake of vitamin B1 and folate is significantly lower in elderly individuals at risk of malnutrition and those with malnutrition (p=0.038 and p=0.011, respectively). The intake of other dietary nutrients is similar between those at risk of malnutrition/malnourished and those with normal nutritional status (p>0.05). The dietary nutrient intake is also similar between those at risk of sarcopenia and those not at risk (p>0.05) (Table 6).

Table 4. The relationship between MNA and SARC-F total scores

	MNA-SF	
	r	**P**
SARC-F	-0.006	**<0.001**

Spearman's correlation, MNA-SF: Mini Nutritional Assessment-Short Form, SARC-F: Sarcopenia screening tool

Table 5. Analysis of Factors Affecting the Risk of Malnutrition Using Logistic Regression

							%95 C.I.	
Risk factors	**β**	**SE**	**Wald**	**df**	**p**	**OR**	**Lower**	**Upper**
Dental problems (solid food)	1.058	0.412	6.581	1	**0.010***	2.881	1.284	6.466

*p<0.05 β: Regression coefficient, SE: Standard error, Wald: Chi-square, df: degree of freedom, p: significance level, OR: Odds Ratio, C.I.: Confidence Interval

Table 6. Comparison of dietary energy and nutrient intakes of individuals according to malnutrition and sarcopenia risk status

	Malnutrition risk and malnourished	**Normal nutritional status**	**p¶**	**No risk of sarcopenia**	**Sarcopenia risk**	**p¶**
Energy (kcal)	1620.21±649.33	1663.17±746.21	0.758	1705.29±767.87	1579.76±641.44	0.359
Carbohydrate (gr)	195.69±102.01	192.35±98.14	0.900	198.38±105.93	187.20±90.16	0.551
Carbohydrate (%)	48.03±11.28	46.76±8.66	0.383#	46.76±10.54	47.66±8.21	0.514#
Protein (gr)	62.57±28.46	62.08±26.59	0.903	64.30±26.03	59.65±28.37	0.052
Protein (%)	16.17±4.68	15.81±3.82	0.507	16.18±5.52	15.61±3.51	0.740
Fat (gr)	63.05±26.41	69.53±35.46	0.422	70.55±37.22	63.60±26.29	0.538
Fat (%)	35.83±11.00	37.39±8.31	0.162	37.06±9.69	36.68±8.71	0.931
Vitamin A (mcg)	981.63±709.07	1029.65±687.43	0.165	961.39±506.69	1080.59±870.43	0.898
Vitamin E (mg)	18.05±10.56	17.73±9.95	0.943	17.28±9.55	18.52±10.81	0.580
Vitamin B1 (mg)	0.82±0.39	0.96±0.53	**0.038***	0.94±0.53	0.89±0.43	0.504
Vitamin B2 (mg)	1.17±0.74	1.27±0.86	0.066	1.27±0.91	1.20±0.70	0.364
Vitamin B6 (mg)	1.23±0.62	1.35±0.59	0.114	1.34±0.60	1.28±0.61	0.393
Folate (mcg)	303.46±154.14	361.64±187.06	**0.011***	356.84±192.68	325.99±159.53	0.297
Vitamin C (mg)	102.66±94.19	128.66±97.87	0.002	118.181±96.32	122.36±98.89	0.673
Sodium (mg)	2362.00±2223.19	2194.15±1434.56	0.870	2310.29±1420.03	2169.13±2041.65	0.052
Potassium (mg)	2522.76±1466.99	2653.78±1183.04	0.066	2623.66±1275.96	2597.64±1287.51	0.798
Calcium (mg)	616.26±303.22	700.32±306.87	0.073#	679.55±312.50	666.09±302.65	0.812
Magnesium (mg)	247.62±120.28	268.92±127.98	0.154	267.39±128.281	255.57±122.05	0.393
Phosphorus (mg)	986.18±476.62	1050.05±505.64	0.261	1065.68±519.74	984.78±464.29	0.212
Iron (mg)	9.87±5.32	10.19±5.06	0.495	10.39±5.02	9.69±5.26	0.107
Zinc (mg)	8.46±4.41	8.58±4.01	0.442	8.67±4.21	8.14±4.01	0.103

*p<0.05, #Independent samples t-test, ¶Mann Whitney U test

Discussion

According to the study findings, 30.3% of elderly individuals are at risk of malnutrition and 44.4% are at risk of sarcopenia. Females have lower MNA screening scores than males (p=0.036) and higher SARC-F scores (p<0.001). Elderly individuals who reported that dental problems prevent them from consuming solid foods are 2.881 times more likely to be at risk of malnutrition compared to those who did not report such problems (p=0.010).

In a multi-center study conducted in Turkey, 49.1% of the elderly were found to be at risk of malnutrition, and 6.7% were malnourished.[15] In a study by Ülger et al.[16], 28.0% of the elderly in the community were observed to be at risk of malnutrition. In this study, using the MNA screening tool, 30.3% of the elderly in the community were found to be at risk of malnutrition and 1.5% were malnourished. According to the SNAQ65+ screening tool, 23.7% of individuals were at risk of malnutrition and 4.6% were malnourished. Studies conducted in Turkey indicate that the prevalence of malnutrition risk among the elderly in the community ranges approximately from 28.0% to 49.1%, supporting the findings of this study.

There are numerous physiological, socioeconomic, and neuropsychological factors related to nutrition that can lead to malnutrition. A meta-analysis has identified that hospitalization, reliance on assisted feeding, poor physical function, and reduced appetite are significant determinants of malnutrition. However, there is inconsistency in the findings regarding the effects of dental health, swallowing difficulties, cognitive function, depression, living conditions, medication usage and/or polypharmacy, constipation, and periodontal disease on malnutrition.[17]Another study indicated that in individuals over the age of 65 in the community, female sex, being single, impaired social resources, and poor quality of life are the main determinants of malnutrition risk.[18] In this research, the MNA score for females was found to be lower than that for males. While female sex may be considered a risk factor for malnutrition, logistic regression analysis showed no significant impact of age, sex, educational level, marital status, presence of chronic disease, or appetite status on malnutrition risk. Additionally, it was found that having dental problems that prevent the consumption of solid foods increases the risk of malnutrition by 2.881 times compared to those without such problems. Among the participants, 52.0% reported having dentures and 55.1% reported missing teeth. Tooth loss or dental problems can lead to difficulties in chewing and the inability to consume solid foods. The prevalence of malnutrition is higher among elderly individuals who are malnourished due to dental problems.[19] Toniazzo et al.[20], in a systematic review, found a significant association between the decrease in the number of functional and average teeth and malnutrition. Research supports the findings of this study, suggesting that elderly individuals who have chewing problems and difficulty consuming solid foods due to dental issues may be at risk of malnutrition.

The prevalence of sarcopenia among the elderly worldwide is reported to range between 10-16% and is more commonly seen in individuals with underlying health conditions.[21,22] In a study conducted in Turkey, sarcopenia was found in 11.8% of elderly individuals living in rural areas of the eastern region and 21.6% of those living in urban areas.[23] Another study reported that 50.2% of the elderly in the community in Turkey had sarcopenia.[24] In this study, 44.4% of the individuals (female: 55.8%, male: 29.4%) were found to have sarcopenia, and females had higher SARC-F scores than males ($p<0.001$). The wide range of prevalence across studies may be attributed to different diagnostic criteria, geographical regions, access to healthcare services, and other factors.

Malnutrition and sarcopenia are clinically significant and interrelated in their pathophysiologies. In a study examining the relationship between malnutrition parameters and sarcopenia diagnostic criteria, strong associations were found regarding muscle mass, and less strong associations were observed concerning muscle strength and physical performance. In malnourished elderly individuals, the risk of sarcopenia may increase due to decreased muscle protein synthesis.[25] In this study, a weakly negative significant relationship was found between the total MNA screening score and the total SARC-F score ($r=-0,306$, $p<0.001$), indicating that the malnutrition risk increases with the sarcopenia risk. The findings are similar to those of previous studies, but due to the weak relationship, more research is needed to obtain clearer results about the complex relationship between malnutrition and sarcopenia.

Inadequate and unbalanced nutrition can lead to the body not receiving essential nutrients in the elderly, increasing the risk of malnutrition. Nutritional quality in older adults is influenced by various factors, including economic status, functional limitations, sex, place of residence, smoking habits, and oral health. Poor nutritional quality often involves low intake of fruits, vegetables, legumes, and whole grains, coupled with high consumption of calorie-dense, nutrient-poor foods high in added sugars. This dietary pattern results in a decreased intake of essential macro and micronutrients.[26] A study conducted in Turkey found that elderly individuals at risk of malnutrition had lower intakes of energy, protein, carbohydrates, fats, vitamins A, E, B1, B2, B6, folate, C, and minerals such as calcium, magnesium, iron, and zinc compared to well-nourished individuals[15]. In this study, elderly individuals at risk of malnutrition/malnourished had lower dietary intakes of vitamins B1 and folate ($p=0.038$, $p=0.011$; respectively).Reduced dietary folate intake in the elderly can lead to folate deficiency, affecting age-related sensory function, appetite, dysphagia, and chewing disorders.[27] Additionally, folate deficiency in the elderly is associated with anemia, Alzheimer's disease, cardiovascular diseases, depression, muscle weakness, and frailty.[28] Although perceived appetite was better in most elderly in this study and appetite was not a risk factor for malnutrition, dietary insufficient folate intake may be a risk factor for appetite loss and muscle weakness. Based on the findings, inadequate dietary intake of folate may be a risk factor for malnutrition and related health problems. In addition, the similarity in other dietary macro-

nutrient and mineral intakes between groups in this study is contradictory compared to other studies, and further research is needed.

Nutrition is a crucial component in the prevention and treatment of sarcopenia. Adequate dietary intake of the macronutrient protein can prevent sarcopenia and muscle loss. Among micronutrients, selenium and magnesium are noted for their muscle performance-enhancing effects. Omega-3 fatty acids can help preserve muscle mass.[6] A study observed that the intake of polyunsaturated fatty acids, monounsaturated fatty acids, omega-3, vitamin E, vitamin B6, magnesium, iron, copper, sodium, and caffeine could reduce the likelihood of sarcopenia and low muscle strength.[29]According to the results of the SarcoPhAge study, individuals with sarcopenia consumed less dietary protein, fat, potassium, magnesium, phosphorus, iron, and vitamin K compared to those without sarcopenia.[30]In this research, the dietary intake of energy, macronutrients, and micronutrients was similar between individuals at risk of sarcopenia and those not at risk. This may be due to differences in demographic characteristics, health status, or lifestyles among the elderly affecting sarcopenia risk.

Conclusion

Elderly individuals living in the community may be at risk of malnutrition, which can lead to the development of sarcopenia and various health problems. Dental issues are a significant factor in the risk of malnutrition in the elderly, and it is important to take measures to protect dental health, such as oral care, regular dental check-ups, and healthy eating. The relationship between dietary intake of folate and malnutrition should be supported by more studies. Further research is also needed to examine the impact of nutrition on the risk of sarcopenia.

Ethical Considerations: Ethical approval for the study was obtained from the Ankara Yıldırım Beyazıt University Ethics Committee, with approval number 06-304 and date 14/06/2023.

Conflict of Interest: The authors declare no conflict of interest.

References

1. Acar Tek N, Karaçil-Ermumcu MŞ. Determinants of health related quality of life in home dwelling elderly population: appetite and nutritional status. *J Nutr, Health Aging*. 2018;22(8):996-1002.
2. Zukeran MS, Neto JV, Romanini CV, et al. The association between appetite loss, frailty, and psychosocial factors in community-dwelling older adults adults. *Clin. Nutr. ESPEN*. 2022;47:194-8.
3. Dent E, Wright OR, Woo J, Hoogendijk EO. Malnutrition in older adults. *The Lancet,* 2023;401(10380):951-66.
4. Lau S, Pek K, Chew J, et al. The Simplified Nutritional Appetite Questionnaire (SNAQ) as a screening tool for risk of malnutrition: optimal cutoff, factor structure, and validation in healthy community-dwelling older adults. *Nutrients*. 2020;12(9): 2885.
5. Gielen E, Beckwée D, Delaere A, De Breucker S, Vandewoude M, Bautmans I. Nutritional interventions to improve muscle mass, muscle strength, and physical performance in older people: an umbrella review of systematic reviews and meta-analyses. *Nutr. Rev.* 2021;79(2):121-47.
6. Ganapathy A, Nieves JW. Nutrition and sarcopenia—what do we know? *Nutrients.* 2020;12(6):1755.
7. Fielding RA, Landi F, Smoyer KE, Tarasenko L, Groarke J. Association of anorexia/appetite loss with malnutrition and mortality in older populations: A systematic literature review. *J Cachexia, Sarcopenia Muscle*. 2023;14(2):706-29.
8. Suzana S, Boon PC, Chan PP, Normah CD. Malnutrition risk and its association with appetite, functional and psychosocial status among elderly Malays in an agricultural settlement. *Mal J Nutr*. 2013;19(1):65.
9. Sarıkaya D. *Geriatrik hastalarda Mini Nütrisyonel Değerlendirme (MNA) testinin uzun ve kısa (MNA-SF) formunun geçerlilik çalışması.* Thesis, Hacettepe University, Faculty of Medicine, Ankara, 2013.
10. Wijnhoven HA, Schilp J, de Vet HC, et al. Development and validation of criteria for determining undernutrition in community-dwelling older men and women: The Short Nutritional Assessment Questionnaire 65+. *Clin. Nutr*. 2012;31(3): 351-8.
11. Evci Kiraz ED, Memiş S, Ergin F, Türe M. "Kısa Nütrisyonel Değerlendirme Ölçeği 65+(Short Nutritional Assessment Questionnaire 65+) Geçerlik ve Güvenirlik Çalışması", 48. Ulusal Nöroloji Kongresi, "Yaşam Boyu Nöroloji-Çocuk Nörolojisi", 62-63, Antalya, 16-22 Kasım 2012.
12. Malmstrom TK, Miller DK, Simonsick EM, Ferrucci L, Morley JE. SARC-F: a symptom score to predict persons with sarcopenia at risk for poor functional outcomes. *J Cachexia, Sarcopenia Muscle*. 2016;7(1):28-36.
13. Kiş, H.C., *SARC-F ölçeğinin Türkçeye uyarlanması ve 65 yaş üzeri bireylerde geçerlilik çalışması.* Thesis, Acıbadem Mehmet Ali Aydınlar University, Institue of Health Sciences, Department of Nutiriton and Dietetics, İstanbul, 2019.

14. Beslenme Bilgi Sistemi - BeBiS, Versiyon 9; 2021, Istanbul.
15. Ongan D, Rakıcıoğlu N. Nutritional status and dietary intake of institutionalized elderly in Turkey: a cross-sectional, multi-center, country representative study. *Arch Gerontol Geriatr*. 2015;61(2):271-6.
16. Ülger Z, Halil M, Kalan I, et al. Comprehensive assessment of malnutrition risk and related factors in a large group of community-dwelling older adults. *Clin. Nutr*. 2010;29(4):507-11.
17. O'Keeffe M, Kelly M, O'Herlihy E, et al. Potentially modifiable determinants of malnutrition in older adults: A systematic review. *Clin. Nutr*. 2019;38(6): 2477-98.
18. Maseda A, Diego-Diez C, Lorenzo-López L, López-López R, Regueiro-Folgueira L,Millán-Calenti JC. Quality of life, functional impairment and social factors as determinants of nutritional status in older adults: The VERISAÚDE study. *Clin. Nutr*. 2018;*37*(3):993-9.
19. Kossioni AE. The association of poor oral health parameters with malnutrition in older adults: a review considering the potential implications for cognitive impairment. *Nutrients*. 2018;10(11):1709.
20. Toniazzo MP, Amorim PDSA, Muniz FWMG, Weidlich P. Relationship of nutritional status and oral health in elderly: Systematic review with meta-analysis. *Clin. Nutr.* 2018;37(3):824-30.
21. Petermann-Rocha F, Balntzi V, Gray SR, et al. Global prevalence of sarcopenia and severe sarcopenia: a systematic review and meta- analysis. *J Cachexia Sarcopenia Muscle*. 2022;13:86–99.
22. Carvalho do Nascimento PR, Bilodeau M Poitras S. How do we define and measure sarcopenia? A meta-analysis of observational studies. *Age Ageing*. 2021;50:1906-13.
23. Mehmet E, Saraç ZF, Savaş S, Kılavuz A, Akçiçek SF. Sarcopenia prevalence and the quality of life in older adults: A study from Turkey's east. *Ege Tıp Dergisi*. 2021;52-9.
24. Doğan G, Ayhan NY. Relationship between malnutrition and sarcopenia in elderly Turkish community-dwellers. *Nutr Clin et Metab*. 2022;*36*(1):40-5.
25. Reijnierse EM, Trappenburg MC, Leter MJ, et al. The association between parameters of malnutrition and diagnostic measures of sarcopenia in geriatric outpatients. *PloS one*. 2015;10(8):e0135933.
26. Nazri NS, Vanoh D, Leng SK. Malnutrition, low diet quality and its risk factors among older adults with low socio-economic status: a scoping review. *Nutr. Res. Rev*. 2021;*34*(1):107-16.
27. Araújo JR, Martel F, Borges N, Araújo JM, Keating E. Folates and aging: Role in mild cognitive impairment, dementia and depression. *ARR*. 2015;22: 9-19.
28. Gana W, De Luca A, Debacq C, et al. Analysis of the impact of selected vitamins deficiencies on the risk of disability in older people. *Nutrients*. 2021;*13*(9):3163.
29. Bagheri A, Hashemi R, Heshmat R, Motlagh AD, Esmaillzadeh A. Patterns of nutrient intake in relation to sarcopenia and its components. *Front. Nutr*. 2021;8:645072.
30. Beaudart C, Locquet M, Touvier M, Reginster JY, Bruyère O. Association between dietary nutrient intake and sarcopenia in the SarcoPhAge study. *Aging Clin. Exp. Res*. 2019;31:815-24.

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Research Article

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INVESTIGATION OF THE EFFECT OF CANCER NEEDS OF OUTPATIENT CHEMOTHERAPY PATIENTS ON THEIR HEALTH PERCEPTIONS: A CROSS-SECTIONAL STUDY

Ilknur Göl[1], Denizkan Lokurlu[1], Serap Açıkgöz[1]

[1]Department of Public Health Nursing, Çankırı Karatekin University, Çankırı, Türkiye

Correspondence:
Serap Açıkgöz (e-mail: acikgoz.serap@gmail.com)

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Ankara Yıldırım Beyazıt University Faculty of Medicine
Department of Family Medicine

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Abstract

Objectives: Cancer, a health problem with an increasing incidence, poses many financial and moral difficulties to the patient and his family. An individual diagnosed with cancer and undergoing chemotherapy has increased care needs throughout the course of the disease in many areas. It is important to consider it holistically to meet the needs of patients. This study was conducted to examine the effects of the cancer needs of patients receiving ambulatory chemotherapy on their health perceptions.

Materials and Methods: A cross-sectional study was conducted with 384 outpatient chemotherapy patients. Data were collected with a sociodemographic information form, the Cancer Needs Questionnaire-Short Form, and the Perception of Health Status Scale.

Results: The mean scores of the study group were 130±12.38 on the total “Cancer Needs Questionnaire" and 2.92±0.68 on the total "Perception of Health Status Scale". A high-level and very significant positive correlation was found between the total scores of both scales ($p \leq 0.05$). It was determined that the cancer needs of the study group highly significantly predicted their health perceptions ($p=0.000$).

Conclusion: The findings of this study showed that patients with cancer receiving ambulatory chemotherapy had a high level of cancer needs and poor health perceptions and that these two characteristics showed a high, positive, and very significant relationship.

Keywords: Cancer, chemotherapy, cancer need, health perception, patient.

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Introduction

Cancer, known as the uncontrollable division of cells in a certain part of the body and its spread into surrounding tissues, is a chronic disease that is compelling for patients and their family members in terms of biopsychosocial and economic aspects and can result in death in some cases.[1] Despite the rapid developments in diagnosis and treatment, cancer ranks first among the diseases that threaten individuals' lives.[2] According to the International Agency for Research on Cancer 2022 data, an estimated 19.9 million new cancer cases and approximately 10 million cancer deaths occurred globally. In addition, IARC foresees the number of cancer cases as 35.3 million people in 2050.[3] In Turkey, the annual number of new cancer cases in 2022 was 240,013 and the number of cancer-related deaths was reported as 129,672.[4] Cancer, which is a health problem with an increasing incidence, creates financial and moral difficulties for patients and their families and even causes many social, psychological, economic, and physical losses.[5]

Chemotherapy is a treatment method that aims to kill cells that proliferate uncontrollably in the individual's body and makes up an important part of cancer treatment.[6] It can be administered more than once, depending on the patient's response to treatment.[6,7] Chemotherapeutic agents used in chemotherapy treatment can also damage healthy cells because they cannot choose their mechanism of action. For this reason, they cause physical and psychological symptoms in patients.[8,9] Individuals diagnosed with cancer and undergoing chemotherapy have to fight against many difficulties, such as disease management, side effects of treatment, anxiety, uncertainty, fear of recurrence, hopelessness, sexual dysfunction, deterioration in body image, deterioration in social relationships, economic losses, marital distress, and performing daily living activities.[10,11] This situation affects the patient and their families physically, emotionally, socially, psychologically, and spiritually in many ways and reduces the quality of life of individuals.[12] It has been stated that patients with cancer have increasing care needs in physical, emotional, social, psychological, spiritual, information, and practical areas throughout the course of the disease.[13] Patients should be handled and supported holistically to meet their needs and manage the symptoms they experience.[14] Supportive care aims to increase patients' physical comfort, support them psycho-socially, provide moral support, and optimize their well-being by reducing their information needs.[14,15] Identifying and addressing supportive care needs reduces the patient's distress, care dissatisfaction, disability, morbidity, and mortality rates and the cost associated with healthcare services, and ultimately contributes to improving quality of life. For these reasons, this study was planned based on the following question: "What is the effect of cancer needs of patients with cancer receiving ambulatory chemotherapy on their health perceptions?"

Materials and Methods

This study has planned as a cross-sectional design. This study was performed in line with the principles of the Declaration of Helsinki. Approval was granted by the Cankiri Karatekin University Scientific Research Ethics Committee in Turkey (Date: 28.06.2022/No: 26). The hospital where the study was conducted was obtained. At the outset, individuals were informed about the study, and then verbal consent of those who agreed to participate in the study voluntarily was obtained. Permission of the authors of the scales to be used in the study was obtained via e-mail.

The population of the research consisted of patients who received treatment in the outpatient chemotherapy unit of a hospital located in the Central Anatolia Region of Turkey between June and August 2022. The study was conducted with 384 individuals who received treatment in the outpatient chemotherapy unit of the oncology department during the data collection time and who met the inclusion criteria of the study. Inclusion criteria were (a) having been diagnosed with cancer, (b) receiving chemotherapy, (c) being literate, (d) speaking Turkish as a mother tongue, and (e) agreeing to participate in the study voluntarily. Exclusion criteria were (a) not filling out data collection tools completely, and (b) not having chemotherapy treatment as an outpatient.

Data collection measures included a Sociodemographic Information Form, the Cancer Needs Questionnaire-Short Form, and the Perception of Health Status Scale.

Sociodemographic Information Form created by the researchers in line with the literature. This form has 9 questions about sociodemographic characteristics of individuals. The variables for these questions are age, gender, education, marital status, place of residence, social security, employment status, income status, and history of cancer in first-degree relatives.

The Cancer Needs Questionnaire-Short Form (CNQ) was developed by Cossich et al for use in patients receiving treatment in an outpatient chemotherapy unit.[16] Its Turkish adaptation study was conducted by Dolu et al.[17] It consists of 32 items and 5 sub-dimensions, namely "psychological", "interpersonal communication", "health information", "patient care and support", and "physical and daily living". There are no reverse-coded items on the scale, and each item is scored on a five-point Likert-type. The total score that can be obtained from the scale is 32-160. High scores indicate that the patient needs a high level of help. Cronbach's alpha coefficient was 0.87. In the present study, this value was 0.88.

The Perception of Health Status Scale (PHSS) was developed by Davis, Avery, and Donald in 1978 and it was adapted into Turkish by Esin in 1997. It is used to determine how individuals perceive their current health

status. The evaluation is done using the “very good” (1), “good” (2), “poor” (3), and “very poor” (4) options. Total scores on the scale range between one and four, with four being the lowest score and one the highest.[18]

Study data were analyzed on the SPSS 23.0 software package. The conformity of the variables to the normal distribution was examined using visual (histogram and probability graphs) and analytical methods (skewness, kurtosis, and Shapiro-Wilk tests). In addition to descriptive statistics, Kruskal-Wallis H and Mann-Whitney U tests were used to analyze variables that did not fit the normal distribution in intergroup comparisons. Pearson correlation analysis was used to determine the relationship between the two scales, and linear regression analysis was employed to determine the effect of cancer needs on health perception.

Results

The mean age of the participants was 58.19±15.87 years, 52.1% of the study group was female, 73.7% were married, 49.2% were primary school graduates, 60.7% did not have a paid job, and 47.1% stated that their income was less than their expenses. In addition, 63.8% of the participants stated that they had a history of cancer in their first-degree relatives (Table 1).

As seen in Table 2, participants’ mean scores were 130±12.38 on the total CNQ, 46.22±5.50 on the psychological sub-dimension, 29.07±3.13 on the interpersonal communication sub-dimension, 31.76±3.68 on the health information sub-dimension, 12.11±1.42 on the patient care and support sub-dimension, and 11.64±2.55 on the physical and daily living sub-dimension. The mean score on the total PHSS was 2.92±0.68 (Table 2).

A high, positive, and very significant correlation was found between the total scores of CNQ and the PHSS (r= 0.225, p=0.000). In addition, a positive and highly significant correlation was found between the psychological, interpersonal communication, health information, and patient care and support sub-dimensions of the CNQ and the total PHSS score (Table 3).

As seen in Table 4, the cancer needs of the research group highly significantly predicted their health perceptions. The psychological sub-dimension of the CNQ explained the 4.4% increase in the perception of health (R^2=0.044), the interpersonal communication sub-dimension 3.8% (R^2=0.038), the health information sub-dimension 1.8% (R^2=0.018), the patient care and support sub-dimension 5.5% (R^2=0.055), and the total scale 5.1% (R^2=0.051) (Table 4).

Table 1. Distribution of the study group according to sociodemographic characteristics (n=384)

Characteristics	**Mean±Sd**	
Age	58.19±15.87 (min: 19, max: 89)	
	n	**%**
Gender		
Female	200	52.1
Male	184	47.9
Education		
Non-literate	61	15.9
Literate	74	19.3
Primary education	189	49.2
Undergraduate	49	12.8
Graduate	11	2.9
Marital status		
Married	283	73.7
Single	101	26.3
Place of residence		
Province	77	20.1
District	211	54.9
Village	96	25.0
Do you have any social security?		
Yes	360	93.8
No	24	6.3
Employment status		
Employed	151	39.3
Unemployed	233	60.7
Income status		
Income<expenses	181	47.1
Income=expenses	153	39.8
Income>expenses	50	13.0
History of cancer in first-degree relatives		
Yes	245	63.8
No	139	36.2

Table 2. Participants' mean scores on the Cancer Needs Questionnaire-Short Form, its sub-dimensions, and the Perception of Health Status Scale (n=384)

Cancer Needs Questionnaire-Short Form	**Min.**	**Max.**	**Mean±Sd**
Psychological	11	55	46.22±5.50
Interpersonal communication	7	35	29.07±3.13
Health information	7	35	31.76±3.68
Patient care and support	4	20	12.11±1.42
Physical and daily living	3	15	11.64±2.55
Total	32	160	130±12.38
Perception of Health Status Scale	4	1	2.92±0.68

Table 3. The correlation between participants' mean scores on the total and sub-dimensions of the Cancer Needs Questionnaire-Short Form and the total Perception of Health Status Scale

		Perception of Health Status Scale
Cancer Needs Questionnaire Short Form	r	0.225**
	p	**0.000**
	n	384
Psychological	r	0.210**
	p	0.000
	n	384
Interpersonal communication	r	0.195**
	p	**0.000**
	n	384
Health information	r	0.134**
	p	**0.008**
	n	384
Patient care and support	r	0.234**
	p	**0.000**
	n	384
Physical and daily living	r	0.075
	p	0.140
	n	384

**p<0.001, r: Pearson product-moment correlation

Table 4. The effect of the participants' scores on the Cancer Needs Questionnaire-Short Form and its sub-dimensions on their health perceptions

Cancer Needs Questionnaire Short Form *	Perception of Health Status Scale					
	Model 1	**Model 2**	**Model 3**	**Model 4**	**Model 5**	**Model 6**
	β	β	β	β	β	β
Psychological	1.726					
Interpersonal communication		1.690				
Health information			2.139			
Patient care and support				1.565		
Physical and daily living					2.694	
Cancer Needs Questionnaire						1.306
R	0.210	0.195	0.134	0.234	0.075	0.225
R^2	0.044	0.038	0.018	0.055	0.006	0.051
F	17.556	15.133	7.011	22.158	2.184	20.331
p	**0.000**	**0.000**	**0.008**	**0.000**	0.140	**0.000**
DW (1.5-2.5)**	1.960	1.924	1.931	1.970	1.928	1.943

Abbreviations: F, ANOVA value R, correlation coefficient; R^2, R square; β, standardized β; DW, Durbin-Watson; *Independent variable

Discussion

Cancer patients struggle with many difficulties, and their relatives are negatively affected by the course of the disease, which makes it vital to handle and meet their care needs holistically.[19] The perception of poor health, which is defined as having negative beliefs about one's health,[20] may negatively affect the course of the disease. Therefore, in this study, we aimed to investigate how the cancer needs of patients receiving ambulatory chemotherapy affected their health perception. The mean score of the research group on the total CNQ was determined as 130±12.38. Considering that the minimum and maximum scores on the scale are 32 and 160, it can be said that patients' cancer needs were at a high level. High scores obtained from the sub-dimensions of the scale also drew attention to patients' care needs in psychological, interpersonal communication, health information, patient care, and physical and daily living domains. Considering that the total score of the research group on the PHSS was 2.92±0.68 and the minimum and maximum scores that can be obtained from the scale were four (very bad) and one (very good), respectively, it can be said that the patients had a perception of poor health.

It was determined that there was a high, positive, and very significant correlation between the total CNQ score and the PHSS score of the research group. This finding is important in that it indicates that the perception of health deteriorates as the cancer requirements of patients receiving ambulatory chemotherapy increase. Today, the prevailing opinion is that anticancer treatment alone is not enough for the treatment of cancer patients and that the supportive care needs of the patients should also be met.[21] Supportive care need is defined as the provision of basic care services that cover different aspects of care, such as self-help and support, provision of information, psychological support, social support, rehabilitation, and complementary therapies, which have been integrated with diagnosis and treatment.[22] Although it is considered a basic care service, studies are showing that the supportive care needs of cancer patients are moderate to high. For example, de Calvo et al., stated that the care needs of nearly half (46.95%) of cancer patients receiving outpatient treatment in oncology units in Colombia were not met.[23] Wu et al., in their systematic review of the Chinese population, stated that Chinese patients had unmet needs during cancer disease, especially in areas that affected their quality of life.[24] Yan et al. reported that the cancer needs of 17.6% to 81.7% of patients with acute leukemia who had been newly diagnosed or treated for cancer were not met.[25] Hetz and Tomasone determined that although the needs of the majority (61.1%) of melanoma patients in Canada seemed to be met, the education and increasing information needs of patients with less education (high school diploma or below) were not met.[26] Liao et al. determined that patients diagnosed with lung cancer had a high level of supportive care needs, especially in the health system and information, psychological, and patient care and support domains.[27] Çelik (2021) determined that cancer patients treated in oncology hospitals needed a high level of care in psychological, health care and information, daily living, and sexuality domains.[28] Ayvat (2019) determined that cancer patients receiving ambulatory chemotherapy mostly needed supportive care in the daily living dimension.[29] The findings of the current study, similar to the findings of both international and national studies, showed that the research group had care needs in psychological, and interpersonal communication, health information, patient care and support, and physical and daily living domains.

The cancer needs of the research group significantly predicted their health perceptions. In other words, the level of cancer needs explained 5.1% of the increase in health perception. The interpretation of this finding is that the perception of health may worsen with the increase in cancer needs, and the perception of poor health might create a significant barrier to meeting the care needs of patients. Regarding supportive care needs, it is emphasized that patients and their relatives play a central role in making decisions about their care. It has also been stated that they may need health professionals' support to help them plan and evaluate their care and discover whether previous decisions need to be changed.[22] How health is perceived can be an important determinant for patients to take a central role in decisions about their care because the perception of health affects health responsibility, health behaviors, treatment and rehabilitation of the disease, adjustment to treatment, and planning and implementation of effective interventions in patient education.[30] In this context, it is important to develop a perception of good health to help patients become aware of their cancer needs and

make decisions about their care, and thus develop the ability to take responsibility for their health. The care needs of patients should be addressed holistically, their awareness and positive beliefs about their health should be increased, and they should be given information about the protection and improvement of their health.

In this study, which was conducted to determine how the cancer needs of patients receiving ambulatory chemotherapy affected their health perception, it was determined that the cancer needs of the participants were high, their perception of health was bad, and these two characteristics showed a high, positive, and very significant correlation. Understanding the care needs and perception of health in cancer patients is important to develop approaches that increase the quality of life and satisfaction with care. Meeting the care needs of patients receiving ambulatory chemotherapy may be effective both in improving the treatment process and the perception of good health, thus improving well-being. Nurses are the individuals who can best understand and produce solutions for patients receiving ambulatory chemotherapy. By providing holistic care, nurses can support patients both in coping with the disease process and improving their health perception. Planning and performing home visits for outpatients can make this support even stronger.

We think that the results of our study will help determine the factors that impair the health perception of cancer patients receiving outpatient chemotherapy and guide the development of nursing practices that will meet their supportive care needs. It is recommended to increase the number of studies on the examination of the variables that may be related to the supportive care needs of patients receiving outpatient chemotherapy and to conduct intervention studies to meet their supportive care needs.

Limitations

In this study, outpatient chemotherapy patients were not evaluated according to cancer type. Therefore, the results obtained from the study cannot be generalized to all cancer types.

Ethical Considerations: The research received approval from the Çankırı Karatekin University Scientific Research Ethics Committee (Date: 28.06.2022/No:26).

Conflict of Interest: The authors declare no conflict of interest.

References

1. American Cancer Society, [Internet]. https://www.cancer.org/content/dam/cancer-org/research/cancer-facts-and-statistics/annual-cancer-facts-and-figures/2016/cancer-facts-andfigures-2016.pdf (Accessed 03.05.2023).
2. Turkish Statistical Institute [Internet]. https://data.tuik.gov.tr/Bulten/Index?p=Olum-Nedeni-Istatistikleri-2017-27620 (Accessed 03 May 2023). [in Turkish].
3. International Agency for Research on Cancer [Internet]. https://gco.iarc.who.int/en (Accessed 19.07.2024).
4. International Agency for Research on Cancer [Internet]. https://gco.iarc.who.int/media/globocan/factsheets/populations/792-turkiye-fact-sheet.pdf (Accessed 19.07.2024).
5. Karagil FMA, Harmancı H. Mental health of the diagnosed patients of cancer and their families. *Karatay Journal of Social Studies*. 2022;9:63-90. [in Turkish].
6. Otto SE. Chemotherapy. In: Langhorne ME, Fulton JS, Otto SE, eds. *Oncology Nursing*. 4th ed. Missouri: Elsevier; 2007;362-76.
7. Gündoğdu F. Planning and implementation of treatment in chemotherapy. In: Can G. ed. *Oncology Nursing*. İstanbul: Nobel Tıp Publications; 2014:191-204.
8. Hintistan S, Pekmezci H, Nural N, Güner SG. Psychologic symptoms of patients receiving chemotherapy. *Cumhuriyet Nursing Journal*. 2015;4(1):1-9. [in Turkish].
9. Mohamed NE, Herrera PC, Hudson S, et al. Muscle invasive bladder cancer: examining survivor burden and unmet needs. *The Journal of Urology*. 2014;191(1):48-53.
10. Seiler A, Jenewein J. Resilience in cancer patients. *Front in Psychiatry*. 2019;10:208.
11. Ülger E, Alacacıoğlu A, Gülseren A, Zencir G, Demir L, Tarhan MO. Psychosocial problems in cancer and the importance of psychosocial oncology. *Journal of Dokuz Eylül University Medical Faculty*. 2014;28(2):85-92. [in Turkish].
12. Yılmaz, M, Yazgı ZG. Nursing Role in coping with psychosocial problems experienced by cancer. *Journal of Adnan Menderes University Health Sciences Faculty*. 2013;4(1):60-70. [in Turkish].
13. Fitch M. Supportive care framework. *Can Oncol Nurs J*. 2008;18(1):6-14.
14. Harrison JD, Young JM, Price MA, Butow P, Solomon MJ. What are the unmet supportive care needs of people with cancer? A systematic review. *Support Care Cancer*. 2009;17(8):1117-28.
15. Uchida M, Akechi T, Okuyama T, et al. Patients' supportive care needs and psychological distress in advanced breast cancer patients in *Japan. Jpn J Clin Oncol*. 2011;41(4):530-6.
16. Cossich T, Schofield P, McLachlan SA. Validation of the cancer needs questionnaire (CNQ) short-form version in an ambulatory cancer setting. *Qual Life Res*. 2004;13:1225-33.

17. Dolu İ, Dönmez E, Yaranoğlu C. Cancer Needs Questionnaire Short-Form: Turkish validity and reliability study in an ambulatory cancer setting. *Türkiye Klinikleri Journal of Nursing Sciences*. 2021;13(3):544-555. [in Turkish].
18. Esin MN. *Promotion and determination of health behaviours of the workers who work in the industry*. PhD Thesis, İstanbul University, Department of Nursing, İstanbul; 1999. [in Turkish].
19. Kıyak M, Özkaraman A. Post-cancer life: Requirements of survivors. *İzmir Katip Çelebi University Journal of Faculty of Health Sciences*. 2021;7(1):99-104. [in Turkish].
20. Alkan SA, Özdelikara A, Boğa NM. Determination of nursing students' health perception. *Gümüşhane University Journal of Health Sciences*. 2017;6(2):11-21. [in Turkish].
21. Gysels M, Higginson IJ, Rajasekaran M, Davies E, Harding R. Improving supportive and palliative care for adults with cancer. *Kings Coll Hosp Gaz Clin Supp*. 2004;5(3): 24
22. National Institute for Clinical Excellence [Internet]. https://www.nice.org.uk/guidance/csg4/resources/improving-supportive-and-palliative-care-for-adults-with-cancer-pdf-773375005 (Accessed: 05.05.2023).
23. de Calvo A, Esperanza L, Sepulveda-Carrillo GJ. Care needs of cancer patients undergoing ambulatory treatment. *Enfermería Global*. 2017;16(1):353-383.
24. Wu VS, Smith AB, Girgis A. The unmet supportive care needs of Chinese patients and caregivers affected by cancer: A systematic review. *Eur J Cancer Care*. 2020;31(6):e13269.
25. Yan J, Wang Y, Chen J, et al. Unmet supportive care needs and its relation to quality of life among adult acute leukaemia patients in China: a cross-sectional study. *Health Qual Life Outcomes.* 2020;18:1-11.
26. Hetz S, Tomasone JR. Supportive care needs of Canadian melanoma patients and survivors. *Can Oncol Nurs J*. 2012;22(4):248-251.
27. Liao YC, Liao WY, Shun SC, Yu CJ, Yang PC, Lai YH. Symptoms, psychological distress, and supportive care needs in lung cancer patients. *Support Care Cancer*. 2011;19:1743-1751.
28. Çelik H. *Examining the relationship between supportive care needs of cancer patients and their attitudes towards complementary and alternative medicine*. Thesis, İnönü University, Nursing Department, Malatya; 2021. [in Turkish].
29. Ayvat İ. *The investigation of the unmet supportive care needs of cancer patients receiving chemotherapy in an ambulatory-care setting in the context of age,* Thesis, Hacettepe University, Nursing Department, Ankara; 2019. [in Turkish].
30. Leventhal H, Leventhal EA., Cameron L. Representations, procedures, and affect in illness self-regulation: a perceptual-cognitive model. In: Baum AS, Revenson TA., Singer JE, eds. *Handbook of Health Psychology*, Lawrence Erlbaum: Mahwah; 2001:19-48.

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Research Article

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HEALTHCARE PROFESSIONALS' INCLINATION TO ETHICAL VALUES AND ETHICAL ATTITUDES TOWARD SEXUAL-REPRODUCTIVE HEALTH

Halime Abay[1], Feride Mualla Alagöz[2], Özlem Moraloğlu Tekin[2]

[1]Nursing Department, Ankara Yıldırım Beyazıt University Faculty of Health Sciences, Ankara, Türkiye

[2]Department of Obstetrics and Gynecology, Ministry of Health Ankara Bilkent City Hospital, Ankara, Türkiye

Correspondence:
Halime Abay (e-mail: halimeabay1@gmail.com)

Submitted: 14.06.2024 // Accepted: 04.09.2024

Ankara Yıldırım Beyazıt University Faculty of Medicine
Department of Family Medicine

ANKARA MEDICAL JOURNAL

Abstract

Objectives: Women's healthcare professionals' ethical values and attitudes regarding sexual-reproductive health are pivotal in guiding their ethical decision-making when confronted with moral issues and dilemmas in this field. This study investigated healthcare professionals' inclination toward ethical values, their ethical attitudes toward sexual-reproductive health, and the effect of gender on those attitudes.

Materials and Methods: This descriptive cross-sectional study was performed between May 1, 2022, and October 30, 2022. The study sample comprised 106 doctors, 108 nurses, and 96 midwives from a maternity hospital (n=310). Participants were recruited using stratified random sampling. Data were collected using a Personal and Professional Information Form, the Inclination to Ethical Values Scale, and the Ethical Attitudes Towards Sexual-Reproductive Health Behaviors and Practices Survey.

Results: Participants had a mean inclination to ethical values score of 69.56±10.32. Most participants had ethical attitudes toward sexual life, family planning, HIV/AIDS, virginity testing, female genital mutilation, and domestic violence against women. Less than half of the participants had ethical attitudes toward abortion, assisted reproductive techniques, prenatal diagnosis and screening, and caesarean section. Participants' attitudes were in line with legal regulations. Gender significantly affected participants' ethical attitudes toward sexual-reproductive health behaviors and practices ($p<0.05$). Participants were protective of their gender.

Conclusion: Ethical issues in sexual-reproductive health affect women more than men. Women's autonomy takes on heightened significance. Healthcare professionals often encounter ethical problems in sexual-reproductive health. Governments should take ethical values into account when regulating laws in this field. Healthcare professionals' awareness and knowledge about reproductive ethics should be increased.

Keywords: Ethics, sexual health, reproductive health, delivery of health care, gender.

Introduction

Ethics is concerned with the values, norms, and rules by which individuals decide what is right/good and what is wrong/bad. Medical ethics, a subset of professional ethics, is concerned with establishing the principles and guidelines that guide the actions and conduct of healthcare professionals. It defines what health professionals should do and what they should refrain from doing to ensure proper and ethical behavior in medical relationships and medical practices.[1] Medical ethics also serves as a guiding and self-regulatory framework for the professional conduct of healthcare professionals. It helps ensure that their actions and decisions align with ethical standards and principles within the field of medicine.[2] Beneficence, nonmaleficence, respect for autonomy, and justice are the basic principles of medical ethics.[3] Ethical values are principles or guidelines that provide direction and justification for one's behavior. They offer a moral framework that guides individuals in making decisions and taking actions that are considered morally right or justifiable.

Having sexual-reproductive health means that one has a satisfying and safe sex life and has the freedom to make decisions about the use of one's reproductive abilities. Sexual-reproductive health services involve promoting sexual health, improving perinatal and neonatal care, eliminating unsafe abortion, providing high-quality services for family planning [infertility services], combating sexually transmitted infection [acquired immunodeficiency syndrome (AIDS)], and prevention of gynecologic cancer.[4]

Healthcare services are advancing in tandem with the progress of medicine and technology. Advances in medical research, diagnostic tools, treatment options, and healthcare delivery systems contribute to better patient care and outcomes, ultimately enhancing the quality of health services. While these advancements address numerous health issues, they also give rise to ethical dilemmas and challenges, particularly in the realm of sexual-reproductive health. This is where complex decisions regarding human life are made, leading to ethical questions and considerations. Ethical problems sometimes result in ethical violations, negatively affecting the health of women, who are more likely to experience sexual-reproductive health problems than men. Women, often influenced by social, cultural, and economic factors, can be more vulnerable than men in certain situations. Consequently, it is the responsibility of all healthcare professionals offering services in the field of women's health to uphold the principles of respect for women's choices and prevent any ethical violations.[5] Therefore, healthcare professionals should be aware of ethical issues and adhere to ethical rules in the field of sexual-reproductive health. In this context, "Sexual Rights: An International Planned Parenthood Federation Declaration" is a critical tool for all healthcare professionals offering services in the field of women's health.[6]

Healthcare professionals providing sexual-reproductive health services encounter ethical challenges encompassing various aspects of sexual-reproductive life. These include issues related to sexual activity,

contraception and family planning, abortion, prenatal diagnosis and screening, cesarean section, assisted reproductive techniques (ARTs), human immunodeficiency virus (HIV)/AIDS, virginity testing, female genital mutilation (FGM), and domestic violence against women.[4,7] In situations that demand ethical decision-making within the realm of sexual-reproductive health, healthcare professionals need to adopt a sensitive approach, possess extensive knowledge, maintain an ethical attitude, and draw upon their experience. These qualities are of paramount importance in navigating the intricate and sensitive nature of these issues and in ensuring that ethical standards are upheld while providing appropriate and respectful care to patients.[1,2] Therefore, health professionals should maintain a high level of awareness regarding ethical challenges and dilemmas associated with sexual-reproductive health. The secondary objective of the present study was to encourage healthcare professionals [doctors, midwives, and nurses] to perform self-assessments and raise their awareness of this issue.

While there is a large body of research on sexual-reproductive health, only a few researchers have addressed healthcare professionals' ethical attitudes toward sexual-reproductive health behaviors and practices.[8] Ethics committee opinions on this issue are noteworthy,[9] because there are still many ethically controversial behaviors and practices related to sexual-reproductive health. Furthermore, ethical issues related to sexual-reproductive health are more related to women because certain reproductive processes (e.g., pregnancy, childbirth, and infertility treatments) primarily involve women's bodies. However, only a few studies investigate the effect of gender on ethical attitudes. Healthcare professionals' sexual-reproductive health practices and ethical attitudes are very important because they are critical decision-makers. Therefore, this study investigated healthcare professionals' inclination toward ethical values, their ethical attitudes toward sexual-reproductive health, and the effect of gender on those attitudes.

Research questions

Q_1. What is healthcare professionals' inclination toward ethical values?

Q_2. What kind of ethical attitudes do healthcare professionals hold toward sexual-reproductive health behaviors and practices?

Q_3. Does gender affect healthcare professionals' ethical attitudes toward sexual-reproductive health behaviors and practices?

Materials and Methods

Research design and setting

This descriptive cross-sectional study was conducted between May 1, 2022, and October 30, 2022, in a maternity hospital. The research was reported according to the Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) checklist.[10]

The study population consisted of 1028 healthcare professionals, including 347 doctors, 358 nurses, and 323 midwives. In situations where the population size is known, it is possible to calculate a sample size that can effectively and accurately represent the entire population. To calculate a sample size that can be representative of the population, the following values were used in the equation: p (probability of occurrence) and q (probability of non-occurrence) set at 0.5, d (sampling error) set at 0.05, t (critical value from the t-table) set at 1.96 for a specific level of significance. With these values, the sample size was determined to be 280. Stratified random sampling was employed to ensure that the sample adequately represented the population. This approach considers that the numbers of doctors, midwives, and nurses are known and aims to create a sample that evenly represents each of these professional groups within the population. Therefore, the target sample consisted of 95 doctors, 97 nurses, and 88 midwives. The researchers contacted 390 healthcare professionals [157 doctors, 128 nurses, and 105 midwives]. They recruited 310 healthcare professionals [106 doctors, 108 nurses, and 96 midwives] who met the inclusion criteria.

The inclusion criteria were (1) having at least two years of work experience and (2) volunteering. The exclusion criteria were (1) failing to fill out the data collection tools and (2) declining to participate. The research was conducted until the desired number of health professionals from each professional group was successfully recruited into the study.

Data collection tools

Personal and Professional Information Form: The researchers developed the personal and professional information form. It consisted of items on sociodemographic characteristics (gender, age, education, etc.), professional characteristics (occupation, work experience, etc.), and ethics (receiving training in ethics, place of training, encountering ethical issues and solving them, etc.).[3,5,8,11]

Inclination to Ethical Values Scale (IEVS): It was developed by Kaya (2015).[12] The instrument consists of 16 items rated on a five-point Likert-type scale. It has three subscales: love and respect [items 1 to 8], justice and

honesty [items 9 to 13], and cooperation [items 14 to 16]. Higher scores indicate more inclination toward ethical values. The scale has a Cronbach's alpha score of 0.90 (18), which was 0.81 in the present study.

Ethical Attitudes Towards Sexual-Reproductive Health Behaviors and Practices Survey (ESRHS): No measurement assesses ethical attitudes towards sexual-reproductive health. Therefore, the ESRHS was developed by the researchers.[3-5,7-9,13,14] The survey addresses sexual life, family planning, abortion, ARTs, HIV/AIDS, virginity testing, FGM, prenatal diagnosis and screening, cesarean section, and domestic violence against women. It consists of 30 true, false, or controversial statements. The items are responded as "Yes," "No," or "Do not know." The survey has a Cronbach's alpha score of 0.81.

Ethical consideration and procedure

The study was approved by the Social and Human Sciences Ethics Board of Ankara Yıldırım Beyazıt University [Approval no: 9.3.2022-04]. Permission was obtained from the hospital [Approval no: 18.3.2022-10]. The study was conducted according to the ethical principles outlined by the World Medical Association's Declaration of Helsinki.

All healthcare professionals were briefed about the research purpose, procedure, and confidentiality. They were also informed that participation was voluntary and that they could choose not to respond to questions or withdraw from the study at any time without any penalty. Written informed consent was obtained from all participants. Participants filled out the data collection tools themselves to avoid bias.

Data analysis

The data were analyzed using the Statistical Package for Social Sciences (SPSS, IBM version 29, Chicago, IL, USA) at a significance level of 0.05. Frequencies [number (n), percent (%)] were used for categorical variables, while descriptive statistics were used for numerical variables [mean, standard deviation (SD), minimum and maximum values]. Skewness, kurtosis values, histograms, and Q-Q plot graphs were checked to determine whether the data were normally distributed. The results showed that the data were nonnormally distributed. Therefore, the data were analyzed using the Mann-Whitney U test.

Results

Participants' characteristics

The sample consisted of 310 healthcare professionals: doctors (34.2%), nurses (34.8%), and midwives (31%). Participants had a mean age of 33.15 ± 8.70 years (min-max: 23-64). 86.1% of the participants were women.

67.8% of the participants had bachelor's degrees. Participants had 8.88 ± 8.51 years of work experience (min-max: 2-35). 78.4% of the participants had received training in ethics before. 51 % of the participants received in-service training in ethics. 54.5% of the participants stated that they encountered various ethical issues as they worked. 71% of the participants noted that they could solve the ethical issues they encountered (Table 1).

Table 1. The distribution of the health professionals' characteristics (n = 310)

Characteristics	**n (%)**
Occupation	
Doctor	106 (34.2)
Nurse	108 (34.8)
Midwife	96 (31.0)
Age, years (Mean ± SD = 33.15 ± 8.70)	
Gender	
Woman	267 (86.1)
Man	43 (13.9)
Education degree	
High school	3 (1.0)
Bachelor	210 (67.8)
Postgraduate	97 (31.3)
Work experience, years (Mean ± SD = 8.88 ± 8.51)	
Receiving training in ethics	
Yes	243 (78.4)
No	67 (21.6)
Place of ethics training (n=243)	
In undergraduate education	25 (10.2)
In postgraduate education	74 (30.4)
In-service training	124 (51.0)
In course	20 (8.2)
Encountering ethical issues	
Yes	169 (54.5)
No	141 (45.5)
Solving ethical issues (n=169)	
Yes	120 (71.0)
No	49 (29.0)

SD: Standard deviation

The inclination toward ethical values

Participants had a mean IEVS score of 69.56 ± 10.32. They had mean IEVS "love, respect," "justice, honesty," and "cooperation" subscale scores of 35.31±5.28, 21.92±3.59, and 12.36±2.61, respectively (Table 2).

Table 2. Distribution of the IEVS and subscale scores (n = 310)

Scale and subscales [a]	Mean ± SD	Median	Min-Max	Cronbach's alpha
IEVS	69.56 ± 10.32	71	16 – 80	0.81
Love, respect	35.31 ± 5.28	37	8 – 40	0.90
Justice, honesty	21.92 ± 3.59	23	5 – 25	0.93
Cooperation	12.36 ± 2.61	12	3 – 15	0.87

IEVS: The Inclination to Ethical Values Scale, SD: Standard deviation.
[a] Higher scores indicate more inclination toward ethical values.

Ethical attitudes toward sexual-reproductive health behaviors and practices

66.1% of the participants did not believe that it was important for women to have sexual intercourse before marriage. 71.9% of the participants did not believe that it was important for men to have sexual intercourse before marriage. 48.4% of the participants believed that healthcare professionals should recommend family planning methods that they believe are less harmful to couples. 68.7% of the participants did not find it ethical to administer emergency contraception after sexual assault without the consent of the patient. 61.9% of the participants noted that before administering tubal ligation and intrauterine devices to a woman, healthcare professionals should get the permission of her husband. 64.8% of the participants were of the opinion that abortion is wrong. 45.5% of the participants believed that a woman should have the right to undergo an abortion, regardless of the gestational week, in cases of pregnancy resulting from sexual assault. 58.7% of the participants thought that spousal authorization is required for abortion. 35.5% of the participants believed that healthcare professionals should not have the right to refuse to provide abortion services. 50.3% of the participants considered oocyte and sperm donation ethically problematic, even in the absence of financial compensation. Surrogacy was ethical for 44.8% of the participants. 56.1% of the participants noted that healthcare professionals should not respect the decision of an individual who chooses to keep their HIV-positive/AIDS diagnosis from their spouse. 54.5% of the participants regarded surgical sterilization as an ethical measure to protect the infant from the risk of HIV/AIDS when one of the parents was HIV-positive. 75.5% of the participants considered it unethical to perform a virginity test on a woman without her consent, even if requested by a competent court and prosecutor's office. 53.2% of the participants expressed the view that elective cesarean section without a medical reason is unethical (Table 3).

Table 3. The distribution of the statements in Ethical Attitudes Towards Sexual and Reproductive Health Behaviors and Practices Survey (n = 310)

Statements	Yes n (%)	No n (%)	Don't know n (%)
Sexual life			
1. It is important for a woman to be a virgin when she gets married.	64 (20.6)	205 (66.1)	41 (13.2)
2. It is important for a man to gain sexual experience before marriage.	51 (16.5)	223 (71.9)	36 (11.6)
3. Providing information on sexual and reproductive health encourages young people to have sexual intercourse.	25 (8.1)	260 (83.9)	25 (8.1)
Family planning			
4. Counseling on family planning methods should only be provided to married couples.	17 (5.5)	285 (91.9)	8 (2.6)
5. When providing information on family planning methods, healthcare professionals should recommend the method that they believe will cause less harm to the couple.	150 (48.4)	130 (41.9)	30 (9.7)
6. If a couple with an active sex life does not want to have a baby, the man should also take responsibility for family planning.	278 (89.7)	25 (8.1)	7 (2.3)
7. The woman must bear the consequences of an unwanted pregnancy.	4 (1.3)	300 (96.8)	6 (1.9)
8. After sexual assault, the healthcare professional should administer emergency contraception without obtaining consent from the patient.	52 (16.8)	213 (68.7)	45 (14.5)
9. A woman has the right to give birth as well as the right not to give birth.	267	25 (8.1)	18 (5.8)
10. Tubal ligation and intrauterine device insertion depend on the woman's request. However, if she is married, her husband's consent must also be obtained.	192 (61.9)	95 (30.6)	23 (7.4)
Abortion			
11. Abortion is absolutely wrong because the embryo has the right to life after fertilization.	56 (18.1)	201 (64.8)	53 (17.1)
12. In the case of a pregnancy resulting from sexual assault, abortion should be performed at the mother's request, regardless of the gestational week.	141 (45.5)	114 (36.8)	55 (17.7)
13. Since a woman has the right to decide over her own body, her husband's consent is not required for an abortion.	100 (32.3)	182 (58.7)	28 (9.0)
14. Parental consent is required for abortion in adolescent/under-18 pregnancies.	205	62 (20.0)	43 (13.9)
15. Healthcare professionals have the right to refuse to provide abortion services.	153 (49.4)	110 (35.5)	47 (15.2)
Assisted reproductive techniques			
19. Oocyte and sperm donation is ethically unproblematic when it is performed without financial compensation.	78 (25.2)	156 (50.3)	76 (24.5)
16. Frozen sperm cells and embryos must be destroyed after divorce or death of a spouse.	140 (45.2)	98 (31.6)	72 (23.2)
17. Since it is every woman's right to have a child, surrogacy should be used if pregnancy is not possible.	139 (44.8)	99 (31.9)	71 (22.9)
18. Sex can be determined by family request during chromosomal examination of embryos.	90 (29.0)	163 (52.6)	56 (18.1)
HIV/AIDS			
20. HIV-positive individuals should not be allowed to get married.	47 (15.2)	216 (69.7)	47 (15.2)
21. Healthcare professionals should respect the right of HIV-positive individuals to hide their condition from their partner to avoid abandonment by their partner.	86 (27.7)	174 (56.1)	49 (15.8)
22. Couples diagnosed with HIV-positive should undergo surgical sterilization to prevent transmission of HIV to their baby.	169 (54.5)	95 (30.6)	46 (14.8)
23. A pregnant woman diagnosed with HIV-positive should terminate her pregnancy.	27 (8.7)	226 (72.9)	57 (18.4)

Virginity testing			
24. Virginity testing can be performed on a woman at the request of her family members.	32 (10.3)	251 (81.0)	27 (8.7)
25. If a woman does not consent to virginity testing, she may be guilty of misconduct related to chastity or honorable behavior.	22 (7.1)	255 (82.3)	33 (10.6)
26. If there is a competent court and prosecutor's decision, virginity testing should be performed without seeking individual consent.	41 (13.2)	234 (75.5)	35 (11.3)
Female genital mutilation			
27. Since female genital mutilation is a cultural practice, it should be left to the decision of family elders.	11 (3.5)	271 (87.4)	28 (9.0)
Prenatal diagnosis and screening			
28. Invasive diagnostic tests performed during pregnancy such as amniocentesis and chorionic villus biopsy should be performed with the consent of both the pregnant woman and her	239 (77.1)	57 (18.4)	14 (4.5)
Cesarean section			
29. Elective cesarean section based on individual preference should not be performed without a medical reason.	165 (53.2)	121 (39.0)	24 (7.7)
Domestic violence against women			
30. As family matters are private/intimate matters, intervention should not be undertaken unless the person experiencing domestic violence reports it.	52 (16.8)	226 (72.9)	32 (10.3)

The effect of gender on ethical attitudes toward sexual-reproductive health

Male participants attached more importance to virginity before marriage than their women counterparts (p=0.015). There were significantly more women than men who believed men should also take responsibility for family planning (p<0.001). There were significantly more men than women who believed it was ethical for a woman to bear the consequences of an unwanted pregnancy (p<0.001). The number of women who believed women should have the right not to give birth was significantly higher than that of men (p=0.011). The number of male participants who regarded abortion as absolutely wrong was significantly higher than that of women participants (p=0.002). Compared to women, significantly more men argued that healthcare professionals should have the right to refuse to provide abortion services (p=0.005). It was mostly male participants who held the belief that it was ethical to discard frozen sperm cells and embryos following divorce or the death of a spouse (p=0.026). Compared to men, significantly more women regarded surgical sterilization as an ethical measure to protect the infant from the risk of HIV/AIDS when one of the parents was HIV-positive (p=0.032). Compared to women participants, there were significantly more male participants who viewed it as ethical to perform a virginity test on a woman without her consent, if requested by her family (p=0.010). There were more male participants who associated not consenting to a virginity test with dishonorable behavior (p=0.006). Significantly more male participants believed it was ethically appropriate to perform a virginity test on a woman without her consent if requested by a competent court and prosecutor's office (p<0.001). There were

significantly more men than women who believed that the decision regarding FGM could be entrusted to family elders (p=0.008) (Table 4).

Table 4. The distribution of the statements in Ethical Attitudes Towards Sexual and Reproductive Health Behaviors and Practices Survey by gender (n = 310)

Statements	Gender [a]		Analysis [b]	
	Woman n (%)	Man n (%)	U	p
Sexual life				
1. It is important for a woman to be a virgin when she gets married.	48 (18.0)	16 (37.2)	8.42	0.015*
2. It is important for a man to gain sexual experience before marriage.	42 (15.7)	9 (20.9)	0.871	0.647
3. Providing information on sexual and reproductive health encourages young people to have sexual intercourse.	18 (6.7)	7 (16.3)	4.804	0.091
Family planning				
4. Counseling on family planning methods should only be provided to married couples.	13 (4.9)	4 (9.3)	5.433	0.066
5. When providing information on family planning methods, healthcare professionals should recommend the method that they believe will cause less harm to the couple.	130 (48.7)	20 (46.5)	0.233	0.890
6. If a couple with an active sex life does not want to have a baby, the man should also take responsibility for family planning.	245 (91.8)	33(76.7)	14.049	<0.001**
7. The woman must bear the consequences of an unwanted pregnancy.	2 (0.7)	2 (4.7)	18.963	<0.001**
8. After sexual assault, the healthcare professional should administer emergency contraception without obtaining consent from the patient.	41 (15.4)	11 (25.6)	2.813	0.245
9. A woman has the right to give birth as well as the right not to give birth.	236 (88.4)	31 (72.1)	9.070	0.011*
10. Tubal ligation and intrauterine device insertion depend on the woman's request. However, if she is married, her husband's consent must also be obtained.	163 (61.0)	29 (67.4)	1.373	0.503
Abortion				
11. Abortion is absolutely wrong because the embryo has the right to life after fertilization.	40 (15.0)	16 (37.2)	12.390	0.002*
12. In the case of a pregnancy resulting from sexual assault, abortion should be performed at the mother's request, regardless of the gestational week.	118 (44.2)	23 (53.5)	1.348	0.510
13. Since a woman has the right to decide over her own body, her husband's consent is not required for an abortion.	84 (31.5)	16 (37.2)	2.547	0.280
14. Parental consent is required for abortion in adolescent/under-18 pregnancies.	173 (64.8)	32 (74.4)	2.269	0.322
15. Healthcare professionals have the right to refuse to provide abortion services.	123 (46.1)	30 (69.8)	10.778	0.005*
Assisted reproductive techniques				
16. Oocyte and sperm donation is ethically unproblematic when it is performed without financial compensation.	65 (24.3)	13 (30.2)	1.229	0.541
17. Frozen sperm cells and embryos must be destroyed after divorce or death of a spouse.	113 (42.3)	27 (62.8)	7.262	0.026*
18. Since it is every woman's right to have a child, surrogacy should be used if pregnancy is not possible.	121 (45.3)	18 (41.9)	6.510	0.089
19. Sex can be determined by family request during chromosomal examination of embryos.	77 (28.8)	13 (30.2)	6.709	0.082

HIV/AIDS				
20. HIV-positive individuals should not be allowed to get married.	37 (13.9)	10 (23.3)	2.718	0.257
21. Healthcare professionals should respect the right of HIV-positive individuals to hide their condition from their partner to avoid abandonment by their partner.	75 (28.1)	11 (25.6)	3.846	0.279
22. Couples diagnosed with HIV-positive should undergo surgical sterilization to prevent transmission of HIV to their baby.	153 (57.3)	16 (37.2)	6.914	0.032*
23. A pregnant woman diagnosed with HIV-positive should terminate her pregnancy.	20 (7.5)	7 (16.3)	4.529	0.104
Virginity testing				
24. Virginity testing can be performed on a woman at the request of her family members.	22 (8.2)	10 (23.3)	9.238	0.010*
25. If a woman does not consent to virginity testing, she may be guilty of misconduct related to chastity or honorable behavior.	14 (5.2)	8 (18.6)	10.309	0.006*
26. If there is a competent court and prosecutor's decision, virginity testing should be performed without seeking individual consent.	28 (10.5)	13 (30.2)	13.578	<0.001**
Female genital mutilation				
27. Since female genital mutilation is a cultural practice, it should be left to the decision of family elders.	6 (2.2)	5 (11.6)	9.625	0.008*
Prenatal diagnosis and screening				
28. Invasive diagnostic tests performed during pregnancy such as amniocentesis and chorionic villus biopsy should be performed with the consent of both the pregnant woman and her partner.	208 (77.9)	31 (72.1)	1.007	0.604
Cesarean section				
29. Elective cesarean section based on individual preference should not be performed without a medical reason.	147 (55.1)	18 (41.9)	2.598	0.273
Domestic violence against women				
30. As family matters are private/intimate matters, intervention should not be undertaken unless the person experiencing domestic violence reports it.	44 (16.5)	8 (18.6)	0.657	0.720

[a] n(%) of those who responded "Yes" to the statements. [b] Mann-Whitney U test *p < 0.05 **p < 0.001

Discussion

In recent years, scientific and technological advancements have brought about new developments in the field of reproductive health. However, these progressions have also raised many ethical issues and challenges that demand careful consideration.[15] More than half of our participants faced ethical issues and challenges. Some researchers argue that effective training programs on ethics help health professionals develop the necessary skills to deal with complex ethical issues.[16] Most of our participants reported that they acquired knowledge about ethics and ethical issues through in-service training programs, in courses, in undergraduate, or postgraduate education. However, our findings do not provide information about the quality of ethics education. Research shows that educators find it challenging to provide education on ethics for two reasons.

First, there needs to be more structured curricula and experts. Second, institutions need to allocate more time for that kind of education.[17] Despite all these challenges, educators in obstetrics and gynecology are very much interested in strengthening ethics education.[15]

Inclination towards ethical values is an important factor for ethical decision-making. Our participants reported a high inclination toward love, respect, honesty, justice, and collaboration, which is consistent with the literature.[11,18]

Abortion is a reproductive health practice imbued with ethical dilemmas. Legal regulations have a direct impact on the choices and decisions related to the termination of an unwanted pregnancy. In some countries, abortion is prohibited altogether or is only permitted under limited circumstances (such as to save the woman's life). However, in some other countries, abortion is legal with no restrictions (The World's Abortion Laws).[19] Prohibiting abortion through legislation, even in cases where a woman's life is at risk due to pregnancy complications, is deemed ethically unacceptable.[7] More than half of our participants also believed that abortion was ethically justified.

In countries where abortion is available on demand, such as China, France, the United States, and Türkiye, there are still certain restrictions in place, such as gestational week, spousal or parental authorization, etc.[19] For example, abortion on demand can be performed up to the tenth week of pregnancy in Türkiye. However, abortion can be performed up to the 20th week of pregnancy if there are medical reasons or if the pregnancy is the result of rape.[20] Approximately half of our participants considered it unethical to restrict the number of gestation weeks for abortions performed after rape. Strict legal restrictions on abortion often cause unsafe abortion and maternal mortality.[19,21] Therefore, it is ethically important for women to have more autonomy over abortion. In other aspects, practices that entail the termination of the life of a living being conflict with medical principles related to the preservation and safeguarding of life. This scenario often places healthcare professionals in the midst of ethical dilemmas as they grapple with these conflicting principles and responsibilities. One out of five participants was completely against abortion. Doctors, midwives, and nurses should analyze their thoughts on this issue and understand the impact of their thoughts on the care they provide. Healthcare professionals can refuse to provide abortion services in line with their freedom of thought and ethical attitudes. Half of our participants believed so. However, a healthcare professional who asserts a conscientious objection should promptly refer the pregnant woman to another healthcare provider who is willing to offer the requested service. In emergency situations where the life of the pregnant woman is in jeopardy, it is crucial to prioritize the ethical duty of ensuring the safety and well-being of the pregnant woman.[21]

Spousal or parental consent requirements, which can act as barriers to accessing safe abortion, are at odds with the principle of individual autonomy. However, in some countries, these legal prerequisites are still legally mandated.[7] Three out of five participants found those requirements necessary and justified. Other practices in which women's right to make decisions about their own bodies are legally contingent on obtaining another person's permission include prenatal invasive testing and tubal ligation.[20] More than half of our participants adopted legal regulation in these interventions. Therefore, it is important to make legal regulations ethically appropriate.

Assisted reproductive techniques raise ethical debates. Ensuring that donors provide fully informed and voluntary consent without coercion or exploitation is a critical ethical consideration. The practice of anonymous donation raises questions about the rights and interests of offspring to access their genetic heritage and medical history. The ethical implications of donor selection criteria and rigorous health screening are vital to safeguard the well-being of recipients and potential offspring. The commercialization of oocyte and sperm donation can be viewed as problematic, as it may prioritize profit over ethical and medical considerations. The ethical implications of regulations, or the lack thereof, governing oocyte and sperm donation vary from one jurisdiction to another and can impact the safety and fairness of the process.[5,13,22] For these reasons, donor use is prohibited in some countries, such as Italy and Germany, but legal in others, such as France and Greece.[23] Our participants also had different opinions regarding oocyte and sperm donation. Half of our participants found oocyte and sperm donation unethical, while one out of four participants found it ethical. One out of four participants were undecided.

Cryopreserved embryos can be destroyed upon the request of the spouses, the death of one of the spouses, divorce, or the expiration of a specified period.[7] This raises ethical questions about the right to life of the embryo. Almost half of our participants viewed it as ethical to destroy frozen sperm or embryos after the death of a spouse or divorce. There were significantly more male participants who viewed it as ethical to destroy frozen sperm or embryos after the death of a spouse or divorce. Following the death of a partner due to an unforeseen cause, the woman may still have the opportunity to have a child using a stored embryo, whereas the man does not have the same option. Therefore, gender may be a factor affecting attitudes on this issue.

Assisted reproductive techniques make it possible to determine the sex of embryos (preimplantation genetic diagnosis) during chromosomal examination.[14] However, elective sex selection may lead to gender bias and possible gender ratio imbalances.[24] Therefore, some countries prohibit sex selection, while others allow it only if it is necessary to prevent a serious sex-related hereditary disease.[24] More than half of our participants also objected to the personal use of preimplantation sex selection, which is consistent with the literature.[8]

Surrogacy is a complex and ethically debated practice that raises various concerns. These include the commercial aspect, where payment can be seen as problematic due to the potential commodification of reproductive processes. Additionally, issues such as multiple embryo transfer, which can lead to health risks, fetal reduction, cesarean sections for non-medical reasons, and the question of maternal identity raise ethical dilemmas. Critics of surrogacy argue that it can be unethical because it has the potential to lead to the abuse and exploitation of women, effectively making them service providers for others.[5,22] Three out of ten participants viewed surrogacy as unethical. Tanderup et al. (2015) focused on surrogate mothers in India and reported two important results. First, women's autonomy is neglected when implementing surrogacy procedures. Second, surrogacy raises ethical issues that cannot be resolved through informed consent.[25] Some countries (Ukraine, Greece, etc.) allow surrogacy if certain conditions are met. However, some others (Holland, Finland, etc.) have no legal surrogacy regulation. Some argue that it is important to ban surrogacy to prevent what they perceive as the commodification of the human body, the treatment of children as products, and the sale of children.[5,22]

Elective cesarean sections are an ethically controversial issue. Some argue that cesarean sections should primarily be performed for medical reasons and should not be viewed as an alternative to vaginal delivery.[5] In cases where a pregnant woman requests a cesarean section without medical indication, it is considered best practice for the obstetrician to engage in a thorough discussion with the woman. This discussion should include a recommendation for vaginal delivery, along with an explanation of the associated benefits and risks. It is essential to ensure that the informed consent process is comprehensive and transparent, allowing the pregnant woman to make an informed decision about her mode of delivery. Ultimately, respecting the pregnant woman's autonomy and implementing her choice is fundamental to patient-centered care and medical ethics.[26] Half of our participants believed that elective cesarean sections are ethically justified. However, two out of five participants believed otherwise. The decision to perform cesarean sections should consider both the autonomy and preferences of the pregnant woman as well as the best interests of the fetus. The principle of autonomy does not entail that cesarean sections should be routinely performed, nor does the mere offering of cesarean sections to pregnant women necessarily serve their health interests. Healthcare professionals should adhere to professional integrity and ethical standards to ensure that potential bias, economic gain, or any other personal interests do not influence their interactions with the pregnant woman.[7]

Stigmatized, isolated, and excluded, HIV-positive individuals seek medical assistance less often than their HIV-negative counterparts. Therefore, healthcare professionals should approach HIV-positive individuals without prejudice in a protective and supportive manner. Our participants had positive attitudes towards the marriage of HIV-positive individuals. More than half of our participants were of the opinion that spouses of HIV-positive individuals should be informed about the situation. When a person is diagnosed with HIV, the question of when and how to disclose this information to their partner presents ethical dilemmas.[27] The desire of an HIV-positive

individual to have a child indeed raises significant ethical issues. This is due to the potential risks associated with HIV transmission to both the HIV-negative partner and the baby during pregnancy, childbirth, or breastfeeding.[28] The question of whether a pregnancy should be terminated if the baby is found to be infected with HIV from an HIV-positive mother is a complex and ethically challenging issue. Most of our participants believed that the pregnancy should not be terminated in that case. However, half of our participants found surgical sterilization ethical under those circumstances. The idea that the risk of HIV transmission can be reduced but not eliminated through precautions (elective cesarean sections and avoiding breastfeeding) can significantly influence decisions related to pregnancy and childbirth in the context of an HIV-positive mother.

Negative gender attitudes and patriarchal social structures can indeed put women in a disadvantaged position in various aspects of their lives, including but not limited to sexual-reproductive health. These attitudes and structures can limit women's access to healthcare, particularly in matters related to family planning, pregnancy, childbirth, and sexual health. In patriarchal societies, women may face barriers in seeking healthcare services, making informed choices about their bodies, and exercising control over their reproductive health. These issues make them more vulnerable, which is unethical. Gender can influence attitudes, often reflected in professional attitudes, including those held by healthcare professionals. This is why this study investigated the effect of gender on healthcare professionals' ethical attitudes toward sexual-reproductive health. The findings showed that gender affected our participants' ethical attitudes toward sexual life, family planning, virginity testing, and FGM.

According to sexual ethics, everyone should understand their sexual rights and responsibilities and respect the rights of their partners.[4,6] Our women participants agreed that men can have sex before marriage. However, our male participants believed that it was important whether or not a woman had sex before marriage. This indicates that Turkish healthcare professionals' attitudes toward sexuality do not align with the principles of equal rights and responsibilities in sexual ethics. Such disparities may be attributed to their upbringing in a patriarchal society.

Healthcare professionals providing family planning counseling should offer clear and comprehensive explanations to women about the risks, benefits, and available alternatives. After obtaining informed consent, healthcare professionals must respect women's decisions fully. In addition, it is considered unethical to administer emergency contraception after sexual assault without the informed consent of the survivor. Similarly, requiring marriage as a condition for providing family planning services is ethically problematic.[7] Most of our participants had similar attitudes. However, half of our participants thought it would be ethical to recommend contraceptive methods, which are believed to cause less harm. This has something to do with good intentions. The findings also showed that gender affected our participants' ethical attitudes toward family planning. In other words, they were protective of their sex. For example, there were significantly more women

participants who believed that men should take responsibility for family planning and that women should have the right not to give birth. On the other hand, there were significantly more male participants who believed that women should bear the consequences of unwanted pregnancies.

The findings showed that gender affected our participants' ethical attitudes toward virginity testing, which is scientifically invalid and a violation of human rights, according to the World Health Organization.[4] This is because the presence or absence of an intact hymen is not a reliable or accurate indicator of a person's sexual history.[29] Virginity testing is also contrary to utility, justice, and autonomy principles for the following reasons. First, it has significant biopsychosocial risks, which are exacerbated by sociocultural pressure. The research by Shalhoub-Kevorkian (2005) highlights the potential dangers and ethical concerns associated with mandatory virginity testing, particularly in cases involving sexual abuse. Mandatory virginity testing can exacerbate the physical and psychological harm experienced by victims, potentially increasing the threat to their well-being, including the risk of death.[30] Virginity testing can have significant long-term psychological and emotional effects on individuals, particularly women. These effects may include feelings of shame, stigma, and trauma. The experience of being subjected to such testing can impact an individual's self-esteem and self-worth, which can, in turn, affect their ability to have a healthy and fulfilling sex life in the future. Virginity tests are often conducted for the benefit or satisfaction of others rather than for the well-being or consent of the woman undergoing the test. Therefore, virginity testing is contrary to the principle of utility. It discriminates against women based on their sex, reduces the priority of health, and involves unnecessary conflicts of interest. Therefore, virginity testing is contrary to the principle of justice. Virginity tests deny women's right to privacy. It cannot be assumed that a woman brought for this procedure can make a decision of her own free will. For her, this procedure is physical and sexual violence and may even amount to rape or torture. Therefore, virginity testing, which is detrimental to women's well-being, is contrary to the principle of autonomy and violates the fundamental ethical principle of "first do no harm".[29] The World Health Organization banned virginity testing.[4] Therefore, healthcare professionals should refuse to perform virginity testing for any reason whatsoever. If legal grounds exist, such as an authorized court or prosecutor's decision, the obstetrician/gynecologist may refer the woman to a forensic medicine doctor. Nurses and midwives also must defend women's rights. Most of our participants found virginity testing unethical. However, gender made a significant difference. Women participants had a more ethical stance in their attitude toward virginity testing than their male counterparts. Women participants said they never accepted the validity of reasons such as family requests or authorized court and prosecutor's decisions. A similar situation was also valid for FGM. Women participants, at a higher rate than their male counterparts, believed that practices that directly affect women's bodies are unethical. Despite global efforts to ban FGM and prevent healthcare providers from performing it, three million girls are subjected to it every year. For similar reasons to virginity testing, FGM is harmful and unethical.[2]

Limitations

This study has two limitations. First, the results are sample-specific and cannot be generalized to all healthcare professionals. Second, we could not conduct further analysis because there is not a valid and reliable instrument assessing healthcare professionals' ethical attitudes toward sexual-reproductive health.

In conclusion, healthcare professionals providing sexual-reproductive health services often encounter complex ethical dilemmas and problems. To navigate these challenges, they should be well-versed in the ethical principles and guidelines that govern their practice, including principles of patient autonomy, non-maleficence, and beneficence. One of the reasons why health professionals experience ethical dilemmas is obsolete legal regulations. Therefore, governments should amend laws to be ethically appropriate. National ethical codes and standards should be based on the principles of justice, autonomy, equality, and sexual-reproductive rights. Since gender affects healthcare professionals' ethical attitudes, it is important to develop policies that will develop positive gender roles in society.

Ethical Considerations: The study was approved by the Social and Human Sciences Ethics Board of Ankara Yıldırım Beyazıt University [Approval no: 9.3.2022-04]. Permission was obtained from the hospital [Approval no: 18.3.2022-10].

Conflict of Interest: The authors declare no conflict of interest.

References

1. Valentino M, Pavlica P. Medical ethics. J Ultrasound. 2016;19(1):73-6 (doi:10.1007/s40477-015-0189-7).
2. Runzheimer J, Larsen LJ. Medical Ethics For Dummies. Canada: Wiley Publishing; 2011.
3. Chervenak FA, McCullough LB, Brent RL. The professional responsibility model of obstetrical ethics: avoiding the perils of clashing rights. Am J Obstet Gynecol. 2011;205(4):315.e1-315.e3155 (doi:10.1016/j.ajog.2011.06.006).
4. World Health Organization (WHO). Sexual and reproductive health core competencies in primary care: attitudes, knowledge, ethics, human rights, leadership, management, teamwork, community work, education, counselling, clinical settings, service, provision [Internet]. 2011; http://apps.who.int/iris/bitstream/handle/10665/44507/9789241501002_eng.pdf;jsessionid=1E370E89A6B97CCB8DFD4DB81D539FF8?sequence=1. (Accessed: 14.06.2024).
5. Abiç A, Yılmaz DV. Current women's health issues: what is the ethical and legal status?. Researcher: Social Science Studies. 2019;7(1):20-34.
6. International Planned Parenthood Federation (IPPF). Sexual rights: an IPPF declaration [Internet]. https://www.ippf.org/sites/default/files/sexualrightsippfdeclaration_1.pdf. (Accessed: 14.06.2024).
7. International Federation of Gynecology and Obstetrics (FIGO). Ethics and professionalism guidelines for obstetrics and gynecology [Internet]. 2021; https://www.figo.org/sites/default/files/2021-11/FIGO-Ethics-Guidelines-onlinePDF.pdf. (Accessed: 14.06.2024).
8. Wilhelm M, Dahl E, Alexander H, et al. Ethical attitudes of German specialists in reproductive medicine and legal regulation of preimplantation sex selection in Germany. PLoS One. 2013;8(2):e56390 (doi:10.1371/journal.pone.0056390).
9. Ethics Committee of the American Society for Reproductive Medicine. Financial compensation of oocyte donors: an Ethics Committee opinion. Fertil Steril. 2021;116(2):319-25 (doi:10.1016/j.fertnstert.2021.03.040).
10. Cuschieri S. The STROBE guidelines. Saudi J Anaesth 2019;13(Suppl 1):31-34 (doi:10.4103/sja.SJA_543_18).
11. Menekli T, Sivrikaya SK, Akay B, et al. The effect of intensive care physicians and nurses' inclination to ethical values on the moral sensitivity. Progress in Health Sciences. 2021;11(2):48-56.
12. Kaya İ. The study of validity and reliability: The Inclination to Ethical Values Scale. The Journal of International Social Research. 2015;8(41):968-74.
13. Dickens BM, Cook RJ. The legal status of in vitro embryos. Int J Gynaecol Obstet. 2010;111(1):91-4 (doi:10.1016/j.ijgo.2010.07.004).

14. Serour GI. Ethical issues in human reproduction: Islamic perspectives. Gynecol Endocrinol. 2013;29(11):949-52 (doi:10.3109/09513590.2013.825714).
15. Byrne J, Straub H, DiGiovanni L, et al. Evaluation of ethics education in obstetrics and gynecology residency programs. Am J Obstet Gynecol. 2015;212(3):397.e1-397.e3978 (doi:10.1016/j.ajog.2014.12.027).
16. Roy S, Shah MH, Ahluwalia A, et al. Analyzing the evolution of medical ethics education: a bibliometric analysis of the top 100 cited articles. Cureus. 2023;15(7):e41411 (doi:10.7759/cureus.41411).
17. Steenbergh K, Fess E, Dade A, et al. PA perspectives on interprofessional ethics education in obstetrics / gynecology. JAAPA 2021;34(12):1 (doi:10.1097/01.JAA.0000800684.93121.5d).
18. Akbiyik A, Ceylan B, Yildirim D, et al. Inclination to ethical values in controlling the spread of COVID-19. Turkiye Klinikleri Journal of Medical Ethics-Law & History. 2022;30(3):231-9 (doi:10.5336/mdethic.2021-86907).
19. Center For Reproductive Rights. The world's abortion laws [Internet]. 2014; https://reproductiverights.org/maps/worlds-abortion-laws/. (Accessed: 14.06.2024).
20. Law on Population Planning - Türkiye. Number: 2827, Date: 27.05.1983 [Internet]. 1983; https://www.mevzuat.gov.tr/mevzuatmetin/1.5.2827.pdf. (Accessed: 14.06.2024).
21. World Health Organization (WHO). Safe abortion: technical and policy guidance for health systems [Internet]. 2012; https://iris.who.int/bitstream/handle/10665/70914/;jsessionid=197AB15FBAF1711C98EC4859024AA64A?sequence=1. (Accessed: 14.06.2024).
22. Mayeda M. Present state of reproductive medicine in Japan - ethical issues with a focus on those seen in court cases. BMC Med Ethics. 2006;7:E3 (doi:10.1186/1472-6939-7-3).
23. Präg P, Mills MC. Assisted reproductive technology in Europe: usage and regulation in the context of cross-border reproductive care. Childlessness in Europe: Contexts, causes, and consequences. 2017;289-309 (doi:10.1007/978-3-319-44667-7_14).
24. Lieman HJ, Breborowicz AK. Sex selection for family balancing. Virtual Mentor. 2014; 16(10):797-802 (doi:10.1001/virtualmentor.2014.16.10.ecas3-1410).
25. Tanderup M, Reddy S, Patel T, et al. Reproductive ethics in commercial surrogacy: decision-making in IVF clinics in New Delhi, India. J Bioeth Inq. 2015;12(3):491-501 (doi:10.1007/s11673-015-9642-8).
26. Chervenak FA, McCullough LB. The professional responsibility model of obstetric ethics and caesarean delivery. Best Pract Res Clin Obstet Gynaecol. 2013;27(2):153-64 (doi:10.1016/j.bpobgyn.2012.09.001).
27. Linda P. To tell or not to tell: negotiating disclosure for people living with HIV on antiretroviral treatment in a South African setting. SAHARA J. 2013;10(Suppl 1):17-27 (doi:10.1080/02664763.2012.755320).

28. Vijayan V, Naeem F, Veesenmeyer AF. Management of infants born to mothers with HIV infection. Am Fam Physician. 2021;104(1):58-62.
29. Moaddab A, McCullough LB, Chervenak FA, et al. Virginity testing in professional obstetric and gynaecological ethics. Lancet. 2016;388(10039):98-100 (doi:10.1016/S0140-6736(15)01275-1).
30. Shalhoub-Kevorkian N. Imposition of virginity testing: a life-saver or a license to kill?. Soc Sci Med. 2005;60(6):1187-96 (doi:10.1016/j.socscimed.2004.07.015).

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TECHNOLOGY-DRIVEN PRESCRIBING ERRORS AND ADVANCEMENTS: ANALYSIS OF THE IMPACT OF ELECTRONIC MEDICAL ON MEDICATION ERRORS

Toka Taha Taha Abdelaziz[1], Elsye Maria Rosa[1]

[1]Department of Hospital Administration, University Muhammadiyah Yogyakarta, Yogyakarta, Indonesia

Correspondence:
Toka Taha Taha Abdelaziz (e-mail:toka.taha.psc23@mail.umy.ac.id)

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Ankara Yıldırım Beyazıt University Faculty of Medicine
Department of Family Medicine

Abstract

Prescribing errors significantly threaten patient safety, incurring substantial costs and jeopardizing well-being. The emergence of electronic medical records (EMRs) and clinical decision support systems (CDSS) within them offers a potential solution.

This abstract explores the impact of this combined technology on prescribing errors. Studies suggest a positive influence, with some reporting reductions of up to 46%. EMRs, with features like e-prescribing and medication history integration, can improve legibility, reduce misinterpretations, and prevent duplicate prescriptions. CDSS further enhances safety by offering real-time alerts for drug interactions, allergies, dosage errors, and potential contraindications. These alerts promote informed decision-making at the point of care.

However, research also acknowledges limitations. While some studies show significant reductions, others report mixed results or even potential increases in reported errors, which might reflect improved detection rather than an actual increase in occurrences. Additionally, usability issues and alert fatigue may diminish the effectiveness of CDSS.

The bibliometric analysis acknowledges the undeniable benefits of technology in reducing medication errors, However, it emphasizes the need for ongoing optimization to minimize unintended consequences. Finally, the analysis paves the way for future research, suggesting the exploration of artificial intelligence and machine learning integration to personalize CDSS interventions and further enhance patient safety.

In conclusion, the integration of EMRs with CDSS holds significant promise for reducing prescribing errors. However, continuous research, system development, and user-centered design are crucial to maximize their effectiveness and ensure optimal patient safety.

Keywords: Electronic medical record, patient safety, medication errors, prescribing errors.

Introduction

Medication errors are an unfortunate but common occurrence in medical care [1,2] and are defined as "any mistake made in the process of prescribing, dispensing, or administering medication."[3] The following are frequent factors leading to avoidable drug-related visits to the emergency room, hospitalizations, and fatalities. Occasionally, these errors can lead to adverse drug events, which encompass any harm caused by medicine given during medical therapy or diagnostic operations. [2] According to data from 1993, over 7,000 deaths were attributed to medication errors. [4]

Medication errors have a significant impact on healthcare. The global prevalence of medication errors is reported to be 3%, with higher rates in elderly settings and intensive care units. [5] These errors can be potentially life-threatening, with a significant proportion occurring during the prescribing stage and involving central nervous system medications.[6] Medication errors are associated with increased morbidity and mortality, prolonged hospitalizations, and higher costs of care.[7] They can also lead to adverse drug events, including harm to patients. Medication errors are often underreported, and there is a need for a safe medication error reporting system to foster medication safety. Healthcare professionals, including hospital pharmacists, play a crucial role in identifying and preventing medication errors. Strategies to mitigate medication errors should be implemented to ensure patient safety during pandemics and beyond. [8]

Medication errors are primarily caused by prescribing errors. These occur in both general practice and hospitals, and while rarely fatal, they can impact patient safety and quality of care. According to the definition, a clinically meaningful prescribing error reduces the likelihood of timely and effective treatment or increases the risk of harm relative to commonly accepted practice. [9] This term focuses on the outcome of an error. However, it does not account for failures that may occur throughout the prescribing process, regardless of potential harm. [10] Prescription errors refer to the act of prescribing while prescribing faults include irrational, inappropriate, under, over, and ineffective prescribing due to faulty medical judgment or treatment decisions. To accomplish appropriate prescriptions, prescribers must limit errors and actively strive for improvement. Prescription errors constitute 70% of drug errors that have the potential to cause serious side effects. [11,12]

All operations associated with prescribing are steps that generate errors. A prescribing error can occur when the incorrect drug is chosen, the wrong dose is administered, the wrong route of administration is used, or the treatment is given for the wrong frequency or duration. Additionally, prescribing errors can result from inappropriate or incorrect prescribing based on the patient's characteristics or other concurrent treatments. Inadequate evaluation of potential harm from a specific treatment can also contribute to prescribing errors.[11] The most frequent type of prescribing errors, accounting for about 50% of all mistakes, are related to dose selection. [13]

Ensuring patient safety (PS) is a worldwide priority to deliver healthcare of exceptional quality. More than 80% of safety events seen by patients can be avoided by promoting ongoing improvement in safety culture. [14] Transparency, communication, teamwork, and strong leadership are crucial elements of a patient safety culture in the health systems of developing nations. These factors are necessary to guarantee that patients receive dependable and secure care. [15] In addition, other detrimental conditions, including a scarcity of personnel, inadequate infrastructure and congestion, a deficit of medical resources, and insufficient hygiene and sanitation, all contribute to the dangerous provision of healthcare in developing nations. [16] An exhaustive and all-encompassing approach is required to handle this problem efficiently. [17]

The healthcare industry is seeing an unparalleled technological shift from traditional paper-based medical records to electronic medical records (EMRs). Although the implementation of EMRs shows great potential for enhancing efficiency, quality, and safety, there have been significant obstacles mostly related to the technology's failure to meet the cognitive requirements of clinical end-users. Healthcare professionals are currently facing heightened levels of stress and dissatisfaction, while also encountering additional safety risks. Applied psychologists have a noteworthy possibility to tackle numerous of these difficulties. [18]

Electronic medical records (EMRs) are digital forms of medical records that offer numerous benefits in terms of economic, clinical, and access to clinical information. In terms of economic benefits, EMRs can lead to cost savings, effectiveness, and cost efficiency. [19] Clinically, EMRs can reduce medical errors, improve data readability, enhance the quality of care services, and increase the productivity of medical personnel. [20] Additionally, EMRs improve the accessibility of patient history information, enhance patient confidentiality, and assist in the decision-making process. [21] However, the implementation of EMRs faces challenges such as privacy concerns, technical scalability, and usability. [20] It is crucial to involve end users in the early stages of designing and implementing EMRs to improve usability. Overall, EMRs have the potential to revolutionize healthcare delivery by providing timely access to patient information and improving the quality and efficiency of care. [22]

Electronic medical records (EMRs) have shown mixed results in their impact on medication errors. EMRs are a helpful tool in epidemiological studies and can contribute to improving healthcare outcomes. Hospitals must maintain medical records, which serve as health service facilities. [23] Some studies have found that the implementation of integrated electronic medication management systems (EMMS) can reduce medication deviations and errors in the transition of care in hospital settings [24]. However, other studies have shown that the adoption of EMRs can lead to an increase in medication errors, particularly in the detection and reporting of errors. [25] Providing patients with access to their medical records through a patient portal has been found to improve medication management safety, including medication adherence and patient-reported experience.[26] The introduction of an electronic patient record (EPR) has been shown to reduce the omission of pre-admission

medications at discharge, but it may also lead to a reduction in deliberate discontinuation of medications.[27] Overall, the effectiveness of EMRs in reducing medication errors depends on various factors, including the specific system design and implementation strategies.[28]

The main objective of this research is to gain a full understanding of the influence of Electronic Medical Records (EMRs) on medication mistakes in hospital environments. With the growing shift towards digital platforms in healthcare systems, it is crucial to evaluate the efficiency and possible obstacles related to incorporating electronic medical records (EMRs) into medication management. The objective is to provide valuable perspectives that can guide enhancements in patient safety, healthcare excellence, and the overall effectiveness of drug procedures.

The research seeks to fill various gaps in the current literature about the correlation between EMRs and medication mistakes. The gaps encompass the following: Inadequate comprehension of the various aspects of EMRs that either contribute to or alleviate pharmaceutical mistakes.

Inadequate investigation of the viewpoints, encounters, and difficulties healthcare professionals face in using electronic medical records (EMRs) for medication administration.

Insufficient understanding of how organizational policies, culture, and leadership support impact the incorporation of EMRs in medication safety efforts. Limited understanding of the contextual variables that could potentially affect the effects of EMRs on medication mistakes.

The research aims to fill these gaps to gain a more comprehensive and intricate comprehension of the intricate interactions between EMRs and prescription errors. Ultimately, this will aid in the creation of evidence-based suggestions for healthcare practitioners and policymakers.

The hospitals used to rely on paper-based medical records and faced various obstacles, including delayed retrieval of vital patient data which resulted in the postponement of decision-making and the provision of medical attention to patients, documentation Prone to errors as handwritten notes are vulnerable to mistakes, which jeopardize patient safety and the effectiveness of treatment, inefficient workflow as manual manipulation of records leads to inefficiencies in the clinic's workflow, affected the productivity of the personnel and the experience of the patients, and heightened risk of recording errors especially medication errors. These difficulties hindered the smooth transmission of information among hospital healthcare practitioners and also undermined the quality of patient care. The importance of implementing EMR in the clinic in this setting cannot be emphasized enough, as it holds the potential to fundamentally transform the management, sharing, and utilization of healthcare data.

The research seeks to offer useful context-specific insights for both the selected hospital and similar healthcare settings by carefully choosing a hospital with distinct characteristics and potential obstacles.

Materials and Methods

Research on Scopus Database: This study analyzed global papers on clinical decision-support systems and electronic health records in the diagnosis field from the Scopus database using bibliometric analysis. Scopus was chosen for its exceptional scientific papers, abstracts, and references, which are of high quality and significance, establishing it as a worldwide acknowledged data source.[29]

Database Selection: To avoid redundancy of articles and authors from several sources, Scopus was selected as the data source due to its inclusion of journals from other databases. The investigation intended to access more prominent papers. To establish the search word, a general study was undertaken on clinical decision support and electronic health records.

Search Terms: Given that the terms "clinical decision support" and "clinical decision making" are commonly found in the titles and keywords of research publications, the search term "clinical decision support" was selected along with "electronic health records" and "prescribing." The search results were refined based on the publication year, publishing language, publication type, and scanned index criteria. we limited the research to next words: electronic medical records, prescribing errors, and language English,

Search Filters: This research limited exact keywords: electronic medical record, medication error, prescription, electronic prescribing, electronic health records, drug use, health information technology, decision making, drug-related side effects and adverse reactions, drug interactions, prevalence, adverse drug reaction, information technology, medical record review, Clinical Decision Making, physician order entry system, hospital information system, clinical decision support system, prescribing error, medical information system, drug safety, patient care, computerized provider order entry, medication therapy management, and patient safety. The publication year for the study results considered was between 2007 and 2024 to encompass all recent studies. By March 2024, 744 articles meeting these criteria were identified. The data for these articles were stored in 744 files retrieved via the Scopus interface, each containing distinct records.

This study will employ crucial procedures to achieve our research objectives. These include quantifying the occurrence rate of keywords, identifying keywords with high frequencies, constructing a co-occurrence matrix, grouping keywords into clusters, and analyzing the intellectual framework of topics through social network

analysis. Before doing a co-word analysis, it is important to establish the analysis unit. Researchers typically choose keywords taken from articles as fundamental units of analysis. For this study, we have used terms retrieved from projects in Scopus as our research data. The temporal duration is a decade, commencing in 2003 and concluding in 2024.

Data Collection: We collected 744 relevant articles, including original research, reviews, and conference papers. In conclusion, we obtained keywords 1017 from the 744 research studies.

Analysis with VOSviewer Program: Using Vosviewer to analyze the data by inserting the data which were downloaded from Scopus and creating a map based on bibliographic data, then the data was chosen in according to analyze all co-occurrence keywords. We conclude all minimum keywords with 4 times co-occurrence, 991 keywords meet the threshold.

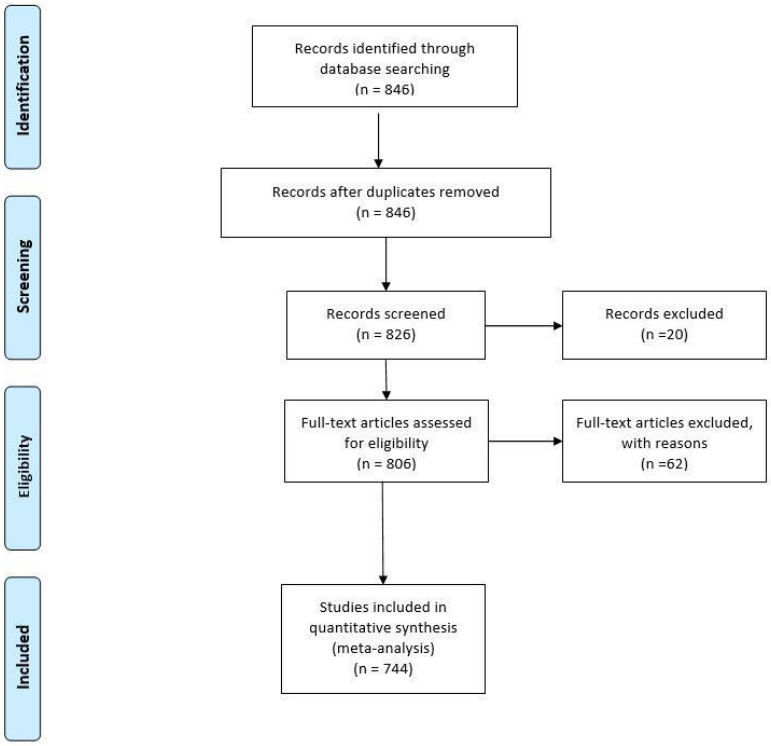

Figure 1. Flow diagram of the article selection process Scopus.

Results

A total of 744 publications that met the criteria were chosen for inclusion in the study. Of these, 527 (70.8%) were original articles, 138 (18.5%) were reviews, 26 (3.5%) were conference papers, and the remaining articles were included in other categories. It is important to point out that the year 2022 saw the publication of a significant number of papers (11.4%). In the end, there were 744 research articles authored in English that were incorporated into the bibliometric study.

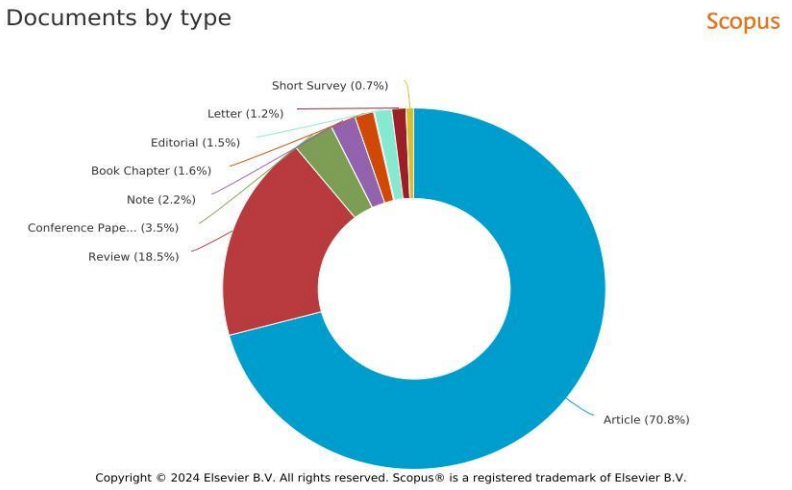

Figure 2. Document types of Published Articles

This study looked into the effects of the implementation of both electronic health records and clinical decision support systems together in hospitals and clinics to reduce medication errors and early While previous studies investigated the impact of clinical decision support systems only, they did not explicitly address its influence on detecting medication errors with electronic health records.

We found that the integration between the two systems correlates with the potential to revolutionize healthcare by providing doctors with the information they need to guide doctors and alert them to errors.

The proposed method in this study tended to have an inordinately higher proportion of specific findings relevant to medication errors. The essential substance of an article can be represented by its keyword, and the frequency of occurrence and co-occurrence might somewhat indicate the topics emphasized in a specific field.[30]

VOSviewer offers the capability to integrate clustering and mapping for visualization. Additionally, VOSviewer provides zoom and scroll functionality, allowing users to obtain more detailed information from a map. Keywords inside each cluster are displayed in distinct colors. When keywords are organized into the same cluster, they are more likely to represent the same themes. Each cluster possesses a distinct quantity of subject keywords. The comprehensive information regarding the clusters presented in Figure 3 reveals that cluster 1 possesses the highest quantity of terms, suggesting that theme cluster 1 garnered more attention from researchers. Therefore, cluster 5 might be considered the most concentrated among the fields. To clarify, the keywords in cluster 5 have received increased focus in the domain of utilizing clinical decision support systems with electronic health records for reducing medication and prescribing purposes.

CLUSTER	NUMBER KEYWORDS
1	328
2	228
3	98
4	94
5	91
6	87
7	65

Figure 3. Clusters in VosViewer

Our findings indicate that higher complexity is not associated with poor performance in diagnosis accuracy. The proposed method may benefit from increased complexity without negatively affecting diagnosis accuracy. An analysis of the keywords utilized in the research revealed a total of 3818 keywords. When a term was repeated at least five times, 443 keywords were classified as such. As the number of repetitions grows, the number of keywords that may be classified inevitably decreases.

Figure 4 shows most countries where hold mostly research on using electronic medical records on medication errors and prescribing errors.

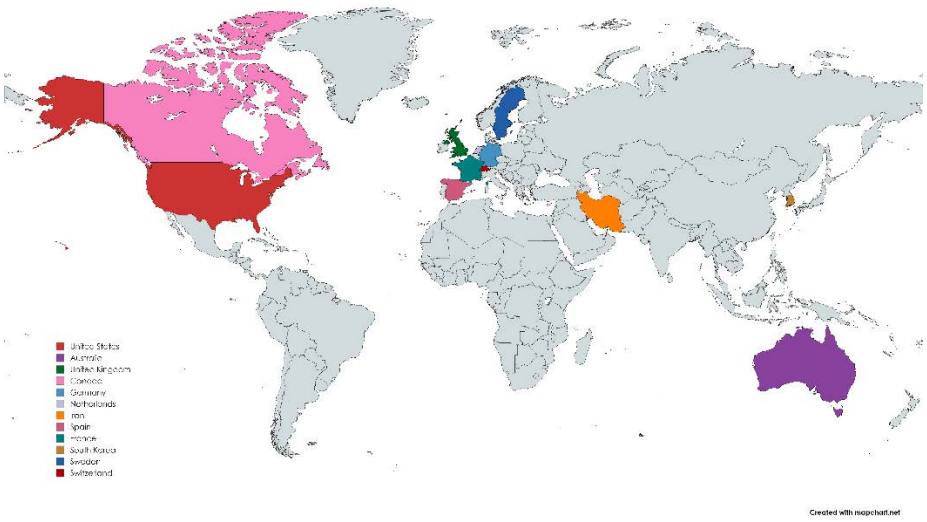

Figure 3. Most Countries that have Publications in clinical decision Support Systems and Electronic Health Records

Figure 5 indicates the published research on the role of electronic medical records in reducing medication errors especially prescribing errors.

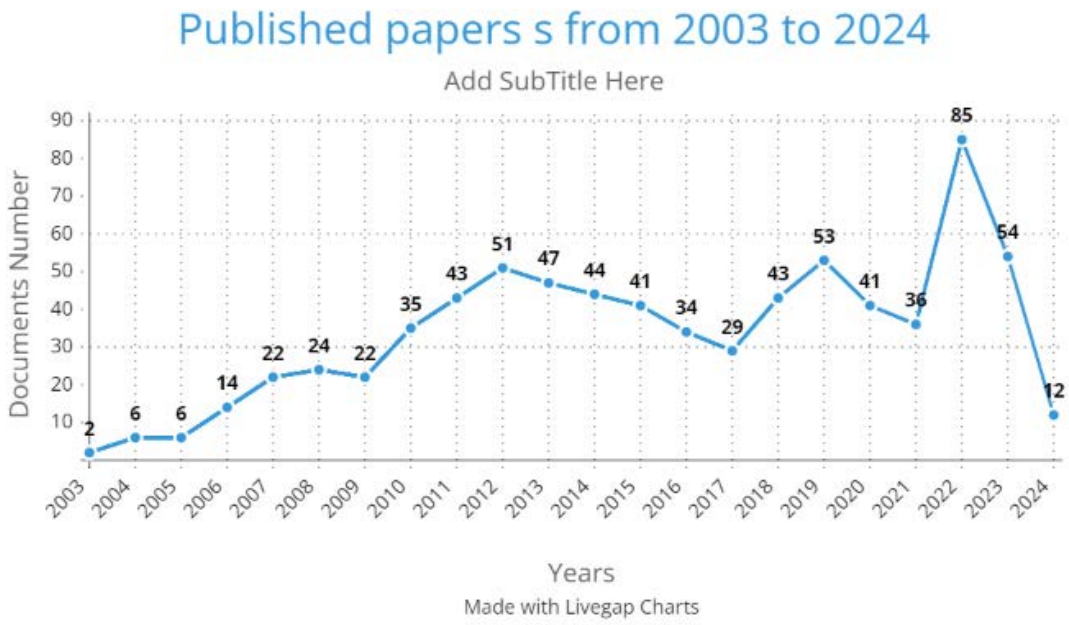

Figure 4. Published papers on clinical decision support systems and electronic health records from 2007 to 2024

Figure 6 shows that the most commonly used terms are "electronic medical records" (327 times), and "medication errors" (252 times). Because the research spans multiple domains, including medical, informatics, pharmacy, and engineering, this condition is mirrored in common word analysis. Figure 6 depicts a diverse range of study topics, disease and medicine names, and scientific procedures within these domains. Word groupings are represented by clusters of various color codes, such as green, yellow, red, and blue. The amount of times colors and words are used together, and the number of repetitions determines their association.

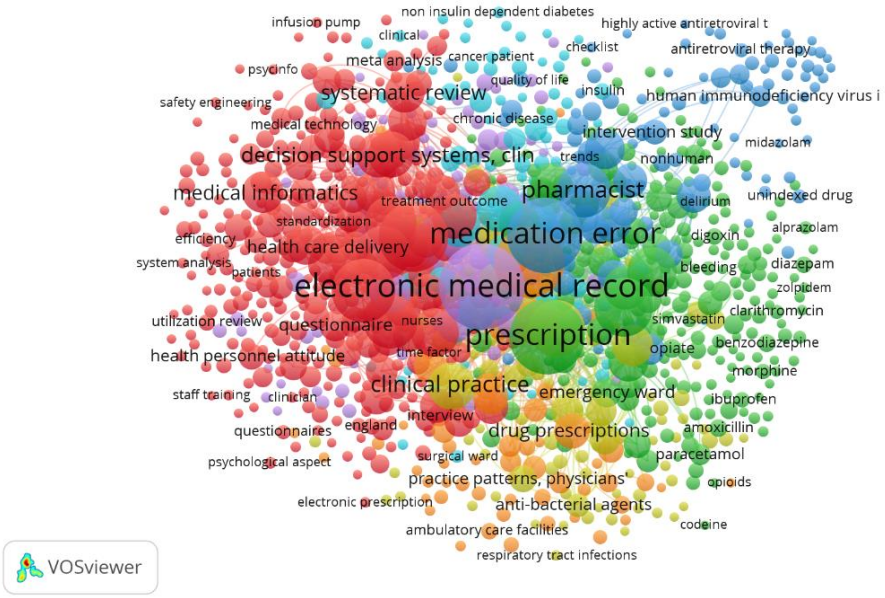

Figure 5. Visual Map of Common Words

In addition, VOSviewer offers an overlay visualization map that can be used to examine the adoption of keywords over several years to evaluate the progression of the study title. Based on the overlay visualization map shown in Figure 7, the yellow node suggests that the keyword is now something that researchers are interested in. The current research trends in electronic medical records, for instance, are centered on prescribing errors, and alert fatigue. Based on these terms, it is possible to predict that the early detection of prescribing errors can be influenced by alert fatigue and not to be indicated by healthcare providers. In addition, researchers are engaged in the process of ensuring that meaningful and important information may be quantified while simultaneously protecting the privacy and security of users and the system.

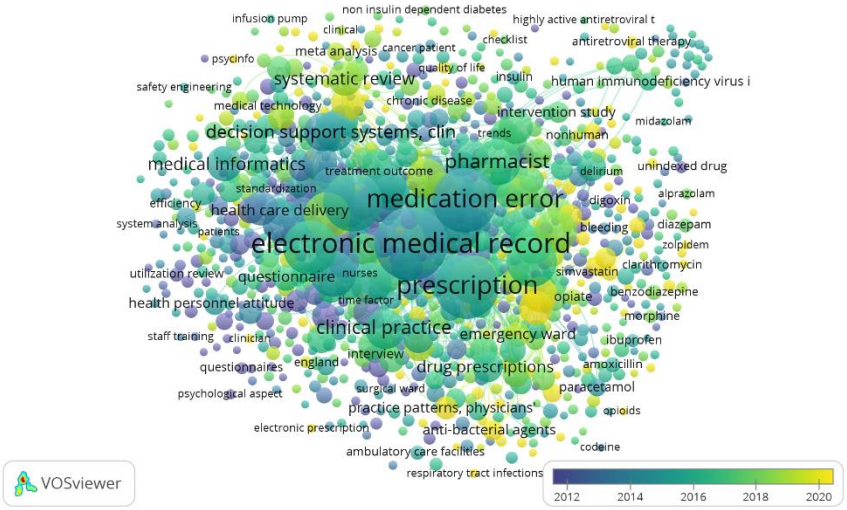

Figure 6. The overlay visualization map of the keywords by using VOSviewer software

To acquire further information regarding these phrases, we procured a graph that illustrates density visualization, as depicted in Figure 8. In the item density visualization, items are represented by their label, similar to the network visualization. Every location on a map is allocated a color according to the density of things found at that point. This hue is inherently a shade that is between the colors yellow and blue. As the quantity of objects in the area of a specific location grows and their magnitudes increase, the hue of the location shifts towards yellow. Conversely, if there are a smaller number of things around a point and those objects have lower weights, the color of the point will be more similar to blue. By examining the density picture, we can readily determine that electronic medical records, and medication error, have a high density representing these keywords and have a strong relationship with other keywords. The user's text is empty. It is a legitimate inference that a higher density of research indicates a greater level of maturity and development in the study of the issue. Nevertheless, we cannot disregard the fact that there are fewer terms in the yellow area, with the majority of keywords being located around the blue area. It is evident that there are fewer key research disciplines, and a significant number of these fields are still in their early stages of development.

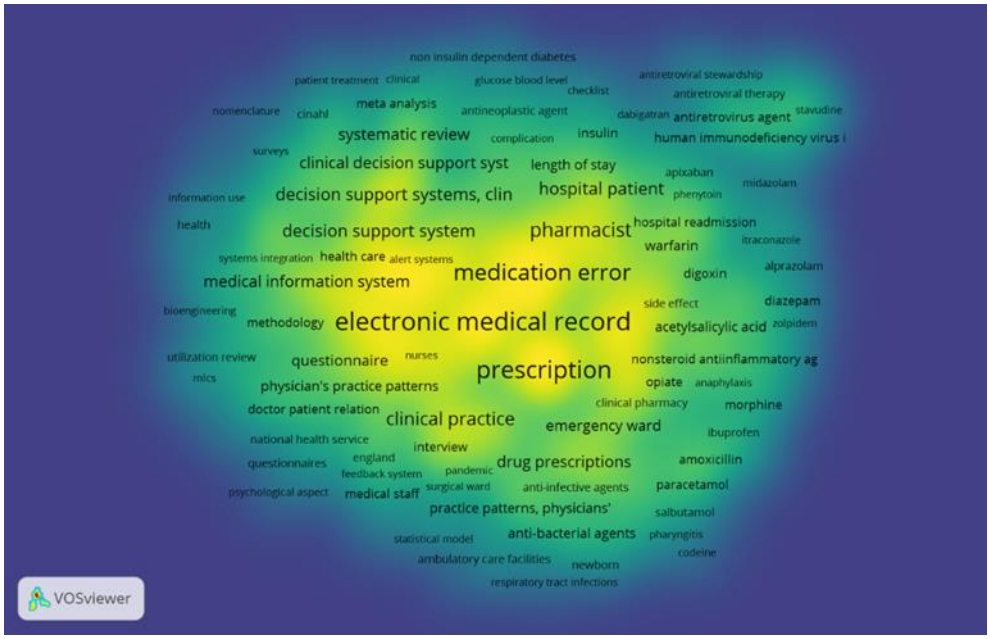

Figure 7. A density visualization map was performed with VOSviewer

Discussion

In Figure 4 it's obvious that the published articles on electronic medical records and their impact on medication errors all of them have well-established and robust economies. Upon examining the nations, the low ranking of emerging and underdeveloped countries in this list can be attributed to various difficulties faced by researchers, including limited proficiency in foreign languages, overwhelming academic workload, and inadequate support for project grants.

In Figure 5 it's obvious that the world's attention has increased from 2003 and gradually until 2024 and it's expected to increase in the next years 2022 is the most year has article published in this field.

In Figure 6 The visual map of common words related to the impact of electronic medical records (EMRs) on medication errors, particularly prescribing errors, offers valuable insights into the current research landscape.

Dominant themes: The most frequent words (large nodes) likely represent the core concepts explored in the research articles. Analyzing these words can reveal the primary focus of the research. For example, if "EMR," "alert," and "prescribing error" are prominent, it suggests a strong emphasis on the use of EMR alerts in identifying prescribing errors.

Interconnected concepts: The thicker lines connecting words highlight frequently co-occurring terms, indicating important relationships between concepts. Examining these connections can reveal key areas of discussion and potential research gaps. For instance, a thick line between "EMR" and "dose" suggests frequent exploration of how EMRs can be used to identify medication dosage errors, indicating a well-investigated area.

Emerging sub-themes: Clusters of interconnected nodes represent specific sub-themes within the research. Identifying these clusters and analyzing the associated words can reveal emerging areas of interest or potential under-researched aspects. For example, a cluster containing "adverse drug event," "pharmacist," and "communication" might suggest a growing focus on the role of pharmacists and communication in preventing adverse drug events related to EMR-identified prescribing errors.

In Figure 7 the overlay visualization provides a general overview of the research articles included in bibliometric analysis. While it highlights the focus on cancer research, clinical aspects, and the potential link between EMRs and medication errors, it lacks the specific details necessary for a more in-depth discussion.

In Figure 8 the density visualization indicates that there are many studies conducted on electronic medical records and their effect on medication errors and according to the presence of prescribing errors in a blue area in Figure 8, it indicates that there are few research on the impact of electronic medical records on finding prescribing errors and there's a need for further researches in this area.

This study investigated a comprehensive analysis of EMR data and the development of using this system to find medication errors. However, additional and in-depth research may be required to confirm its generalizability and applicability to find prescribing errors, particularly regarding potential biases in the data and variations in healthcare practices across different populations. Our research shows that the EMR is more resilient than traditional methods in identifying medication errors. Future research may look into further refining the model and developing practical tools for integrating it into clinical workflows, such as decision support systems for healthcare professionals to identify prescribing errors. Recent observations indicate that the increased availability of electronic health records (EHRs) has opened up new opportunities for utilizing data-driven approaches in healthcare. Our findings offer definitive proof that prescribing errors can significantly reduce and development of EMR, rather than solely relying on traditional methods that may be limited by human subjectivity and lack of comprehensive data analysis.

Ethical Considerations: Since public data and related literature were analyzed in our study, there was no ethical violation.

Conflict of Interest: The authors declare no conflict of interest.

References

1. Dean Franklin B, Vincent C, Schachter M, Barber N. The incidence of prescribing errors in hospital inpatients: an overview of the research methods. *Drug Saf*. 2005;28(10):891-900. doi:10.2165/00002018-200528100-00005
2. Singer A, Duarte Fernandez R. The effect of electronic medical record system use on communication between pharmacists and prescribers. *BMC Fam Pract*. 2015;16(1):1-6. doi:10.1186/s12875-015-0378-7
3. Al Meslamani AZ. Medication errors during a pandemic: what have we learnt? *Expert Opin Drug Saf*. 2023;22(2):115-118. doi:10.1080/14740338.2023.2181954
4. Kohn L, Corrigan J, Donaldson M. *To Err Is Human: Building a Safer Health System*. Vol 6.; 2000.
5. J MV, Samuel S. INTERNATIONAL JOURNAL OF SCIENTIFIC RESEARCH MEDICATION ERRORS : CAUSE & EFFECT – A DESCRIPTIVE STUDY Medical Surgical Nursing. 2023;(2277):2022-2023.
6. Hanna JS, Saad R. 923C372Medication Errors: Assessment and Prevention. Abd-Elsayed A, Abd-Elsayed A, eds. *Adv Anesth Rev*. Published online March 1, 2023:0. doi:10.1093/med/9780197584521.003.0371
7. Komjathy H, Gogolova V, Tóthová K, et al. 5PSQ-111 Medication errors, their perception, analysis, and proposal of solutions in a public hospital. *Eur J Hosp Pharm*. 2023;30(Suppl 1):A149 LP-A149. doi:10.1136/ejhpharm-2023-eahp.311
8. Tariq RA, Vashisht R, Sinha A, Scherbak Y. Medication Dispensing Errors and Prevention. In: ; 2024.
9. Dean B, Barber N, Schachter M. What is a prescribing error? *Qual Health Care*. 2000;9(4):232-237. doi:10.1136/qhc.9.4.232
10. Ferner RE, Aronson JK. Clarification of terminology in medication errors: definitions and classification. *Drug Saf*. 2006;29(11):1011-1022. doi:10.2165/00002018-200629110-00001
11. Lesar TS, Briceland L, Stein DS. Factors related to errors in medication prescribing. *JAMA*. 1997;277(4):312-317.
12. Rasool MF, Rehman A ur, Imran I, et al. Risk Factors Associated With Medication Errors Among Patients Suffering From Chronic Disorders. *Front Public Heal*. 2020;8(November):1-7. doi:10.3389/fpubh.2020.531038
13. Velo GP, Minuz P. Medication errors: Prescribing faults and prescription errors. *Br J Clin Pharmacol*. 2009;67(6):624-628. doi:10.1111/j.1365-2125.2009.03425.x
14. World Health Organization. *Patient Safety Incident Reporting and Learning Systems*.; 2020.
15. Elmontsri M, Banarsee R, Majeed A. Improving patient safety in developing countries – moving towards an integrated approach. *JRSM Open*. 2018;9(11):2054270418786112. doi:10.1177/2054270418786112

16. Smith DS. Patient safety. *Case Manager*. 2005;16(3):74-79. doi:10.1016/j.casemgr.2005.03.001
17. NHS England and NHS Improvement. Implementing the NHS patient safety strategy: Safer culture, safer systems, safer patients. *NHS Engl*. 2019;(July):1-82. https://www.england.nhs.uk/wp-content/uploads/2020/08/190708_Patient_Safety_Strategy_for_website_v4.pdf
18. Ratwani R. Electronic Health Records and Improved Patient Care: Opportunities for Applied Psychology. *Curr Dir Psychol Sci*. 2017;26(4):359-365. doi:10.1177/0963721417700691
19. Ariyanti N, Agushybana F, Widodo AP. The Benefits of Electronic Medical Records Reviewed from Economic, Clinical, and Clinical Information Benefits in Hospitals . *J Kesehat Komunitas (Journal Community Heal*. 2023;9(1 SE-Articles):190-197. doi:10.25311/keskom.Vol9.Iss1.1420
20. Shinde S V., Mahalle PN, Bendre V, Castillo O. Disruptive Developments in Biomedical Applications. *Disruptive Dev Biomed Appl*. Published online 2022. doi:10.1201/9781003272694
21. Gopidasan B, Amanullah S, Adebowale A. Electronic Medical Records – A Review of Cost-Effectiveness, Efficiency, Quality of Care, and Usability. *J Psychiatry Spectr*. 2022;1(2). https://journals.lww.com/jops/fulltext/2022/07000/electronic_medical_records___a_review_of.2.aspx
22. Anandi V, Ramesh M. Descriptive and Predictive Analytics on Electronic Health Records using Machine Learning. In: *2022 Second International Conference on Advances in Electrical, Computing, Communication and Sustainable Technologies (ICAECT)*. ; 2022:1-6. doi:10.1109/ICAECT54875.2022.9808019
23. Santosa E, Rosa E, Nadya F. Kelengkapan Pengisian Berkas Rekam Medis Pelayanan Medik Rawat Jalan Dan Patient Safety Di Rsgmp Umy. *J Medicoeticolegal dan Manaj Rumah Sakit*. 2014;3(1):114692.
24. Vaghasiya MR, Poon SK, Gunja N, Penm J. The Impact of an Electronic Medication Management System on Medication Deviations on Admission and Discharge from Hospital. *Int J Environ Res Public Health*. 2023;20(3). doi:10.3390/ijerph20031879
25. Hamad MME, Bah S. Impact of Implementing Electronic Health Records on Medication Safety at an HIMSS Stage 6 Hospital: The Pharmacist's Perspective. *Can J Hosp Pharm*. 2022;75(4):267-275. doi:10.4212/cjhp.3223
26. Assiri G. The Impact of Patient Access to Their Electronic Health Record on Medication Management Safety: A Narrative Review. *Saudi Pharm J*. 2022;30(3):185-194. doi:https://doi.org/10.1016/j.jsps.2022.01.001
27. O'Shea MP, Kennedy C, Relihan E, Harkin K, Hennessy M, Barry M. Assessment of an electronic patient record system on discharge prescribing errors in a Tertiary University Hospital. *BMC Med Inform Decis Mak*. 2021;21(1):195. doi:10.1186/s12911-021-01551-5
28. Hunt S, Chakraborty J. Electronic Health Records in Hospitals: Preventing Dosing Errors in the Medication Administration Context BT - Advances in Human Factors and Ergonomics in Healthcare and Medical Devices. In: Lightner NJ, Kalra J, eds. Springer International Publishing; 2020:65-76.

29. Aktürk C. Bibliometric Analysis of Clinical Decision Support Systems. *Acta Inform Pragensia*. 2021;10:61-74. doi:10.18267/j.aip.146
30. Zong QJ, Shen HZ, Yuan QJ, Hu XW, Hou ZP, Deng SG. Doctoral dissertations of Library and Information Science in China: A co-word analysis. *Scientometrics*. 2013;94(2):781-799. doi:10.1007/s11192-012-0799-1

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FRAILTY, SARCOPENIA AND NUTRITION

Burcu Ozen Yesil[1], İrem Naz Okur[2], Şamil Hızlı[3]

[1]Department of Pediatric Metabolism, Ankara Bilkent City Hospital, Ankara, Türkiye
[2]Department of Nursing, Atılım University Faculty of Health Sciences, Ankara, Türkiye
[3]Department of Pediatric Gastroenterology Hepatology and Nutrition, Ankara Yıldırım Beyazıt University, Ankara, Türkiye

Correspondence:
Burcu Ozen Yesil (dyt.burcu@hotmail.com)

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Ankara Yıldırım Beyazıt University Faculty of Medicine
Department of Family Medicine

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Abstract

Recently, the terms frailty and sarcopenia have been used frequently. Frailty, which occurs due to age-related physiological changes in multiple systems, is accepted as one of the geriatric syndromes. In frailty, negative energy balance, decreased strength, slowed walking speed, decreased grip strength, sarcopenia and involuntary weight loss can be seen. Frailty emerges as an indicator of biological age and correlates with the outcomes of biological age regardless of age, gender and comorbidities. Recent studies have begun to use the concept of frailty in children. Frailty in children is caused by a multi-system physiological impairment, including neurological, endocrine, immune and skeletal systems, which leads to a deterioration in quality of life. Frail children therefore require additional care and related services compared to children of the same age. Sarcopenia is defined as progressive loss in the musculoskeletal system. It has been determined that frailty and sarcopenia have many things in common in terms of their formation mechanisms, clinical consequences, treatment and prevention methods. Nutrition is closely related to both frailty and sarcopenia. Therefore, adequate energy and protein intake is extremely important in preventing malnutrition and loss of lean body mass.

Keywords: Frailty, sarcopenia, nutritional status.

Introduction

Frailty is defined as “a clinical condition characterized by weakness, physical disability, functional decline, and increased dependence in physiological reserves, along with age, a clinical condition characterized by a reduction in physiological reserves, and increased addiction in daily life activities”. [1] In some sources, a clinical syndrome characterized by a reduction of power, durability, and physiological function, characterized by a reduction in immunity, endocrine, stress, and energy regulation systems, which makes individuals fragile to negative health results such as physical dysfunction. [2]

In frail elderly, negative energy balance, decrease in strength, slowing in walking speed, decrease in grip strength, sarcopenia, and unintentional weight loss can be seen. [3] Frailty is reported to be directly related to increased risk of falls and injury, hospitalization, high health costs, and increased death rate. [4]

Types of Frailty

1. Physical Frailty

Physical frailty is a geriatric syndrome defined by components such as decreased physical activity, decreased walking speed, decrease in walking speed, weight loss, muscle power loss, and exhaustion throughout many physiological systems. [5]

2. Cognitive Frailty

Recent studies have found that losses in cognitive functions are associated with frailty. A study examined the relationship between cognitive level and frailty, 45 mild cognitive disorders, 64 stages Alzheimer's patients, and 13 middle-stage Alzheimer's patients, and it has been found that the level of frailty increased as cognitive dysfunction increased. [6]

3. Psychological Frailty

It is ignored because it is less known and cared about than physical frailty. Psychological frailty increases the patient's addiction by leading to cognitive and physical frailty. [7]

4. Social Frailty

Social frailty in the studies done is associated with factors such as the patient's living environment, income level, exercise status, alcohol use, whether or not it goes out less than before, daily frequency of communication,

and quality. These factors affect the patient's cognitive and physical frailty, affecting mortality and morbidity rates. [8]

Epidemiology

According to data from Europe and the United States, the percentage of frailty among the elderly has been reported as 8 percent in the community. This frequency reaches %3.2 in the age of 65-70, while %23 in the 90s. [9] Prevalence of frailty among individuals over 65 years old varies between %10-60 depending on the diagnostic criteria used. The prevalence range in studies is broad; it is thought that it is due to the lack of standard scales the difference in scales used and cultural and ethnic differences. [10]

There are different studies in Turkey on the frequency of frailty in the elderly. In a study conducted in 2015 with 1126 elderly individuals from 13 different institutions, the prevalence of frailty was found to be %39.2. [11] A study conducted in Turkey in 2020 reported that the average frailty rate was %44,5. Another study conducted in the same year determined that while %10 of the elderly were frail, %45,6 were in the pre-frailty stage. [12] More studies are needed in this area in Turkey.

It is emphasized that frailty increases with age and is common in women, individuals with low education and income levels, with chronic disease and disability. A compilation by Collard and his friends has examined factors and frailty prevalence that affect frailty, increased age, and the condition of being a woman, meaningfully associated with frailty. In the same study, there was a big difference in the prevalence of frailty between countries and that difference was caused by changes in the evaluation criteria. [13]

Pathophysiology

Frailty is characterized by a multi-system disorder that causes dynamic loss of homeostasis, a decrease of physiological reserve, and increased morbidity and mortality. Changes in the musculoskeletal and endocrine system with chronic inflammation play an important role in the pathogenesis of frailty. Possible etiological factors include genetic/epigenetic and metabolic factors, environmental and life-related stress, and acute and chronic diseases. [14] Systemic changes involved in the pathogenesis of frailty are observed in all elderly individuals. Systemic changes involved in the pathogenesis of frailty are observed in all elderly individuals. The risk of developing diseases increases with age in many patients. However, an increase in visceral adipose tissue mass is a universal change associated with aging, significantly impacting pathophysiology, particularly in light of its effects, such as sarcopenia.

Consequently, signaling systems (immune and endocrine systems), the musculoskeletal system, energy metabolism, and the nervous system contribute to the development of frailty through complex interactions.

Chronic inflammation and immune activation are believed to play a pivotal role in this process, acting through both direct and indirect pathways. [15]

Clinical Effects of Frailty

1. Changes in Brain Function Related to Frailty

Degeneration in both the central and peripheral nervous systems with aging is a significant marker for frailty. It manifests as a decline in cognitive function, impaired ability to perform independent activities of daily living, and deterioration in memory, speed, and executive function. Aging leads to structural and functional degeneration in the peripheral nervous system, specifically in motor neurons and neuromuscular junctions, contributing to frailty. Ultimately, this results in a decrease in the number of motor neurons and motor units, as well as a slowing of nerve conduction. [15] A prospective cohort study of 750 patients aged 65 and over was followed for 12 years, cognitive dysfunction increased as the frailty rating increased and cognitive function increased rapidly as the degree of frailty increased. [16]

2. Endocrinological Changes Associated with Frailty

With aging, growth hormone and IGF 1 are decreasing. With IGF 1 decrease, both muscle power and muscle mass decrease, which causes physical frailty. [17] Increase in cortisol secretion with age is seen. [18] High cortisol levels are characterized by increased catabolism, loss in muscle mass, anorexia, and weight loss, which are all important findings associated with frailty. However, studies show that increased basal cortisol levels cause a decrease in cognitive capacity are available. [19] Furthermore, studies have shown that elevated basal cortisol levels are associated with a reduction in cognitive capacity and hippocampal volume. A cross-sectional study involving 214 elderly women revealed a correlation between frailty levels and diurnal cortisol elevation. [20]

3. Changes in The Immune System in Frailty

Many changes occur in the immune system, including a decrease in stem cell count, a decrease in T cell differentiation, a fall in antibody response of B cells, neutrophils, and macrophages, and a decrease in the phagocytosis capacity of natural killer cells. [21] In normal conditions, changes in the immune system as a result of aging are not causing problems, while the response to acute stress and inflammation is incompetent. Since the inadequate response to acute inflammation is not enough to end the infection, it is a long-term, low-grade inflammatory response and plays an important role in the pathophysiology of frailty. The level of pro-inflammatory cytokines such as Interleukin 6 (IL-6) and C-reactive protein (CRP) in fragile elderly. [22]

4. Changes and Sarcopenia Seen in The Muscle-Skeletal System in Frailty

Sarcopenia is defined as a progressive loss in the mass and strength of the muscle-skeletal system, and this loss is related to physical frailty. [23] Under normal circumstances, there is a balance between muscle cell breakdown, hypertrophy, and protein loss, a balance that is influenced by the brain, endocrine system, immune system, physical activity, and nutrition. Any adverse events in these systems can lead to sarcopenia. However, not all frail elderly individuals exhibit sarcopenia, and conversely, %30 of sarcopenic elderly individuals do not display frailty. [20]

Prognosis

Frailty has been associated with increased morbidity and mortality, while varied by scales and population used. In a prospective cohort study on 754 patients, the leading cause of death in elderly patients was fragile; death was %27.9 determined as frailty, death due to frailty was %21.4, death due to organ failure, death due to malignancy was %13.8 and other causes of death related to dementia was %13.9. [24] A study involving 5,993 men aged 65 and older found that those identified as frail had a mortality rate twice as high as those considered healthy. As frailty levels increase, there is also an increase in the incidence of disability, falls, hospitalizations, and death. [20]

Variables and Measuring Parameters

1. Weight Loss

Loss of 4-5 kg unintentional weight according to the previous year

Compared to the previous year in follow-up, weight loss is more than %5 of body weight

2. Fatigue

Most of the time and feel exhausted 3-4 days a week

3. Weakness

Decreased grip power according to gender and body mass index (at least %20 of them have been accepted basal value)

4. Slowness

Walking speed is greater than 4.57 meters in 6-7 seconds. (the slowest %20 of the population is considered base)

5. Reduced Physical Activity

Energy consumption <383 kcal/week for men, <270 kcal/week (1/5 of the lowest physical activity for each sex is determined)

In addition, various scales have been developed for the diagnosis of frailty. A few of the frailty scales used in the world are sorted; Frailty Index, Frailty Measure, Cardiovascular health study index, Groningen Frailty Indicator, Edmonton Frailty Scale, Canada Health and Age Study Index, Osteoporotic fractures study index, Fried Index. [25]

Nutrition

Nutrition is a closely related factor to frailty. Among the diagnostic criteria of frailty, unintentional weight loss, low muscle power, feeling of exhaustion, decreased physical activity, and slow walking speed are affected by malnutrition.

Inadequate energy and protein can cause weight loss, sarcopenia, a decrease in muscle power, and a sense of exhaustion. However, frailty can negatively affect nutrition and nutritional status. [26]

Malnutrition and Frailty

The loss of body weight caused by malnutrition results in fatigue, weakness, slowing down at walking speed, and decreased physical activity, which are other criteria of frailty.

Half of fragile elderly people are at high risk for malnutrition. Likewise, %90 of those with malnutrition are at risk for frailty or frailty. Nutrition should be considered a modifiable environmental factor potentially associated with preventing fragile conditions. [27]

Obesity is also thought to be a risk factor in terms of frailty. Although the relationship between them isn't exactly explained, it is noted that adipose tissue may play a role. [28]

Energy Intake and Frailty

The reduction in energy intake can cause a loss in muscle mass and power. It is emphasized that less than 25 kcal/kg/day energy intake increased the risk of frailty by 3.3 times. It is recommended to provide 1.2-1.5 g/kg/day protein intake and distribute equally to meals. [29]

Protein Intake and Frailty

Protein is an important macronutrient in terms of preventing muscle strength and loss of force. The relationship between animal and herbal protein intake and frailty risk was examined; both types of protein intake have a protective effect against frailty. [30]

In the Women's Health Initiative Observational Study; 24,417 women aged 65-79 were followed for 3 years of frailty development. The increase of %20 in protein intake has been shown to decrease the risk of being seen by %32. [31] However, in a study of Bollwein and his friends over 75 in 194 individuals over the age of 75, there is no meaningful relationship between total protein intake and frailty risk. In the study, the distribution of protein intake in meals was noted. It is noted that the intake of protein in fragile elderly meals is more unstable than those in the pre-fragile period. [32]

A cross-sectional study involving 2,108 women aged 65 and older found that individuals with a daily protein intake greater than 69.8 g had lower rates of frailty. The study also examined the relationship between animal and plant protein intake and frailty risk, revealing that both types of protein intake had a protective effect against frailty. However, a separate study highlighted that only animal protein intake reduced the risk of frailty. [33]

Given the results of the studies done, it is understood that protein type, quantity, and distribution of meals are important in the prevention of frailty. [32]

Vitamin D and Frailty

25-hydroxy vitamin D (25-OH-D3) is a vitamin hormone that plays a crucial role in calcium homeostasis and bone turnover. Its levels are determined by measuring serum 25-OH-D3 levels. Values between 12-30 ng/ml are considered “insufficient,” while values below 12 ng/ml are considered “deficient.” Vitamin D deficiency is quite common in older adults, and low 25-OH-D3 levels have been associated with falls, fractures, bone pain, and impaired mobility and balance. Low 25-OH-D3 levels contribute to an increased frequency and prevalence of frailty in both elderly women and men. [34] Vitamin D deficiency is reported to be associated with low physical performance in older individuals. In the National Health and Nutrition Research (NHANES III) in individuals

over 60 years of age, serum 25(OH) is lower than 15 ng/mL, and it has been found to increase the risk of frailty by 3.7 times. A meta-analysis that examined the relationship between vitamin D and frailty found that low serum vitamin D levels increase the risk of frailty. [35]

Antioxidants and Frailty

Several studies suggest antioxidant nutrients are effective in preventing frailty. In a study where the relationship between food intake and frailty of 802 individuals over 65 years old was examined; it was reported that the risk of frailty in individuals with diet and vitamin E intake is higher inadequate. Inadequate intake of more than three nutrients increases the risk of frailty. [36]

Mediterranean Diet and Frailty

The Mediterranean diet is a dietary pattern based on the consumption of unprocessed foods, including vegetables, legumes, nuts, fresh fruits, bread, and unrefined grains. The Mediterranean diet is characterized by a low intake of saturated fatty acids and a high intake of unsaturated fatty acids. It is particularly rich in antioxidant micronutrients, such as vitamin C and carotenoids, which contribute to its protective effect against frailty by preventing oxidative stress and inflammation. [33] In Germany, in the cross-sectional study of 192 individuals over 75 years old between 2009 and 2010, the risk of Mediterranean diet and frailty was examined. People with high Mediterranean diet scores have been reported to have a lower risk of frailty. [37]

A meta-analysis of four prospective studies conducted in 2018 examining the relationship between the Mediterranean diet and frailty found that adherence to the Mediterranean diet significantly reduced the risk of frailty. [38]

Recent studies on the Mediterranean diet highlight its anti-inflammatory, and antioxidant properties and its significant role in preventing fragility. Studies report that patients following the Mediterranean diet have lower rates of fragility. [39]

Frailty in Paediatrics

Recent studies suggest that frailty as a physiological phenotype may also exist in children outside the geriatric population. The frailty situation in children is caused by a multisystemic physiological disruption. That's why, the range of diseases that contribute to frailty is wide and heterogeneous. These include syndromes, malformations, infections, neurologic, muscular, oncologic, hepatalogic, respiratory, cardiologic, and metabolic disorders.

This causes the quality of life to deteriorate. Therefore, frail children need additional care and related services compared to children of the same age. However, frailty has not been studied in much detail in children and adolescents. One of the reasons for this is the lack of objective criteria for the evaluation of frailty in children. In a study conducted on adolescents treated for childhood cancer, the frequency of frailty was found to be %7.8. In addition, it has been shown in this study that high frailty scores are associated with an increased risk of morbidity and mortality. [40] When the severity of frailty in children with compensated chronic liver disease is compared to those with end-stage liver disease, it has been shown that severe patients can be distinguished by determining the severity of frailty. [41] It was found that frailty in children with chronic heart disease was worse in all areas than in children in the control group. By conducting similar studies investigating the concept of frailty in children in large groups, especially children with chronic diseases, it will be possible to determine how much and at what level the concept of frailty affects pediatric patients. [42]

Sarcopenia

EWGSOP (European Working Group on Sarcopenia in Older People) initially published its guidelines in 2010. These guidelines provided a framework for the definition and diagnosis of sarcopenia. [43] EWGSOP2 convened again in 2018 to update these guidelines. The content of the meeting focused on revising the definition and diagnostic criteria for sarcopenia based on new scientific evidence and clinical practice advances. The updated guidelines, known as EWGSOP2, emphasized the importance of muscle strength as a primary indicator of sarcopenia, rather than muscle mass alone. Additionally, they provided updated criteria for diagnosis, recommended assessment tools, and discussed the importance of early detection and intervention to manage and treat sarcopenia effectively. [44]

According to the definition of the Sarcopenia Working Group in European Elderly Individuals (EWGSOP), age-related sarcopenia is a syndrome with unwanted results, such as a progressive loss in skeleton muscle mass and power, physical disability, decrease in quality of life and increase in mortality. [43] Hormonal changes, such as genetic, breaking down of nutrition status, decrease in physical activity, decrease in anabolic hormones, such as testosterone and growth hormone, increase insulin resistance, increase in atherosclerosis, and increase in the load of proinflammatory cytokine in circulation are the causes of sarcopenia. [45]

Epidemiology

The prevalence of sarcopenia appears to change %8-40 of the age of 60 and over. In a meta-analysis study investigating sarcopenia prevention in the world, sarcopenia prevention was determined as %10 in both sexes. [46]

The prevalence of sarcopenia in Turkey was found as %16 in their study with 100 elderly individuals who applied to the Hacettepe University Geriatrics Polyclinic of sarcopenia in Turkey. [47]

Sarcopenia Categories

The Sarcopenia Working Group (EWGSOP) in European Elderly Individuals categorizes sarcopenia into 2 different categories, primary sarcopenia and secondary sarcopenia. Sarcopenia without a specific cause other than aging is classified as 'primary', and developing sarcopenia due to multiple causes is 'secondary '. [48, 49]

Stages

EWGSOP recommends that sarcopenia should be examined in 3 stages, including 'pre sarcopenia', 'sarcopenia', and 'serious sarcopenia' to guide the clinical management of sarcopenia. The Presarcopeniaa phase is characterized by decreasing muscle mass and is the stage where muscle strength and physical performance are not affected. Therefore, muscle mass measurement techniques can be used to detect the phase of pre sarcopenia. In the Sarcopenia phase, as in the period of pre sarcopenia, decrease in muscle mass and in addition to decreasing in muscle power or physical performance. In the phase of serious sarcopenia, there is a decrease in all muscle strength, muscle mass, and physical performance criteria. [49]

Diagnostic Criteria

The International Association of Gerontology and Geriatrics-European Region, European Geriatric Medical Association, International Association of Nutrition and Aging, and European Association of Clinical Nutrition and Metabolism states that first measurement of muscle mass for diagnosis of sarcopenia, then muscle strength and physical performance criteria should be evaluated if a decrease in muscle mass measurement is detected. [50]

EWGSOP has developed an algorithm based on the sarcopenia scanning test and walking speed measurement, as well as an easy and reliable sarcopenia scanning test for practical use in practice. Simple Sarcopeni Interrogation Form (SARC-F) is a simple and easy-to-apply scan test, which includes five questions about power, foot-up, upstairs, and fall, score between 0-2 points for each question and guides individuals with a score of over four points to advanced assessment for sarcopenia. 48 In the algorithm, walking speed is evaluated. The cutting point of walking speed is >0.8 m/s, which defines the risk of sarcopenia. The algorithm recommends assessing the measurement of walking speed in individuals aged 65 and older, accordingly, the ability to look at the hand grip of older individuals with walking speed >0.8 m/s. Hand grip power is determined to have no sarcopenia in individuals who are considered normal; people with low hand grip measurements are looked at for muscle mass measurements. Muscle mass measurements of older individuals with walking speed

≤0.8 m/s are taken; muscle mass is determined to have no sarcopenia in older individuals with normal muscle mass measurement results; older individuals with lower muscle mass measurement are diagnosed with sarcopenia. [48]

In an evaluation of muscle mass; body imaging techniques, bioimpedance analysis, and anthropometric measurements are used. In the evaluation of muscle power; handshake power test, dysflexion-extension techniques, and peak expiratory current measurement are used. [51] Tests used in evaluating physical performance are short physical performance battery, general walking speed, six-minute walk test, and stair climbing power test. Functional activities are measured in these tests that determine the levels of independence in a person's daily life activities. The levels of independence in these activities affect the quality of a person's daily life. [50]

Nutritional Treatment

With age, conditions such as decreased taste and smell receptors, hormone changes, slowing down of the gastrointestinal tract, and chewing and swallowing problems cause a decrease in energy intake, thus leading to malnutrition. [52] Malnutrition is known to lead to the development of sarcopenia by causing a decrease in muscle function with reduced energy intake; Inadequate protein and vitamin intake leads to malnutrition, a decrease in lean body mass, and increased dysfunction. [53] This situation increases the importance of nutrition in sarcopenia and reveals the importance of protein and vitamin D, especially with adequate energy intake that helps muscle development.

Protein

Inadequate protein intake is an important cause of nutritional deficiencies in the elderly. Studies have shown that as protein intake increases, muscle strength also increases. [54] In elderly individuals with normal renal function, a protein intake of 1.0 g/kg/day - 1.2 g/kg/day is recommended. [55] In studies, ensuring optimal stimulation of protein synthesis by distributing protein intake evenly to meals and preferring protein consumption of animal origin compared to vegetable proteins increases muscle strength more. [56]

Vitamin D

Vitamin D levels decrease with age, while low vitamin D levels are associated with sarcopenia. In studies, vitamin D replacement applied to individuals with low vitamin D has been found to improve muscle strength, reduce falls, and prevent fractures. [57] According to one meta-analysis, vitamin D supplementation increased muscle strength and function but showed no effect on muscle mass. [58]

Omega-3 Fatty Acids

Dietary omega-3 fatty acid levels are inversely related to sarcopenia. There are some studies showing that omega-3 fatty acid supplementation increased protein metabolism and indirectly counteracted anabolic resistance by taking it in the early stages of sarcopenia. [59] Intake of more than 2 g/day of omega-3 fatty acids may enhance muscle mass and walking speed, particularly in sarcopenia patients who have been under treatment for over six months. However, linear regression analysis found no link between plasma omega-3 levels and grip strength in older adults. Expert opinions suggest that doses of 3,000 mg/day DHA plus EPA or more (preferably over 800 mg/day EPA) may be necessary for positive physical performance in older adults, as lower doses do not significantly impact muscle strength. While omega-3 fatty acids might improve sarcopenia, well-designed, large prospective cohort studies, and randomized controlled trials are needed to validate these findings. [60]

Conclusion and Recommendations

It is known that the elderly population in Turkey is increasing. It is recommended that every elderly patient visiting family physicians should be assessed for frailty syndrome. Identifying frail individuals and providing them with multidisciplinary rehabilitation, as well as slowing down and stopping the progression to frailty in pre-frail individuals, are crucial. Routine screening for frailty syndrome can help identify frail and pre-frail individuals, which can lead to a better understanding of the negative health outcomes of frailty. Increasing awareness of risk factors for frailty in individuals can help prevent frailty and minimize its negative consequences. Timely and appropriate interventions can reduce morbidity and mortality associated with frailty syndrome, ultimately benefiting both patients and healthcare workers. A family physician specialist's evaluation includes recognizing a patient's frailty, cognitive condition, physical functions, and functional reserve. Family physicians should take the initiative to improve and implement caring models that meet the needs of patients and communities.

Ethical Considerations: Since public data and related literature were analyzed in our study, there was no ethical violation.

Conflict of Interest: The authors declare no conflict of interest.

References

1. Bouillon K, Kivimaki M, Hamer M, Sabia S, Fransson EI, SinghManoux A, et al. Measure of frailty in population-based studies: An overview. BMC Geriatr 2013;13(1): 64.
2. Kang, J., Jeong, Y. J., Jang, J. H. ve Lee, M. Risk factors for frailty in critical care survivors: a secondary analysis, Intensive and Critical Care Nursing, 2020, 64(2):102981.
3. Kapucu, S. ve Ünver, G. Fragile elderly and nurshing care. Osmangazi Journal of Medicine, 2017, 39 (1), 122-129.
4. Thiruchelvam, K., Byles, J., Hasan, S. S., Egan, N. Ve Kairuz, T. Prevalence and association of continuous polypharmacy and frailty among older women: A longitudina analysis over 15 years. Maturitas, 2021, 146:18-25.
5. Runzer-Colmenares FM, Samper-Ternent R, Snih SA, Ottenbacher KJ, Parodi JF, Wong R. Prevalence and factors associated with frailty among Peruvian older adults. Archives of Gerontology and Geriatrics 2014; 58:69–73.
6. Chong MS, Tay L, Chan M, Lim WS, Ye R, Wong WC, et al. Stage-Specific Relationship between Frailty and Cognitive Impairment in a Specialist Memory Clinic Setting. J Frailty Aging. 2014;3(2):113-9.
7. Fitten LJ. Psychological Frailty in the Aging Patient. Nestle Nutr Inst Workshop Ser. 2015; 83:45-53.
8. Tsutsumimoto K, Doi T, Makizako H, Hotta R, Nakakubo S, Makino K, et al. Association of Social Frailty With Both Cognitive and Physical Deficits Among Older People. J Am Med Dir Assoc. 2017;18(7):603-7.
9. Eyigör S, Gökçe-Kutsal Y. Kırılgan yaşlıya yaklaşım. Turk J Phys Med Rehab 2010;56:135-40.
10. Waite, S. J., Maitland, S., Thomas, A., ve Yarnall, A. J. Sarcopenia and frailty in individuals with dementia: A systematic review. Arch of Gerontol Geriatr, 2021, 92:104268.
11. Eyigor S, Kutsal YG, Duran E, Huner B, Paker N, Durmus B, et al. Frailty prevalence and related factors in the older adult-FrailTURK Project. Age (Omaha) 2015; 37(3): 50.
12. Özşaker S, Yaşlı Cerrahi Hastaları ve Kırılganlık Sendromu, JSHS, 2023, 8(1):49-62.
13. Collard RM, Boter H, Schoevers RA, Oude Voshaar RC. Prevalence of frailty in communitydwelling older persons: a systematic review. Journal of the American Geriatrics Society 2012; 60:1487-92.
14. Wilson D, Jackson T, Sapey E, Lord JM. Frailty and sarcopenia: The potential role of an aged immune system. Ageing Res Rev 2017; 36: 1–10.
15. Ferrucci, L., Fabbri ., Walston J. D., Frailty, in Hazzard's, K.G.E. Kim J Davis, Editor. 2017, Minion Pro by Cenveo: China. p. 691-708.
16. Boyle PA, Buchman AS, Wilson RS, Leurgans SE, Bennett DA. Physical frailty is associated with incident mild cognitive impairment in community-based older persons. J Am Geriatr Soc. 2010;58(2):248-55.

17. Leng SX, Cappola AR, Andersen RE, Blackman MR, Koenig K, Blair M, et al. Serum levels of insülin like growth factor-I (IGF-I) and dehydroepiandrosterone sulfate (DHEA-S), and their relationships with serum interleukin-6, in the geriatric syndrome of frailty. Aging Clin Exp Res. 2004;16(2):153-7.
18. Attaix D, Mosoni L, Dardevet D, Combaret L, Mirand PP, Grizard J. Altered responses in skeletal muscle protein turnover during aging in anabolic and catabolic periods. Int J Biochem Cell Biol. 2005;37(10):1962-73.
19. Jang YM, Lee EJ, Kim DL, Kim SK, Song KH. The Association between Midnight Salivary Cortisol and Metabolic Syndrome in Korean Adults. Diabetes Metab J. 2012;36(3):245-50.
20. Hymabaccus Muradi BAB, Yaşlılarda kırılganlığı ölçmeye yarayan frail ölçeğinin Türkçe geçerlilik ve güvenirlik çalışması, Hacette Üniversitesi Tıp Fakültesi İç Hastalıkları Anabilim Dalı, Uzmanlık Tezi, 2017, Ankara.
21. Sahin E, Depinho RA. Linking functional decline of telomeres, mitochondria and stem cells during ageing. Nature. 2010;464(7288):520-8.
22. Qu T, Yang H, Walston JD, Fedarko NS, Leng SX. Upregulated monocytic expression of CXC chemokine ligand 10 (CXCL-10) and its relationship with serum interleukin-6 levels in the syndrome of frailty. Cytokine. 2009;46(3):319-24.
23. Marzetti E, Calvani R, Bernabei R, Leeuwenburgh C. Apoptosis in skeletal myocytes: a potential target for interventions against sarcopenia and physical frailty - a mini-review. Gerontology. 2012;58(2):99-106.
24. Gill TM, Gahbauer EA, Han L, Allore HG. Trajectories of disability in the last year of life. N Engl J Med. 2010;362(13):1173-80.
25. Sternberg SA, Wershof Schwartz A, Karunananthan S, Bergman H, Mark Clarfield A. The identification of frailty: a systematic literature review. J Am Geriatr Soc. 2011;59(11):2129-38.
26. Yannakoulia M, Ntanasi E, Anastasiou CA, Scarmeas N. Frailty and nutrition: From epidemiological and clinical evidence to potential mechanisms. Metabolism 2017; 68: 64–76.
27. S Davinelli, G Corbi, G. Scapagnini, Frailty syndrome: A target for functional nutrients? Mech Ageing Dev. 2021, 195:111441.
28. Choi J, Joseph L, Pilote L. Obesity and C-reactive protein in various populations: a systematic review and meta-analysis. Obes Rev 2013; 14(3): 232–44.
29. Bonnefoy M, Berrut G, Lesourd B, Ferry M, Gilbert T, Guerin O, et al. Frailty and nutrition: Searching for evidence. J Nutr Health Aging 2015; 19(3): 250–7.
30. Kobayashi S, Asakura K, Suga H, Sasaki S. High protein intake is associated with low prevalence of frailty among old Japanese women: a multicenter cross-sectional study. Nutr J 2013; 12(1):164.
31. Beasley JM, LaCroix AZ, Neuhouser ML, Huang Y, Tinker L, Woods N, et al. Protein ıntake and ıncident frailty in the Women's Health Initiative Observational Study. J Am Geriatr Soc 2010; 58(6): 1063–71.

32. Bollwein J, Diekmann R, Kaiser MJ, Bauer JM, Uter W, Sieber CC, et al. Distribution but not amount of protein intake is associated with frailty: a cross-sectional investigation in the region of Nürnberg. Nutr J 2013; 12(1): 109.
33. Alkan ŞB, Rakıcıoğlu N, Kırılgan Yaşlılarda Beslenme, SDÜ Sağ Bil Derg, 2019, 10(2)
34. Durmaz H, İç hastalıkları yoğun bakımına yatan yaşlı hastalarda kırılganlığın ve etkilerinin değerlendirilmesi, Hacette Üniversitesi Tıp Fakültesi İç Hastalıkları Anabilim Dalı, Uzmnalık Tezi, 2018, Ankara.
35. Zhou J, Huang P, Liu P, Hao Q, Chen S, Dong B, et al. Association of vitamin D deficiency and frailty: A systematic review and meta-analysis. Maturitas 2016; 94: 70–6.
36. Bartali B, Frongillo EA, Bandinelli S, Lauretani F, Semba RD, Fried LP, et al. Low nutrient intake is an essential component of frailty in older persons. J Gerontol A Biol Sci Med Sci 2006; 61(6): 589–93.
37. Bollwein J, Diekmann R, Kaiser MJ, Bauer JM, Uter W, Sieber CC, et al. Dietary quality ıs related to frailty in community-dwelling older adults. Journals Gerontol Ser A Biol Sci Med Sci 2013; 68(4): 483–9.
38. Kojima G, Avgerinou C, Iliffe S, Walters K. Adherence to Mediterranean Diet reduces ıncident frailty risk: Systematic review and meta-analysis. J Am Geriatr Soc. 2018: 2–7.
39. Dominguez LJ, Donat Vargas C, Sayon Orea C, Baberia Latasa M, Veronese N, Rey Garcia J and et al, Rationale of the association between Mediterranean diet and the risk of frailty in older adults and systematic review and meta-analysis, Experimental Gerontology 177, 2023.
40. Ness KK, Krull KR, Jones KE, Mulrooney DA, Armstrong GT, Green DM, Chemaitilly W, Smith WA, Wilson CL, Sklar CA, Shelton K, Srivastava DK, Ali S, Robison LL, Hudson MM Physiologic frailty as a sign of accelerated aging among adult survivors of childhood cancer: a report from the St Jude Lifetime Cohort Study. J Clin Oncol 2013;31:4496-4503 6.
41. Lurz E, Quammie C, Englesbe M, Alonso EM, Lin HC, Hsu EK, Furuya KN, Gupta NA, Venkat VL, Daniel JF, Leonis MA, Miloh T, Telega GW, Yap J, Menendez J, Book LS, Himes RW, Sundaram SS, Parekh R, Sonnenday C, Bucuvalas J, Ng VL, Kamath BM Frailty in children with liver disease: a prospective multicenter study. J Pediatr 2018;194:109-115.
42. Benini, F., Antoniello, L.M., Duci, M. Frailty in Pediatrics: Definition and Care Needs. In: Lima, M., Mondardini, M.C. (eds) Frailty in Children. Springer, Cham. 2023, http://dx.doi.org/10.1007/978-3-031-24307-3_1.
43. Savaş, S., Sarkopeniden korunma. Ege Tıp Dergisi, 2015, 54(10), 46-50.
44. Cruz-Jentoft AJ, Bahat G, Bauer J, Boirie Y, Bruyère O, Cederholm T, et al. Sarcopenia: Revised European consensus on definition and diagnosis. Age Ageing. 2019;48(1):16-15.
45. Fielding RA., Vellas B., Evans WJ., Bhasin S., Morley JE., Newman AB., et al. Sarcopenia: An undiagnosed condition in older adults. Current consensus deinition: Prevalence, etiology, and consequences. International Working Group on Sarcopenia. Journal of the American Medical Directors Association. 2011, 12(4):249-256.

46. Shafiee G, Keshtkar A, Soltani A, et al. Prevalence of sarcopenia in the world: a systematic review and metaanalysis of general population studies. J Diabetes Metab Disord. 2017;16(1):21-31.
47. Kuyumcu, M.E., et al, Ultrasonographic evaluation of the calf muscle mass and architecture in elderly patients with and without sarcopenia. Archives of gerontology and geriatrics, 2016, 65, 218-224.
48. Cruz-Jentoft A.J., Morley J.E., Sarcopenia.Wiley Black Well, 2012, 8-153.
49. Cruz-Jentoft, A. J., Sarcopenia: a clinical review. Reviews in Clinical Gerontology, 2013, 23 (4), 267-274.
50. Cruz-Jentoft, A. J., et al., Sarcopenia: European consensus on definition and diagnosis Report of the European Working Group on Sarcopenia in Older People. Age and ageing, 2010, 39(4), 412-423.
51. Cruz-Jentoft AJ, Landi F, Schneider SM, et al. Prevalence of and interventions for sarcopenia in ageing adults: a systematic review. Report of the International Sarcopenia Initiative (EWGSOP and IWGS). Age Ageing 2014;43(6):748-59.
52. Biolo G, De Cicco M, Dal Mas V, et al. Response of muscle protein and glutamine kinetics to branched-chain– enriched amino acids in intensive care patients after radical cancer surgery. Nutrition. 2006;22(5):475-482.
53. Liguori I, Russo G, Aran L, et al. Sarcopenia: assessment of disease burden and strategies to improve outcomes. Clin Interv Aging. 2018; 13:913-927.
54. Muscaritoli M, Anker S, Argiles J, et al. Consensus definition of sarcopenia, cachexia and pre-cachexia: joint document elaborated by Special Interest Groups (SIG)"cachexia-anorexia in chronic wasting diseases" and "nutrition in geriatrics". Clin Nutr. 2010;29(2):154-159.
55. Wackerhage H. Sarcopenia: causes and treatments. German Journal of Sports Medicine. 2017;68(7-8):178-183.
56. Bauer JM. Nutrition in older persons. Basis for functionality and quality of life. Internist ((Berl). 2011;52(8):946-954.
57. Bischoff-Ferrari HA. Validated treatments and therapeutic perspectives regarding nutritherapy. J Nutr Healht Aging. 2009;13(8):737-741.
58. Beaudart C, Buckinx F, Rabenda V, et al. The effects of vitamin D on skeletal muscle strength, muscle mass, and muscle power: a systematic review and meta-analysis of randomized controlled trials. J Clin Endocrinol Metab. 2014;99(11):4336-4345.
59. Di Girolamo FG, Situlin R, Mazzucco S, et al. Omega-3 fatty acids and protein metabolism: enhancement of anabolic interventions for sarcopenia. Curr Opin Clin Nutr Metab Care. 2014;17(2):145-150.
60. Liu S, Zhang L, Li S, Advances in nutritional supplementation for sarcopenia management, Front. Nutr. 2023, 10:1189522. doi: 10.3389/fnut.2023.1189522.