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Research Article/Özgün Araştırma

The importance of p16 and CD117 expression in melanocytic lesions

Melanositik lezyonlarda p16 ve CD117 ekspresyonunun önemi

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Abstract

Aim: The present study aims to determine the p16 and CD117 expression profiles of melanocytic lesions to investigate immune profiles that may facilitate differential diagnosis of melanoma from benign or potential precursor melanocytic lesions.

Materials and Methods: Immunohistochemistry for p16 and CD117 was applied in a total of 81 cases with melanocytic lesions.

Results: A significant loss of p16 expression was found in melanoma cases compared to benign and precursor melanocytic lesions (p<0.05). Moreover, a significant loss of p16 expression was also noted in cases of dysplastic nevus compared to those with intradermal nevus (p<0.01). While no CD117 expression was observed in intradermal nevi, high-level expression was seen in cases with Spitz nevus, blue nevus, invasive melanoma and dysplastic nevus (p<0.01).

Conclusion: We believe using p16 and CD117 together may provide an important marker combination to aid in distinguishing melanoma from benign lesions and benign lesions from potential precursor melanocytic lesions.

Keywords: Melanocytic tumors; Immunohistochemistry; P16; CD117.

Öz

Amaç: Bu çalışmada melanositik lezyonların p16 ve CD117 ekspresyon profillerini belirleyerek, melanomun diğer benign ya da potansiyel prekürsör melanositik lezyonlardan ayırıcı tanısını yapmayı kolaylaştıracak immün profillerini saptamayı amaçladık.

Gereç ve Yöntem: Seksen bir melanositik lezyon olgusuna immünohistokimya ile p16 ve CD117 uygulandı.

Bulgular: Melanom olgularında diğer benign ve prekürsör melanositik lezyonlara kıyasla anlamlı olarak p16 ekpresyon kaybı mevcuttur(p<0.05). Ayrıca displastik nevüs olgularında da intradermal nevüs olgularına göre anlamlı olarak p16 ekspresyonunda kayıp mevcuttur (p<0.01). CD117 ise intradermal nevüslerde eksprese olmaz iken, spitz nevüs, blue nevüs, invaziv melanom ve displastik nevüslerde ise yüksek oranda ekspresyon mevcuttur (p<0.01).

Sonuç: p16 ve CD117 belirteçlerinin birlikte kullanıldığı zaman, melanomları benign lezyonlardan ve benign lezyonları potansiyel prekürsör melanositik lezyonlardan ayırımda önemli belirteçler olarak katkı sağlayacağını düşünmekteyiz.

Anahtar Kelimeler: Melanositik tümör; İmmünohistokimya; P16; CD117.

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Introduction

Cutaneous melanocytic tumors constitute a broad spectrum of tumors with highly heterogeneous prognosis and morphological appearance. The distinction between precursor malignant lesions and benign nevus types proves to be challenging due to the heterogeneous morphology.[1] Melanoma is a cutaneous neoplasm associated with high mortality. Although surgical resection may be curative in early stages, high rates of local recurrence and metastasis are observed despite chemotherapy and immunotherapy.[2] Accurate recognition of primary melanoma is of critical importance for treatment management. Unfortunately, differential diagnosis is often challenging with the use of standard histological criteria and distinction of melanoma from chronically inflamed nevus, Spitz nevus and dysplastic/atypical nevus may even be impossible in some patients.[3,4]

Although genetic studies have led to the development of a modern morphogenetic classification, it is not deemed practical for routine use in everyday practice. Diagnostic molecular tests are either not used or only used in the most challenging and critical cases owing to the fact that these techniques require a molecular pathology lab and experienced pathologists to interpret the findings in addition to being costly tests with long turnaround time[3]. Convenient techniques such as immunohistochemistry (IHC) are widely used appropriate diagnostic tools in first-line setting.[1] IHC is the most common adjunct test pathologists use to distinguish between benign and malignant melanocytic lesions. Although immune markers such as S100, HMB45, Melan-A, Sox-10 are broadly used in the differential diagnosis of melanocytic lesions, there is no single immune marker or panel to establish differential diagnosis with absolute precision.[5]

The tumor suppressor protein, p16, is the gene product of *CDKN2A* and has been characterized as one of the proteins that regulate the G1/S checkpoint of the cell cycle and functions as an important effector.[6] The role of p16 appears to be of great importance in cell aging, particularly in melanocytes, and aging is thought to be involved in tumor formation or progression of melanoma.[7] In vitro cell culture studies further support this notion. Analyses of human melanocytes have revealed that cells depleted of p16 have enhanced proliferation and an extended replicative lifespan in the presence of replication-associated DNA damage.[8] Studies that combined cell aging and its effects on melanoma have revealed presence of *CDKN2A* when analyzing the genetics of familial melanoma and found that a limited number of uncontrolled melanoma cases also had a p16 mutation.[9] The observation of germline mutations in cases of melanoma has led to the application of p16 IHC marker in melanoma cases.[3]

C-KIT (CD117) is a transmembrane tyrosine kinase that plays a physiological role in the development of various cell types such as hematopoietic cells, breast epithelium, germ cells and melanocytes.[10,11] Changes in CD117 expression are known to play a key role in tumor cell growth, proliferation and metastasis in several types of neoplasms including gastrointestinal stromal tumors (GIST), germ cell tumors and mastocytosis. Therefore, oncogenic mutations in KIT have become a focus of studies on melanoma and melanocyte transformation in recent years.[12,13] C-KIT has an important role in the pathogenesis of melanoma, especially in acral and mucosal melanoma.[14,15] Relevant studies have reported the frequency of C-KIT mutations as 1-7% in melanomas.[16,17]

The present study aims to determine the p16 and CD117 expression profiles in different melanocytic lesions classified as benign/precursor and malignant and identify immune profiles that may aid in the differential diagnosis of melanoma with poor prognosis and survival from benign or potential precursor melanocytic lesions.

Materials and Methods

The type and sample of the research

This retrospective study included a total of 81 melanocytic lesions diagnosed in 2012-2019, including 27 benign nevi, 12 blue nevi, five Spitz nevi, 17 dysplastic nevi and 20 cases of primary invasive malignant

melanoma. While all malignant melanoma, spitz nevus and blue nevus cases from 7 years in our archive were included in the study, randomly selected cases of benign nevus and dysplastic nevus were included in the study. Since the number of cases of benign and dysplastic nevi in 7 years was large, the cases were randomly selected with the number of cases similar to the other cases. The patients' paraffin-embedded blocks were retrieved from the archive and eligible blocks of lesions were selected.

Sections of 4-micron thickness were obtained from 81 formalin-fixed, paraffin-embedded tissues for IHC analysis and positive-charged microscope slides were used to avoid tissue shedding. The sections were allowed in an incubator at 60°C for an hour and deparaffinized with xylene for 15 minutes. The samples were hydrated through descending-grade series of alcohol and washed in distilled water. Samples were then introduced to a BenchMark XT device. Antibodies for p16 (ABM, 1:100) and CD117(Ventana, RTU) were applied and staining was performed. The samples stained in the automated staining device were covered using fluid-based covering material. Results were evaluated with an Olympus CX41 light microscope.

Analysis of data

For each case, both H&E (hematoxylin-eosin) and IHC slides were analyzed by two pathologists concurrently. Only nuclear staining was accepted positive during the evaluation of p16 staining pattern. The p16 staining was scored as follows: 3 (>50% positive cells), 2 (11–50% positive cells), 1 (1–10% positive cells), 0 (0% positive cells).[1]

CD117 immunostaining was graded with a semiquantitative approach as follows: 0 (no staining), 1+ (1–10% staining), 2+ (11–29% staining), 3+ (30–50% staining) or 4+ (>50% staining).[11] CD117 staining pattern was assessed both in the cytoplasm and the cytoplasmic membrane.

Statistical method

Patient demographics and data were analyzed using the SPSS 24 program. Variables were expressed as frequency, percentage, mean (arithmetic mean, median), standard deviation (min-max), tables and graphs. ANOVA was used to compare the variables between diagnostic groups. $p<0.05$ was considered statistically significant.

Ethics committee approval

The study was approved by the Non-Interventional Clinical Trials Ethics Committee (Decision no 2020.116.05.17). The research has been prepared in accordance with the Declaration of Helsinki Principles.

Results

Mean age of the 81 patients was 40.4 years (min: 8, max: 93). There were a total of 81 patients including 27 with intradermal nevus (33.3%), 20 with primary malignant melanoma (24.7%), 17 with dysplastic nevus (21%), 12 with blue nevus (14.8%) and five with Spitz nevus (6.2%). Three of the displastic nevi cases had mild, three of had severe atypia and others had moderate atypia. Although dysplastic nevi were divided into groups as mild, moderate and severe, all of them were considered as a single group when evaluating the staining results. The difference in p16 and CD117 staining between all melanocytic groups was statistically significant ($p<0.01$). A post-hoc test comparing the groups in pairs revealed a significant loss of p16 expression in melanoma cases compared to benign and precursor melanocytic lesions. In addition, a significant loss of p16 expression was also noted in cases of dysplastic nevus compared to those with intradermal nevus. A dysplastic nevus case with complete p16 loss included severe dysplasia. P-values of the differences in p16 and CD117 expression across diagnoses are shown in Table 1. The p16 and CD117 IHC staining of the cases are presented in Figure 1.

While a high level of p16 expression was observed in intradermal nevi, Spitz nevi and blue nevi, the expression was significantly reduced in dysplastic nevi, which represent melanocytic lesions with low risk of progression, and almost complete loss of staining was detected in invasive melanoma.

Table 2 presents the p16 staining pattern of the cases.

Table 1. P-values of the differences in p16 and CD117 expression across diagnoses.

Diagnosis		Malignant melanoma	Spitz nevus	Dysplastic nevus	Intradermal nevus	Blue nevus
Malignant melanoma	p16	X	**0.01**	**0.049**	**0.01**	**0.01**
	CD117	X	0.73	1	**0.01**	0.55
Spitz nevus	p16	**0.01**	X	0.12	0.99	0.77
	CD117	0.73	X	0.75	**0.07**	1
Dysplastic nevus	p16	**0.049**	0.12	X	**0.01**	0.48
	CD117	1	0.75	X	**0.01**	0.6
Intradermal nevus	p16	**0.01**	0.99	0.01	X	0.47
	CD117	**0.01**	**0.07**	**0.01**	X	**0.002**
Blue nevus	p16	**0.01**	0.77	0.48	0.47	X
	CD117	0.55	1	0.6	**0.002**	X

*Measurements that are statistically significant (p value<0.05) are indicated in bold. ANOVA was used to compare the variables between diagnostic groups.

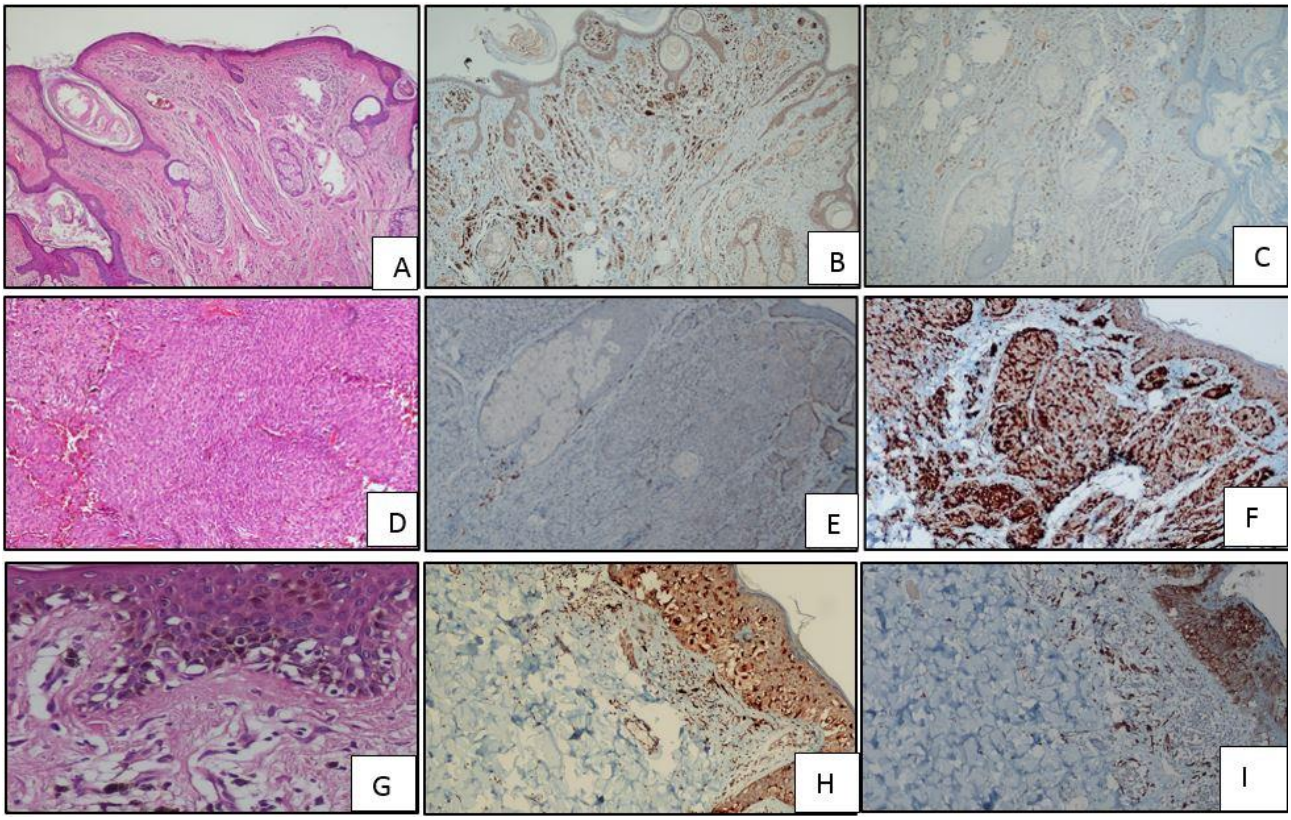

Figure 1. The p16 and CD117 IHC staining of the cases A) Nevus H&E x100, B) Nevus p16x100, C) Nevus CD117x100 D) Malignant Melanoma H&E x100, E) Malignant Melanoma p16 x100, F) Malignant Melanoma CD117x100 G) Displastic nevus H&E x100, H) Displastic nevus p16x100, I) Displastic nevus CD117 x100

Table 2. p16 immunohistochemical staining pattern of all lesions.

Diagnosis	p16 mean value	Score 0	Score 1	Score 2	Score 3	Total
Malignant melanoma	1.25±0.26	8	1	9	2	20
Spitz nevus	3±0	0	0	0	5	5
Dysplastic nevus	2±0.86	1	3	8	5	17
Intradermal nevus	2.85±0.08	0	1	2	24	27
Blue nevus	2.5±0.9	0	3	0	9	12

ANOVA was used to compare the variables between diagnostic groups

No CD117 expression was detected in intradermal nevi whereas significantly increased expression was observed in Spitz nevi as well as blue nevi. A high level of expression was seen in invasive primary melanoma and in dysplastic nevi. Table 3 presents the CD117 staining pattern of the cases.

Table 3. CD117 immunohistochemical staining pattern of all lesions

Diagnosis	CD117 Mean value	Score 0	Score 1	Score 2	Score 3	Score 4	Total
Malignant melanoma	2.25±0.3	2	4	7	1	6	20
Spitz nevus	1.6±0.5	1	1	2	1	0	5
Dysplastic nevus	2.24±0.3	0	7	2	5	3	17
Intradermal nevus	0.26±0.1	21	5	1	0	0	27
Blue nevus	1.67±0.3	1	5	4	1	1	12

ANOVA was used to compare the variables between diagnostic groups

Discussion

Our study supports that using p16 and CD117 together may provide an important marker combination to aid in distinguishing melanoma from benign lesions and benign lesions from potential precursor melanocytic lesions. In particular, p16 will be useful in differentiating malignant melanoma with dysplastic nevus containing severe atypia and CD117 in separating mild and moderate dysplasia nevus from benign nevi. A portion of melanocytic tumors require adjunct tools for pathologists to determine their malignancy potential due to the diagnostic difficulties encountered with these tumors. Although immune markers such as S100, Ki67, HMB45, Melan-A are Sox10 are commonly used in routine practice, these may fall short to establish the diagnosis and finalize differential diagnosis of melanoma[5]. After the KIT mutation was first described in melanoma, further mutations have been detected in exon 11, 13 and 17 of KIT in cutaneous melanomas.[12] Mutations in exon 11 and *K642E* point mutations of exon 13 are known to be the most important subsites of genetic alteration.[18-20] Furthermore, KIT gene amplification has been detected in approximately 30% of melanoma cases bearing a KIT mutation.[18,19] Using IHC, Torres-Cabala et al. demonstrated a significant relationship between the percentage of CD117-positive cells and KIT mutation status in melanoma.[21] There are also studies in the literature that have shown C-KIT expression in 31% of melanomas without detectable KIT mutation or amplification.[22] Although reported rates may vary based on the subtype of melanoma, IHC results show CD117 expression in approximately 53.7% of primary cutaneous melanomas and in more than 80% of metastatic melanomas.[22,23]

Pilloni et al. applied IHC for CD117 in 60 melanocytic lesions and reported that the CD117 expression in melanocytes located in dermis may aid the differential diagnosis between superficial invasive melanoma and compound nevus or intradermal nevus.[24] They suggested that CD117 may offer a useful diagnostic tool to distinguish benign compound nevi from malignant melanocytic lesions with dermis invasion and metastatic melanoma from primary melanoma.[24]

The present study showed that the CD117 IHC marker is not expressed in cases of intradermal nevus while near-complete expression is observed in cases of Spitz nevus and blue nevus, invasive melanoma and dysplastic nevi. Our results support that the CD117 IHC marker may be used as a marker for the differential diagnosis of invasive melanoma, especially in distinguishing them from compound nevi with dermal component. The finding that there was no CD117 staining greater than 30% in any case of intradermal nevus indicates that this marker is considerably successful in distinguishing these nevi from other lesions based on the diffuse staining. Furthermore, we observed that it may be a valuable marker also in distinguishing cases of intradermal nevus from rare blue nevi and Spitz nevi as well as dysplastic nevi, which represent precursor melanocytic lesions.

KIT mutations are seen in about 70-80% of GIST cases where this mutation plays a key role in treatment. The high rates of response treatment in GIST have led to studies with imatinib and similar therapeutics in patients with melanoma bearing KIT mutations, and screening for KIT mutations may offer novel treatment options for melanoma patients with poor prognosis.[25] In the present study, CD117 expression score was 1+ in four out of the 20 cases with primary invasive cutaneous

melanoma, 2+ in seven, 3+ in one and 4+ in six. The CD117 expression we observed in cases of invasive melanoma suggests that it may be relevant to investigate potential treatment with tyrosine kinase inhibitors in these tumors.

Upon detection of germline *CDKN2A* in cases of melanoma, studies on p16 IHC to distinguish benign melanocytic lesions, particularly from sporadic melanoma have demonstrated loss of p16 expression in melanomas.[26] Subsequent studies revealed that p16 mutation rate is lower also in atypical/dysplastic nevi compared to that in melanoma cases.[9] Studies suggest that p16 IHC may be used to distinguish melanoma from benign nevi, especially in the case that nuclear staining is taken into account.[3,14]

Koh and Cassarino reviewed all studies on p16 IHC in melanocytic lesions in the literature and published the pooled results of these studies.[3] They reported the rate of p16 IHC staining as 61-100% in benign nevi and 12-93% in primary cutaneous invasive melanoma, highlighting the broad range of findings[3]. While some of the studies support the diagnostic use of p16 IHC to distinguish nevi from primary invasive melanoma, others report a lack of significant difference in staining pattern between these entities.[3,27-30] However, the shared results of studies analyzing nodal metastases recommend using p16 IHC to distinguish nodal nevi from nodal metastatic melanoma.[3,31,32]

Studies on atypical nevi support that including p16 in the immune panel is useful in terms of distinguishing mild to moderate atypical cellular blue nevi from severe atypical blue nevi and melanomas. In this study dysplastic nevi were evaluated as a single group, while staining results were evaluated because our case numbers were small. On the other hand, they revealed loss of p16 in severe atypical cases similar to the cases of melanoma. Re-analysis of study results based on p16 staining pattern demonstrated p16 staining in 89-100% of benign nevi versus 50-68% in primary invasive melanoma when only nuclear staining was recognized as positive. According to this review that included several studies, the diagnostic value of p16 appears limited in melanocytic lesions; however, it supports the use of p16 IHC in the immune panel to distinguish benign nevi and dysplastic lesions from melanoma in the event that only nuclear staining is taken into account.[3]

We considered only nuclear staining in our evaluation. High-level p16 expression was present in all benign lesions included in our study. We observed a heterogeneous staining pattern in dysplastic nevi. Our observations reflect that p16 is a useful marker to distinguish invasive melanoma from benign nevi when the nuclear and strong diffuse staining rates over 50% are considered for evaluation. We did not detect total loss in any of the cases with intradermal nevus, Spitz nevus or blue nevus. Therefore, one may conclude that loss of p16 is considerably specific for melanoma with dermal dominance, although with a lower rate of sensitivity.

While organizing our study, we prepared the case groups homogeneously, but the limitation of our study is that the only malignant group was invasive melanoma and the other groups were benign.

Conclusions

In conclusion, we believe adding p16 and CD117 IHC analyses to other routine markers in the immune panel for melanocytic lesions may allow a more successful approach in diagnosis compared to the current situation. In this regard, attention must be paid to the multiple-pattern staining features of p16 and nuclear staining should be considered for evaluation. In the present study, the p16 score was 0 in eight out of the 20 melanoma cases, 1+ in one, 2+ in nine and 3+ only in 2 cases. Since total loss of p16 is observed only in melanoma, p16 IHC may be useful in the differential diagnosis of melanocytic lesions with dermal component. Furthermore, we believe the CD117 expression results of our study may light the way for future studies with tyrosine kinase inhibitors in malignant melanoma.

Ethics Committee Approval

The study was approved by the Non-Interventional Clinical Trials Ethics Committee (Decision no 2020.116.05.17). The research has been prepared in accordance with the Declaration of Helsinki Principles.

Author Contributions

Idea, design, collection of resources, analysis and interpretation of results and literature, written and critical: SK, AİA.

Conflict of Interest

There is no conflict of interest among the authors.

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There is no financial disclosure.

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These research results have not previously been presented.

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Validity and reliability study for Turkish adaptation of water balance questionnaire

Su dengesi ölçeği'nin Türkçe'ye uyarlanması geçerlik ve güvenirlik çalışması

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Abstract

Aim: The aim is to adapt the Water Balance Questionnaire (WBQ), to Turkish society, assess its validation and reproducibility.

Materials and Methods: 301 healthy adult individuals were included in the methodological study. First, linguistic equivalence was ensured, and expert opinions were obtained before piloting. For validation, 24-hour dietary recall (24HR), urine pH and urine specific gravity (USG) were used. To assess reliability, it was administered twice with a two-week interval.

Results: The questionnaire had strong and significant correlation with 24HR (r=0.771; p<0.001), and strong, negative, and significant correlation with USG (r=-0.630; p<0.001), and strong, positive and significant correlation with urine pH (r=0.604; p<0.001). The test-retest correlation was 0.98.

Conclusion: The WBQ, is a valid and reliable questionnaire. In the future, studies can be conducted to determine the hydration status of larger populations and groups suffering from dehydration by using WBQ.

Keywords: Water intake; Water loss; Water balance; Validity and reliability; Hydration.

Öz

Amaç: Bu çalışmada Su Dengesi Ölçeği'ni (SDÖ) Türk toplumuna uyarlamak, validasyonu ve tekrar elde edilebilirliğini değerlendirmek amaçlanmıştır.

Gereç ve Yöntem: Metodolojik tipteki bu çalışmaya 301 sağlıklı yetişkin birey katılmıştır. İlk aşamada ölçeğin dil eşdeğerliği sağlanıp uzman görüşleri alınmış, ardından pilot uygulama yapılmıştır. Validasyan aşamasında 24 saatlik geriye dönük besin tüketim kaydı, idrar pH'ı ve idrar özgül ağırlığı kullanılmıştır. Güvenirliğin değerlendirilmesinde ölçek örnekleme 2 hafta ara ile ikinci kez uygulanmıştır.

Bulgular: Ölçek ile yirmi dört saatlik geriye dönük besin tüketim kaydı arasında güçlü düzeyde (r=0,771; p<0,001), idrar özgül ağırlığı ile negatif yönde, güçlü düzeyde (r=-0,630; p<0,001), idrar pH'sı ile pozitif yönde, güçlü düzeyde (r=0,604; p<0,001) anlamlı ilişki olduğu belirlenmiştir. Ölçeğin test-tekrar test korelasyonu 0,98 olarak bulunmuştur.

Sonuç: Su Dengesi Ölçeği, genel popülasyon için geçerli ve güvenilir bir ölçektir, SDÖ kullanılarak daha geniş popülasyonlar ve dehidrasyondan muzdarip grupların hidrasyon durumunun saptanabileceği çalışmalar yapılabilecektir.

Anahtar Kelimeler: Su alımı; Su kaybı; Su dengesi; Geçerlilik ve güvenilirlik; Hidrasyon.

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Introduction

Euhydration defines the state of body water content at the optimal level of 280–290 mOsmol/kg and urine specific gravity optimal level of 1.005-1.030 g/cm³.[1] Research has demonstrated that euhydrated individuals are associated with a low rate of mortality from coronary heart disease and a low risk of developing kidney stones.[2,3] Euhydration has been further reported to reduce urolithiasis, the incidence of constipation, and the risk of exercise-induced asthma.[4] It has been reported that mild dehydration that occurs due to changes in body water balance may cause thirst, fatigue, weakness, dry mouth, sleepiness, agitation, and decreased concentration, while moderate dehydration may lead to thirst, fatigue, headache, incoordination, dyspnea and cognitive dysfunctions and severe dehydration to delirium, coma and death.[5,6,7] Therefore, dehydration assessment is highly important in terms of individual and public health.[8] The literature contains very limited information on the daily water requirement for various populations as well as the hydration level required for the prevention and treatment of chronic diseases and urinary system infections.[7,9-11] This is due to the facts that hydration is affected by several confounding factors, that there is no measurement method considered as gold standard for an accurate determination of hydration, and that the available methods are not cost-effective and require time.[10-12] The European Food Safety Authority (EFSA) has indicated the need for a practical, low-cost and non-invasive tool for hydration assessment.[11]

Malisova et al. were the first to develop a Water Balance Questionnaire (WBQ), which is a practical and non-invasive screening tool to determine the water balance by identifying individuals water loss from sweating, defecation and urination, and water from beverages, foods and drinking water, and reported the WBQ to be a valid and reliable tool.[8] Recently, there has been an increasing number of studies intended to establish hydration and its relationship with health in various populations in several countries upon the increased contribution of fluids to daily energy intake worldwide, the better understanding of the impact of euhydration on prevention of diseases and its significant role in treatment and maintaining health status, and the development of screening tools for this purpose.[13,15-17] However, there has been no study conducted yet in Turkey the general population or various groups, except for athletes in order to establish individuals' total daily water intake and hydration status, and there is no practical and cost-effective screening tool to determine individuals' total water intake and evaluate water loss and hydration state.[18]

The present study aimed to adapt the WBQ, which can be used for preventive health services, treatment and scientific research on this matter to the Turkish population, and to assess the validity and reproducibility of the questionnaire.

Materials and Methods

Type of research

The population of this methodological study consisted of individuals working at a medical center in Istanbul province, and individuals presenting at the medical center for checkup. The WBQ and urine analyses were administered under similar weather conditions in the same medical center at Istanbul. The average temperature during the two periods that the repeatability testing and validity occurred was 4.6 °C (T.C. Ministry of Agriculture and Forest, General Directorate of Meteorology, Istanbul, Turkey).

The universe and sample of the research

The study sample was determined by simple random sampling, and the study was conducted between December 2018 and January 2020. As reported in the literature, a sample size of minimum 300 is required for a valid and reliable scale and a minimum 30 pairs of data is required for test-retest reliability assessment.[19] A power analysis was made to determine the sample size, revealing that a minimum sample size of 258 was required for the correlation between two qualitative variables at a minimum level of 0.200 (weak) to be statistically significant at α=0.05 and with a power of 90%.

Accordingly, the study included 330 individuals aged 18–60 years, who did not have diabetes, cancer, liver diseases, kidney diseases, hypertension, cardiovascular diseases or gastrointestinal diseases, who had not made any significant dietary changes for the last six months, who were not using any hypertensive, diuretic or antibiotics, who were not alcohol consumers of high levels (2 and 3 units for femeles and males, respectively), who did not have cold, flu and fever, who did not have any urinary system disease and who agreed to participate in the study. A total of 29 individuals who had failed anthropometric measurements (n=2), provided incomplete or incorrect responses to questions (n=6) and were identified to have urinary tract infection (n=21) were excluded. As a result, the study sample consisted of 301 participants with 96 (31.9%) males and 205 (68.1%) females. Table 1 presents descriptive characteristics of the study participants.

Table 1. Sample characteristics.

	Male (n=96)		Female (n=205)		Total sample	
	mean±SD	min-max	mean±SD	min-max	mean±SD	min-max
Age (year)	35.7±11.9	18-59	37.1±12.2	18-59	36.7±12.1	18-59
Height (cm)	180.0±0.1	158.0-190.0	160.0±0.1	150.0-180.0	165.0±0.1	149.0-190.0
Weight (kg)	80.4±9.1	60.0-102.0	64.4±10.2	43.0-95.0	69.5±12.4	43.0-102.0
BMI (kg/m^2)	26.0±2.9	20.3-33.9	25.4±4.5	15.6-40.5	25.6±4.1	15.6-40.5

Food frequency questionnaire (FFQ), diet history questionnaire, isotope analyses and biochemical markers have been recommended for use as a reference method to assess validity in studies on nutrition.[20,21] To assess the validity of the Turkish adaptation of the WBQ, a 24HR, urine pH and urine specific gravity (USG) were used. First, the WBQ was administered to the participants at the first interview, and then the 24HR and urine samples were collected; participants' body weight and height were measured (Body Composition Analyser Tanita/MC 780 ST, Leister Height measure, Corporation of America, Arlington Heights, IL, USA) and body mass index (BMI) were calculated. Within the scope of test-retest for the assessment of questionnaire reliability, the participants were administered the WBQ for the second time using the face-to-face interview method two weeks after each participant's first interview.

Data collection tools

Water balance questionnaire

It was designed to be comprehensive, explicit, short, simple and non-perplexing as well. The WBQ included a series of questions regarding: (a) the profile of the individual; (b) consumption of solid and fluid food; (c) drinking water or beverage intake; (d) physical activity; (e) sweating; (f) urination and defecation and (g) trends on fluid and water intake. Water balance is calculated by subtracting total water loss (sweating, defecation, urination) from total water intake (water from beverages, water from foods, water from drinking water). The body water intake from foods and beverages was determined using a food frequency questionnaire and a beverage consumption beverage frequency questionnaire, and the water content of foods was determined using the 'Nutrition Information System' (BeBIS 8.1, Blue Apple Software, Istanbul, Turkey), which is a computer-aided nutritional program developed for Turkey. Details of the WBQ has been explained in the study of Malisova et al.[8]

Urine biomarkers

Urine samples of the participants were collected between 09.00–10.00 A.M. at as their first urine in the morning minimum 50 ml in a 100 ml sterile containers, and analyzed immediately using urinalysis strips (ACON Insight Xpert, San Diego, CA, USA). Urine specific gravity and pH were evaluated based on the reference values of 1.005–1.030 g/cm³ and 5–8, respectively that were used at the medical center's laboratory. In dehydration state, urine specific gravity increases above 1.030 g/cm³ and urine pH decreases below 5.[1] The urine biomarker values were found to be within physiological range for all participants (Table 2).

Table 2. Biochemical urine markers characteristics.

	Male (n=96)		Female (n=205)		Total sample	
	mean±SD	min-max	mean±SD	min-max	mean±SD	min-max
Urine specific gravity (g/cm^3)	1019.3±7.5	1006-1030	1017.8±5.8	1006-1030	1018.3±6.4	1006-1030
Urine pH	6.1±0.6	5.0-7.2	6.1±0.4	5.1-7.4	6.1±0.5	5.0-7.4

Twenty four-hour dietary recall

The daily water intake of study participants was determined through the 24HR. The water from foods and beverages was calculated using BeBIS 8.1.

Data analysis

Statistical analyses were performed using the Number Cruncher Statistical System 2007 (NCSS; Kaysville, Utah, USA) program. The Pearson correlation analysis was used to evaluate the associations between quantitative variables. The strength of correlation was evaluated using Evans'classification. Test and retest measurements were compared using the dependent samples t-test, and the Pearson correlation analysis was used to establish the extent of the correlation between test and retest measurements. The agreement between test and retest measurements was analyzed using the Bland-Altman plots. A p value of <0.05 was considered statistically significant.

Ethical aspect of the research

The study protocol was approved by Relevant University Faculty of Medicine Clinical Research Ethics Committee (Ethics Committee Number: 09.2018.785). Institutional permission was obtained from the center where the study was conducted.

Results

Equivalance of language and content validity

For the linguistic equivalence of the questionnaire, first the necessary permission was obtained from the researchers who developed the questionnaire. The linguistic equivalence of the questionnaire was provided using the standard translation-back translation method, as reported to be an effective method in the literature.[22] During the translation step, the original questionnaire was translated into Turkish by three individuals who could speak both languages fluently, were familiar with the culture involved in the research and had knowledge of the constructs to be measured. Then, the items from three Turkish versions were compared, and the items with same translation were identified, resulting in the draft version. Subsequently, the questionnaire was translated from Turkish back into English by two individuals who had good command of both languages and who were living abroad. The original questionnaire and the one translated back to English were compared, and were found to be in agreement. Foods not consumed by the Turkish population (pork meat and bacon), traditional Greek dishes (gigandes plaki, sesame-covered Thessaloniki bread, pastitsio, anthotyro and manouri) and beverages (Greek coffee, milkshake and sorbet) in the food frequency and beverage frequency sections of the WBQ were removed from the questionnaire. Instead, food commonly consumed by Turkish population but not included in the questionnaire Turkish bagel, corn bread, flatbread, lahvash, soujouk, pastrami, giblets, tarhana, lentil, ezogelin soup, lentil patties, Turkish bulgur salad, Turkish noodles, Turkish type ravioli, kebabs, stews, dates, burek and other pastries, halvas, syrup sweets, molasses and tahini) and beverages specific to the country (sahlep, Turkish coffee, ayran, kefir, boza and turnip juice) were added to the proper sections by considering their water content provided in the TürKomp (National Food Composition Database) and BeBIS databases. Portions of the foods and beverages included in the questionnaire were based on the portions specified in the Turkish Guidelines on Nutrition.[23]

The questionnaire that was finalized according to the expert opinion was administered to 30 individuals who were representatives of the target population, met the study inclusion criteria and were not included in the study sample, and comprehensibility of the items was examined through questions such as "What do you think this question asks?" or "What does this

question mean?". After the pilot study, some statements were simplified and the response time for the questionnaire was found to be 10–15 minutes.

For the content validity assessment of the WBQ, seven experts were asked to provide their opinion on the questionnaire and expert opinions were evaluated using the Content Validity Index (CVI). A CVI higher than 0.80 was considered acceptable for content validity.[24] The total CVI of the Turkish version of the WBQ was 0.86. Turkish of WBQ is rendered as a supplement.

Validity of WBQ

The validity of the WBQ was evaluated by analyzing the correlation between the water balance from the questionnaire, and USG and pH. Accordingly, as shown in Table 3, there was a strong negative correlation between water balance and USG values (r=-0.630, p<0.001), and a strong positive correlation between water balance and urine pH values (r=0.604; p<0.001). When the correlation between the WBQ and the 24HR was examined, there was a very strong positive correlation with water from beverages and drinking water (for drinking water and beverages, r=0.988, r=0.954, respectively; p<0.001), a weak positive correlation with water from foods (r=0.398; p<0.001) and a strong positive correlation with total water intake (r=0.771; p<0.001) (Table 4).

Table 3. Relationship between WBQ and biochemical urine markers

Urine markers	Water balance	
	r	*p*
Urine specific gravity	-0.630	<0.001*
Urine pH	0.604	<0.001*

Pearson correlation analysis, *p<0.001 r: pearson correlation coefficient

Table 4. Relationship between WBQ and 24-hour dietary recall

24-hour dietary recall	correlation with questionnaire	
	r	*p*
Total (n=301)		
Water total consumption (ml/day)	0.771	<0.001*
Water from foods (ml/day)	0.398	<0.001*
Water from liquids (ml/day)	0.988	<0.001*
Water from water (ml/day)	0.954	<0.001*
Male (n=96)		
Water total consumption (ml/day)	0.950	<0.001*
Water from foods (ml/day)	0.996	<0.001*
Water from liquids (ml/day)	0.996	<0.001*
Water from water (ml/day)	0.927	<0.001*
Female (n=205)		
Water total consumption (ml/day)	0.703	<0.001*
Water from foods (ml/day)	0.336	<0.001*
Water from liquids (ml/day)	0.985	<0.001*
Water from water (ml/day)	0.965	<0.001*

Pearson correlation analysis, *p<0.001 r: pearson correlation coefficient

The water from beverages from the questionnaire was statistically significantly greater than the water from beverages from 24HR (712.2. L vs. 681.7 L, p<0.001). There was no statistically significant difference between total water intake (foods, beverages, drinking water) from the WBQ and total water intake (foods, beverages, drinking water) from the 24HR (p>0.05) (Table 5).

Reliability of WBQ

The reliability of the WBQ was evaluated through test-retest comparison, and the results are provided in Table 6. Accordingly, there was no statistically significant difference in total water intake, water from foods, water from beverages, water from drinking water, body water loss and body water balance between the two measurements (p>0.05). The test-retest correlation analysis revealed a very strong positive correlation between total water intakes (r=0.985; p<0.001), a very strong positive correlation between water from foods (r=0.996; p<0.001), a very strong positive correlation between water from beverages (r=0.997; p<0.001), a very strong positive correlation between consumptions of drinking water (r=0.984; p<0.001), a very strong positive correlation between body water loss amounts (r=0.950; p<0.001) and between

body water balance values (r=0.954; p<0.001).

Table 5. Comparison of WBQ and 24-hour dietary recall.

	WBQ	24-hour dietary recall	difference	*p*
Total (n=301)				
Water total consumption (ml/day)	2821.6±610.2	2774.8±794.3	46.8±505.8	0.109
Water from foods (ml/day)	768.3±183.0	748.0±510.0	20.3±468.3	0.452
Water from liquids (ml/day)	712.2±360.5	681.7±361.0	30.5±54.8	<0.001*
Water from water (ml/day)	1341.0±579.1	1345.1±598.5	-4.1±180.5	0.697
Male (n=96)				
Water total consumption (ml/day)	2753.7±704.6	2842.9±642.1	-89.2±221.9	<0.001*
Water from foods (ml/day)	723.9±190.6	678.9±190.5	45.0±16.8	<0.001*
Water from liquids (ml/day)	696.7±371.9	725.8±372.0	-29.1±34.0	<0.001*
Water from water (ml/day)	1378.1±582.4	1393.2±544.7	-15.1±218.1	0,499
Female (n=205)				
Water total consumption (ml/day)	2784.6±834.5	2811.6±596.1	-26.9±593.3	0.516
Water from foods (ml/day)	789.1±176.0	780.3±601.8	8.8±567.4	0,824
Water from liquids (ml/day)	674.7±356.6	705.9±355.7	-31.2±62.2	<0.001*
Water from water (ml/day)	1329.6±606.6	1316.6±594.2	13±159.6	0.244

Samples t-test, *p<0.001

Table 6. Results of the reliability procedure.

	First recording of the WBQ	Second recording of the WBQ	difference	***p***
Total (n=301)				
Water total consumption(ml/day)	2821.6±610.2	2824.7±615.5	3.1±89.8	0.547
Water from foods (ml/day)	768.3±183.0	769.6±183.9	1.3±11.4	0.051
Water from liquids (ml/day)	712.2±360.5	712.2±360.5	0.00±0.00	0.999
Water from water (ml/day)	1341.0±579.1	1342.9±583.6	1.8±89.1	0.722
Water loss (ml/day)	2001.3±675.4	1999.7±692.2	-1.6±224.8	0.900
Water balance (ml/day)	820.2±800.1	824.9±798.1	4.8±242.4	0.734
Male (n=96)				
Water total consumption (ml/day)	2842.9±642.1	2838.9±650.2	4.1±62.9	0.529
Water from foods (ml/day)	723.9±190.6	726.1±191.4	-2.2±13.3	0.109
Water from liquids (ml/day)	725.8±372	725.8±372	6.3±61.2	0.320
Water from water (ml/day)	1393.2±544.7	1387±554.9	28.5±328.7	1.000
Water loss (ml/day)	2101.9±836.2	2073.4±834.7	-24.4±335.0	0.398
Water balance (ml/day)	741±940.7	765.4±910.8	4.1±62.9	0.477
Female (n=205)				
Water total consumption (ml/day)	2811.6±596.1	2818.1±600.1	-6.5±99.9	0.354
Water from foods (ml/day)	789.1±176	790±177.2	-0.9±10.5	0.236
Water from liquids (ml/day)	705.9±355.7	705.9±355.7	-5.6±99.4	1.000
Water from water (ml/day)	1316.6±594.2	1322.2±596.7	-10.9±153.3	0.420
Water loss (ml/day)	1954.2±581.5	1965.2±613.5	4.5±184.1	0.308
Water balance (ml/day)	857.3±724.5	852.9±740.2	-6.5±99.9	0.729

Samples t-test, p<0.0

Figure presents the Bland-Altman plots for the test-retest data of the WBQ. Accordingly, the average values were close to zero and the test-retest differences were within the limits of agreement, except for a few outliers. Concordantly, there was an agreement between test and retest measurements.

Discussion

The present study was carried out on the Turkish adaptation of the WBQ developed by Malisova et al., as well as the validity and reliability analyses. The review of literature shows that dietary recall have been used as a reliable method in the validation studies of FFQ, beverage intake questionnaires (BIQ) and WBQ.[17, 25] The study by Malisova et al. for the development of the original questionnaire reported that the daily water intake from the questionnaire (1.920±35.5 ml) was significantly lower than the daily water intake from the three-day food intake record (2.264±79 ml).[8] Karabudak and Köksal's Turkish adaptation study for the BIQ reported that the water intake from the 24HR (1.120±49.5 ml/day) was lower than the water

intake from the questionnaire (1.990±46.3 ml/day).[24] Likewise, the present study found that the water intake from foods and beverages from the WBQ was higher than the water intake from the 24HR. While the present study established a strong correlation between total water intakes from the questionnaire and from the 24HR, Karabudak and Köksal similarly demonstrated a very strong correlation between all beverage intakes on the assessment tool, except for alcoholic beverage intake.[24]

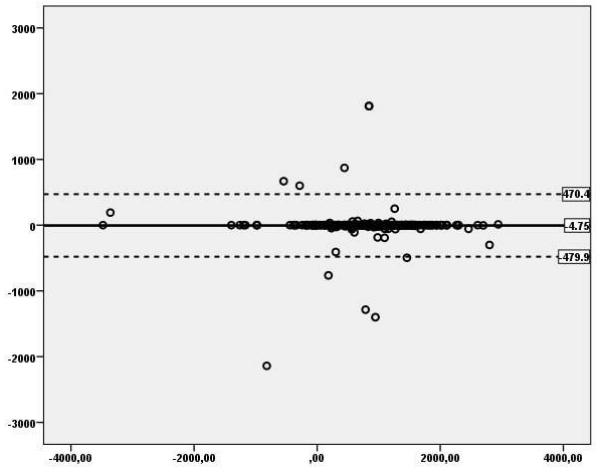

Figure 1.1 Average from water balance of both administrations

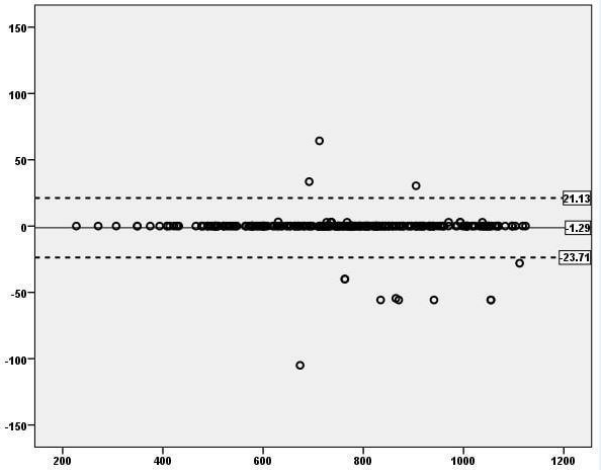

Figure 1.2 Average from water from foods of both administrations

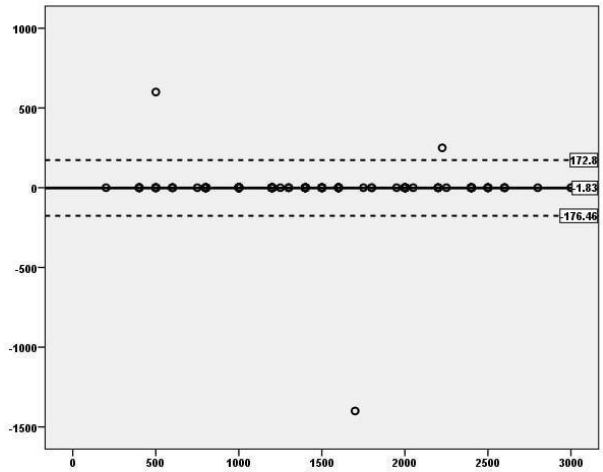

Figure 1.3 Average from drinking water of both administrations

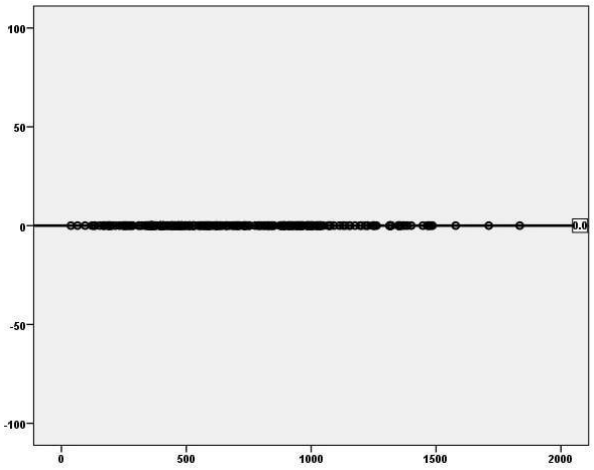

Figure 1.4 Average of water from beverages of both administrations

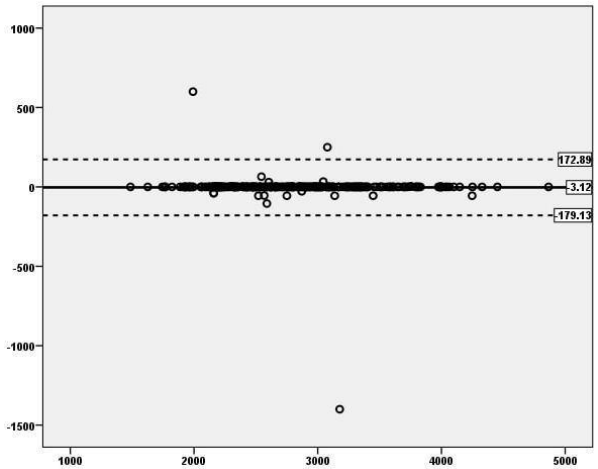

Figure 1.5 Average from total water ıntake of both administrations

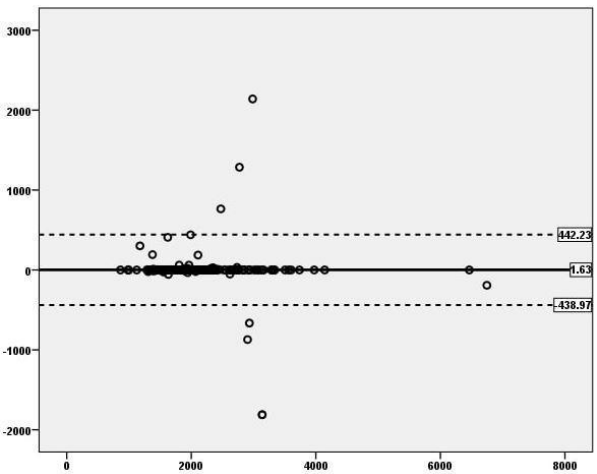

Figure 1.6 Average from water loss of both administrations

When compared with the 24HR, the Turkish adaptation of the WBQ was found to accurately determine water from foods, beverages and drinking water.

When the water balance from the questionnaire and the urinary biomarkers were compared as part of the validity assessment of the Turkish adaptation of the WBQ, there was a strong positive correlation between water balance from the questionnaire and urine pH values, and a strong negative correlation between water balance from the questionnaire and USG values. Malisova et al. in turn, did not establish any correlation between water balance, and USG and urine pH values.[8] Hedrick et al. and Karabudak and Köksal reported a weak negative correlation between USG and fluid intake. When compared with USG and pH, the Turkish adaptation of the WBQ was found to accurately determine water balance.[26,27]

As part of the reliability analysis of the Turkish adaptation of the WBQ, test-retest reliability was evaluated to establish time invariance. In line with the literature, the questionnaire was re-administered to the study sample at two weeks intervals, and the correlation between the two measurements was evaluated. Accordingly, no statistically significant difference was established in participants' total water intake, water from foods, water from beverages, water from drinking water, body water loss and body water balance between two measurements, as in the studies by Malisova et al.[8,24]

Some limitations exist in this investigation. Firstly, participants completed the self-administrated WBQ and 24HR. So subjects were prone to underestimate their beverage and food intake when they kept dietary records. Secondly, no clinical and practical method in the literature determines the hydration status through feces and sweat. Therefore, only urine biomarkers were used. Thirdly, there isn't a gold standard method assessing hydration status in the literature. This suggests that a combination of indices may be appropriate in depicting hydration status. In this study, urine specific gravity and pH methods are used.

Conclusion

In conclusion, the Turkish adaptation of the WBQ is a valid and reliable tool to evaluate individuals' water balance, water intake, water loss and fluid consumption habits. In this way, it can identify nutritional reasons that cause dehydration. The Turkish version of WBQ can be used to evaluate the effectiveness of hydration in the prevention and treatment of diseases. It is a device-free, practical and fast method that can be used to determine the effectiveness of hydration strategies and hydration education interventions used to prevent dehydration, especially in groups at risk of dehydration (athletes, the elderly, heavy workers).

Ethics Committee Approval

The study protocol was approved by Relevant University Faculty of Medicine Clinical Research Ethics Committee (Ethics Committee Number: 09.2018.785). Institutional permission was obtained from the center where the study was conducted.

Informed Consent

All participants signed the Informed Consent Form and their consent was obtained.

Author Contributions

Idea, design, collection of resources, analysis and interpretation of results and literature, written and critical: NŞ and ŞA.

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Conflict of Interest

There is no conflict of interest among the authors.

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The effect of pilates on body awareness, activity level, aerobic capacity and balance in healthy young adults

Pilatesin sağlıklı genç yetişkin bireylerde vücut farkındalığı, aktivite düzeyi, aerobik kapasite ve denge üzerine etkisi

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Abstract

Aim: In this study, it was aimed to investigate the effects of Reformer Pilates on body awareness, activity level, aerobic capacity and balance in young adults.

Materials and Methods: Participants were consisted of Reformer Pilates (individuals who received a program of muscle strengthening and flexibility exercises; *n*=82) and sedentary groups (*n*=87). Body Awareness Questionnaire (BAQ), International Physical Activity Questionnaire Short Form (IPAQ-SF), YMCA 3-Minute Step Test, Single-Limb Stance Test (SLST), and Functional Reach Test (FRT) were used in the evaluations of the participants.

Results: A statistically significant difference was found in favor of the Reformer Pilates group in the scores of BAQ, IPAQ-SF mild level activity, YMCA 3-Minute Steps Test, SLST with eyes closed, and lateral FRT scores ($p<0.05$). In the sedentary group, heart rate change after the YMCA 3 min Step Test was statistically significantly higher ($p=0.001$).

Conclusion: Body awareness, aerobic performance, and balance scores were found to be better in individuals who practiced Reformer Pilates than in sedentary individuals.

Keywords: Reformer Pilates, Functionality, Balance, Body Awareness, Exercise.

Öz

Amaç: Bu çalışmada, genç erişkin bireylerde Reformer Pilatesin vücut farkındalığı, aktivite düzeyi, aerobik kapasite ve denge üzerine etkilerinin incelenmesi amaçlanmıştır.

Gereç ve Yöntem: Katılımcılar Reformer Pilates (kas güçlendirme ve fleksibilite egzersizi programı alan bireyler; n=82) ve sedanter (*n*=87) gruplarından oluşmaktaydı. Katılımcıların değerlendirmesinde Vücut Farkındalığı Anketi (VFA), Uluslararası Fiziksel Aktivite Anketi Kısa Form (UFAA-KF), YMCA 3-Dakika Basamak Testi Tek Ayak Üzerinde Durma Testi (TAÜDT) ve Fonksiyonel Uzanma Testi (FUT) kullanıldı.

Bulgular: VFA, UFAA-KF hafif düzey aktivite, YMCA 3-Dakika Basamak Testi, gözler kapalı TAÜDT ve yana FUT skorlarında Reformer Pilates grubu lehine istatistiksel olarak anlamlı farklılık bulundu ($p<0,05$). Sedanter grupta YMCA 3 dakikalık Adım Testi sonrası kalp hızı değişimi istatistiksel olarak anlamlı derecede yüksekti ($p=0,001$).

Sonuç: Reformer Pilatesi uygulayan bireylerin vücut farkındalığı, aerobik performans ve denge skorlarının sedanter bireylere göre daha iyi olduğu bulunmuştur.

Anahtar Kelimeler: Reformer Pilates; Fonksiyonellik; Denge; Vücut Farkındalığı; Egzersiz.

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Introduction

The World Health Organization (WHO) recommends physical activities of different severity specific to individuals of different age groups.[1] There is evidence that regular physical activity reduces the risk of various chronic diseases such as heart attack, stroke, diabetes, and cancer and positively affects overall health by improving mental health and quality of life.[1,2] Pilates is one of the popular and widespread physical activities throughout the world that can be recommended.[3] This exercise form has different classifications, such as classical, modern and clinical (modified) Pilates. It can be applied on a Mat or with the help of a tool (Reformer). Pilates is a physical method and a holistic approach that provides mental focus and reduces stress and anxiety.[4]

The number of studies on Pilates is increasing and diverse day by day. Pilates aims to develop body awareness through movements that are controlled, concentrated and accurately initiated, and complemented by appropriate efforts.[5] It is reported that Pilates positively affects the aerobic parameters of individuals with both healthy and limited aerobic capacity.[6] In addition to the effects on muscle strength and endurance, it is reported that Pilates improves balance by providing different proprioceptive inputs. Pilates may also improve balance scores regardless of the physical activity history of individuals.[7-10]

In the literature, Pilates-related studies generally include individuals with chronic diseases, geriatric and obese individuals who are at risk of falling, and only the effect of Pilates on certain parameters has been investigated.[11-15] Although it has been reported that Reformer Pilates increase body awareness, static and dynamic balance, general body flexibility, muscle strength, joint range of motion, and posture, studies evaluating different parameters together are insufficient.[7,16,17] The number of studies evaluating the effectiveness of Pilates on multi-faceted health components in groups including young and healthy subjects is limited.[18] Therefore, in our study, we aimed to investigate the effects of Reformer Pilates on body awareness, activity level, aerobic capacity, and balance in young adult healthy individuals.

Materials and Methods

The type of the study

Our study was designed as a descriptive observational study.

The population and the sample of the study

In our study, G*Power Analysis Program was used to determine the sample size. According to the results obtained from the study conducted by Tolnai et al., the effect size was determined as 0.129. With 95% power (Type-1 error=0.05), the number of participants was calculated as 124 participants (62 participants for each group).[14]

This study was a single-center, controlled study. Between 10.07.2020 and 10.01.2021, 90 individuals who perform Reformer Pilates regularly for at least 2 months and 98 individuals without any regular exercise or sports history in a similar age group were evaluated in terms of eligibility. Of these individuals, thirteen refused to participate in the study (Reformer Pilates group: n= 5; Sedentary Group: n=8). In addition, 6 individuals did not meet the inclusion criteria (3 Active athletes in Reformer Pilates Group; 3 with Chronic disease in sedentary Group) After the eligibility assessment, a total of 169 participants were included in the study (82 participants who performed Reformer Pilates regularly and 87 sedentary participants). The exercises were performed by a certified physiotherapist.

The inclusion criteria of the study were: to be between the ages of 18-30, to have the cognitive ability to understand and interpret the questions in the questionnaires, to perform only the Reformer type of Reformer Pilates for at least 2 months for the Reformer Pilates group and not to perform any regular exercise in the last 2 months for the sedentary group. Participants who had chronic, neurological, orthopedic, systemic, and/or pulmonary disease and individuals who had any other exercise/sport except Reformer Pilates (for the Reformer Pilates group) were excluded from the study.

Written and oral information was given to all participants and written informed consent was obtained from all subjects.

Exercise Protocol

Reformer pilates group consisted of the individuals who received a standard program that included muscle strengthening and flexibility exercises for at least 2 months, 3 days a week.

The exercises consisted of a program that included muscle strengthening and flexibility exercises. The Reformer Pilates focused on spinal stabilization, muscular strength, flexibility, balance, proprioception, and body awareness. The exercises were performed in different positions such as lying down, sitting and standing. Each Reformer Pilates session lasted approximately 60 minutes. The subjects performed warm-up exercises on the mat for 10 minutes, Reformer exercises for 40 minutes, and cooling exercises on the mat for 10 minutes. The intensity of the exercises was increased by changing the resistance of the springs and adding different positions. The number of repetitions of exercises was increased according to individual progress. The Reformer Pilates program was standard and all sessions were performed by the same physiotherapist.

Data collection tools

The demographic and clinical characteristics of the participants were evaluated by using the "Participant Report Form". In this form, demographic information such as body mass index (BMI), marital status, the habit of smoking, chronic disease, and regular sports history were examined.

The body awareness of the participants was evaluated by using the Body Awareness Questionnaire (BAQ) and level of physical activity with the International Physical Activity Questionnaire-Short Form (IPAQ-SF). For the functional assessments, Young Men's Christian Association 3 Minute Step Test was used for the assessment of aerobic capacity, the Single-Limb Stance Test (SLST) for static balance, and the Functional Reach Test for the dynamic assessment of the participants.

The body awareness questionnaire (BAQ) is a questionnaire aimed at determining the level of sensitivity of individuals to body composition. The questionnaire consists of 18 items, and each item is rated between 1 and 7 by the participants (1=not true at all, 7=completely true). The total score is a maximum of 126 and a high score taken from the scale indicates that the individual's body awareness level is high.[8,19]

The International Physical Activity Questionnaire-Short Form (IPAQ-SF) is a questionnaire that consists of 7 questions and 4 categories. The questionnaire categories the activities as mild, moderate, and vigorous - intensity. For each category, duration (minutes), frequency (days), and metabolic equivalent (MET) values are multiplied together to obtain a total score. In the calculation of IPAQ-SF data, activity levels are used as 3.3 MET for walking, 4.0 MET for moderate to vigorous activity, and 8.0 MET for vigorous activity.[9]

The Young men's Christian Association (YMCA) 3 minute step test is a useful and easily administered assessment for measuring aerobic capacity. A 30.50 cm (12 in) step, stopwatch, and metronome (96 beats/min) were used for this test. Each participant was asked to step up and down (Up-Up-Down-Down) with each beat of the metronome for 3 minutes. At the end of the test, the participant immediately sat down, and the heart rate 5 seconds after sitting was measured for 1 minute.[10]

The Single-Limb Stance Test (SLST) was used to evaluate the static balance of the participants. Participants were asked to stand on one leg for 60 seconds with their arms crossed over their chests and the time they could stay in this position was recorded with a stopwatch. The test was applied 3 times for both the right and left legs, with the eyes open and closed. The test was terminated and the average time obtained was recorded when the participant lost his/her balance or touched their foot on the ground/the ankle of their stance limb.[20]

Functional Reach Test (FRT); the test was performed to evaluate the dynamic balance of

the participants in two directions: forward and lateral. The participants were asked to stand while their dominant sidearm closed but without touching the wall. The shoulder was in 90º flexion, the elbow was in extension, while the dorsal hand was facing the wall. The tip of the 3rd finger was marked on the wall, the participant asked to lie as far as he/she could without lifting his/her heels. The new location of the 3.th finger was marked, the difference between the start and endpoint was measured and scored.[21]

Data analysis

The statistical analysis of the study was made by using the SPSS version 21.0 (SPSS inc. Chicago, IL, USA) package program. In the data set, variables were defined as percent (%), mean and standard deviation (SD). The Shapiro Wilk test was used to examine the distribution of the data. The Chi-Square test was used to compare the categorical variables. Independent Sample t-Test was used to evaluate independent data found by the Normal distribution. Values below 0.05 were considered statistically significant.

Results

A total of 169 participants were included in the study, including 82 subjects who regularly performed Reformer Pilates and 87 sedentary individuals. All of the participants were female. The mean age of the participants was 26.93±4.52 years in the Reformer Pilates group and 24.67±4.70 years in the sedentary group. BMI was 21.93±3.08 kg/m^2 in the individuals in the sedentary group and 22.34±3.44 kg/m^2 in the Reformer Pilates group.

In the comparison of the demographic characteristics of the groups, there was no statistically significant difference in terms of age, BMI, marital status, and presence of chronic disease (p>0.05). Smoking and exercising habits were more in the Reformer Pilates group (respectively: p=0.008; p=0.038). The weekly exercise frequency of the subjects in the Reformer Pilates group was found to be 3.09± 0.83 days (Table 1).

Table 1. Comparison of the demographic and clinical characteristics of the groups.

Variables		**Reformer Pilates (n=82)**	**Sedentary (n=87)**	***p***
Age (Mean ±SD) (year)		26.9±4.52	24.7±4.7	0.479*
BMI (Mean ±SD) (kg/m^2		22.34±3.44	21.93±3.08	0.414*
Reformer Pilates Frequency (day/week) (Mean ±SD)		3.09±0.83	-	
Reformer Pilates Session Duration (Mean± SD)		50.95±1.16	-	
Marital Status: n (%)	Married	30 (36.6)	25 (28.7)	
	Single	51 (62.2)	61 (70.1)	0.549**
	Divorced	1 (1.2)	1 (1.1)	
Smoking: n (%)	Yes	23 (28.0)	13 (14.9)	**0.038****
	No	59 (72.0)	74 (85.1)	
Chronic Disease: n (%)	Yes	23 (28.0)	19 (21.8)	0.351**
	No	59 (72.0)	68 (78.2)	
Sports History: n (%)	Yes	41 (50)	26 (29.9)	**0.008****
	No	41 (50)	61 (70.1)	

SD: Standard Deviation. BMI: Body Mass Index
* Independent Sample t-Test.
**: Chi-Square test.
p<0.05 significant.

The comparison of the body awareness level, physical activity level, and aerobic performance of the groups is shown in Table 2. A statistically significant difference was found in the BAQ and IPAQ-SF mild level activity scores in the Reformer Pilates group (respectively: p<0.00; p=0.022). The difference in the IPAQ-SF moderate and vigorous levels and the IPAQ-SF total score was not statistically significant (p>0.05). In the sedentary group, heart rate change after the YMCA 3 min Step Test was statistically significantly higher (p=0.001).

Table 2. Comparison of body awareness level, activity level and aerobic performance of groups.

	Reformer Pilates (n=82) (Mean± SD)	**Sedentary (n=87)** (Mean± SD)	***p****
BAQ	104.45±16.63	88.74±16.47	**<0.001**
IPAQ-SF Total	1916.12±1827.70	1815.03±1293.87	0.677
IPAQ-SF Mild	1347.72±1541.01	896.23±945.61	**0.022**
IPAQ-SF Moderate	405.61±506.65	361.71±657.87	0.627
IPAQ-SF Vigorous	353.29±173.25	333.10±130.28	0.395
HR after the YMCA 3MST	108.95±14.63	123.77±21.43	**0.001**

SD: Standard Deviation, BAQ: Body Awareness Questionnaire IPAQ-SF: International Physical Activity Questionnaire Short Form, YMCA 3MST: Young Men's Christian Association 3 Minute Step Test; HR: Heart Rate.
* Independent Sample t-Test.
p<0.05 significant.

The comparisons of the static and dynamic balance scores of the groups are given in Table 3. There was a statistically significant difference in the eyes' closed SLST scores for both limbs in the Reformer Pilates group (p<0.001; p<0.001). The lateral FRT score was significantly higher in the Reformer Pilates group (p=0.003).

Table 3. Comparison of static and dynamic balance scores of groups.

		Reformer Pilates (n = 82) (Mean ± SD)	**Sedentary (n = 87)** (Mean ± SD)	***p****
SLST; Eyes Open (sec)	Right	58.02±8.27	57.33±7.05	0.559
	Left	57.30±10.09	56.75±8.07	0.695
SLST; Eyes Closed Balance (sec)	Right	38.93±21.52	26.67±18.29	**<0.001**
	Left	37.63±21.97	23.84±18.49	**<0.001**
Functional Reach Test (cm)	Forward	36.92±7.09	34.88±6.93	0.61
	Lateral	27.14±5.08	24.83±4.96	**0.003**

SD: Standard Deviation. SLST: Single-Limb Stance Test, sec: second, cm: centimeter.
* Independent Sample t-Test.
p<0.05 significant.

Discussion

This study investigated the effect of Reformer Pilates on body awareness, physical activity level, aerobic capacity, and balance in young adults. According to the results, body awareness, balance, and aerobic capacity were found better in individuals who regularly exercise Reformer Pilates compared to sedentary individuals.

Adams M et al. aimed to investigate the experiences of their students in a semester-long Pilates mat class and the results showed that Pilates increased postural awareness in 78% of the students and also supported both mental and physical well-being.[22] In a similar study made by Atılgan et al., university students that applied Pilates during a semester showed improvement in body awareness and flexibility scores.[23] Although there was also a control group in our study; similar to these results, we found that individuals who performed regular Reformer Pilates had better body awareness scores.

Johnson E.G. et al. applied a 10-session Pilates-based exercise program to healthy individuals and a significant improvement was found in dynamic balance.[17] Erden A. et al. reported that an 8-week Pilates program had significant effects on the improvement of dynamic and static balance in healthy adults.[8] In a study made by Kloubec et al., 12 weeks of Pilates were performed on young adults, and the results showed significant improvement in posture and balance.[7] One of the aims of our study was to evaluate the effect of regular Pilates practice on balance parameters. In our study, similar to the literature, balance results were found significantly better in individuals who have regular exercise habits for 3 days a week for at least two months.

Fernández et al. In a meta-analysis conducted in 2019, it was stated that Pilates increased aerobic performance regardless of health status.[6] Diamantoulla et al. compared two different types of Pilates applications (aquatic and ground), and similar improvements were found in both groups in terms of aerobic capacity, strength, endurance, and balance, while the percentage

of fat loss and the development of flexibility was higher in the ground group. Rayes et al. investigated the effects of Pilates on aerobic capacity and reported a significant improvement in aerobic capacity parameters after an 8-week Pilates program in individuals without regular exercise habits.[12] In our study where we also investigated the effect of Pilates application on aerobic performance. The results of our study were consistent with the literature. Although the number of smokers was higher in the Reformer Pilates group, it was found that aerobic performance and balance scores were better than sedentary individuals.

In a systematic review made by Hornsby et al in 2020, it was reported that Pilates improve flexibility, strength, and postural control in children and young adults while minimizing muscle energy expenditure and improving the level of physical activity.[24] García-Soidán et al. stated that a 12-week Pilates application is a method that increases physical activity and is easy to access and apply.[25] In our study, we also investigated the effect of Pilates on physical activity level. The results showed that only mild-level activity was higher in the Pilates group compared to the sedentary group, while the medium, vigorous, and general activity levels were at a similar level in both groups. These results showed that individuals who perform Reformer Pilates can have higher levels of body awareness, aerobic capacity, and balance than sedentary individuals, even if the activity intensity is similar.

A key strength of the present study is that it represents a comprehensive examination of the effect of Reformer Pilates on multiple health-related components such as body awareness, physical activity level, aerobic capacity, and balance in healthy young adults. Another strength of this study is the presence of a control group. The limitation of our study is the absence of long-term follow-up. Future studies are recommended to include long-term follow-up and compare different Reformer Pilates applications with larger sample sizes.

Conclusion

Reformer Pilates is an effective method to improve body awareness, aerobic capacity, and balance. Especially when compared with sedentary individuals, it has been found that Reformer Pilates has a significant positive effect. We think that recommending Reformer Pilates as a component of preventive rehabilitation will be beneficial in terms of public health.

Ethics Committee Approval

The ethical approval of the study was obtained from Istanbul University-Cerrahpaşa, Faculty of Medicine, Non-Invasive Clinical Research Ethics Committee dated 17.07.2020 with decision number 60350273-605.99-91919. Our research was conducted under the principles of the Declaration of Helsinki.

Informed Consent

Informed consent was obtained from all subjects. In addition, necessary approvals were obtained from the centers where the data was collected.

Authors' Contributions

Study Concept / Design: Y.A.A., I.E, A.A., M.K.; Data collecting: I.E, A.A., M.K.; Data analysis and interpretation: E.Z, Y.A.A.; Literature Review: E.Z., Y.A.A., I.E, A.A., M.K; Writers: E.Z., Y.A.A., I.E, A.A., M.K. The final version of this article was read and approved by all authors.

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Conflict of Interest

The authors declare that there is no conflict of interest

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Statements

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Özgün Araştırma/Research Article

Acil servisten istenen radyolojik görüntüleme incelemelerinin etkinliğinin değerlendirilmesi

Evaluation of the effectiveness of radiological imaging examinations ordered from the emergency department

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Öz

Amaç: Acil servisten istenen radyolojik görüntüleme incelemelerinin etkinliği ve görüntülemelerdeki patolojilerin değerlendirilmesi amaçlanmıştır.

Gereç ve Yöntem: 01 Temmuz 2019 ile 01 Ağustos 2019 tarihleri arasında hastanemiz Acil Servisi'ne başvuran ve tanısal amaçlı bilgisayarlı tomografi (BT) ve manyetik rezonans görüntüleme (MRG) istenen hastaların sonuçları retrospektif olarak değerlendirildi.

Bulgular: Çalışmaya toplam 2321 BT ve difüzyon MRG görüntülemesi alınmış olup bunların 2012'si BT, 309'u difüzyon MRG görüntüleme idi.

BT istemlerinin %23,9'unda, MRG'lerin %19,1'inde patoloji izlendi.

En sık BT tipi kranial BT idi (n=1294, %64,3). En sık patoloji abdominopelvik BT'de (n=262,%54,9), en az patoloji omurga BT 'de (n=11, %2,3) izlendi.

BT istemlerinde, 0-10 yaş grubunda patoloji izlenme sıklığı diğer yaş gruplarından daha düşüktü(p<0,001).

BT veya MRG'de patoloji izlenen hastaların yaş ortalaması patoloji izlenmeyenlerden daha yüksekti (sırasıyla p<0,001, p=0,039)

Sonuç: Acil serviste, hekimlerin ileri görüntüleme tetkiki isterken uluslararası kabul görmüş kılavuzlardan yararlanmasını öneriyoruz.

Anahtar Kelimeler: Acil servis; Bilgisayarlı Tomografi; Manyetik Rezonans Görüntüleme.

Abstract

Aim: It was aimed to evaluate pathological findings in imaging and the effectiveness of radiological imaging examinations ordered from the emergency department.

Materials and Methods: The results of the patients who applied to the Emergency Service of our hospital between 01, July 2019 and 01, August 2019 and who requested diagnostic computerized tomography (CT) or diffusion magnetic resonance (MRG) were evaluated retrospectively.

Results: A total of 2321 radiological images were included in the study, and of these radiological images, 2012 was CT, and 309 was diffusion MRI. Pathology was observed in 23.9% of CT imaging and 19.1% of MRI. The most common type of CT was cranial CT (n=1294, 64.3%). The most frequent pathologies presence is observed in abdominopelvic CT (n=262, 54.9%), while the least presence of pathology is observed in spine CT (n=11, 2.3%). The mean age of patients with pathology in CT or MRI imaging was significantly higher than patients without pathology (p<0.001, p= 0.039, respectively).

Conclusion: We recommend that physicians take advantage of the guidelines when ordering advanced imaging in Emergency Department.

Keywords: Emergency department; Computed Tomography; Magnetic Resonance Imaging.

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Giriş

Acil sağlık hizmetleri, sigorta durumu veya sosyoekonomik durumu ne olursa olsun tüm topluma hizmet sunmaktadır. Acil servise herhangi bir şikayetle gelen her hasta, uygun bir şekilde sorgulanmalı ve acil bir durum varlığı açısından değerlendirilmelidir.[1] Hastaların acil servis personelinden hızlı bir şekilde hizmet alma ve doğru tanı koymaları konusunda beklentileri vardır. Doktorlardan, acil müdahale gerektirmeyen hastaları doğru bir şekilde filtrelemeleri beklenmektedir.[1,2]

Diğer taraftan acil servisleri etkileyen en kritik konulardan biri yoğunluk sorunudur. Bu yoğunluk, acil servis sunumunu etkileyen çok yönlü bir konudur.[1] Bu zorlu ortam, birçok belirsizlikle birlikte, acil doktorlarının klinik tanılardaki hataları en aza indirmek için ileri teknolojiye daha fazla ve klinik becerilerine daha az güvenmelerine yol açmıştır.[3]

Teşhis koymada görüntülemenin öneminin artması, bilgisayarlı tomografi (BT) ve manyetik rezonans görüntüleme (MRG) gibi görüntüleme yöntemlerine kolay ulaşabilme imkanıyla birlikte acil servislerde BT başta olmak üzere üst düzey görüntüleme yöntemlerinin kullanımını da arttırmıştır. Bunun sonucunda hastalar ve sağlık personeli radyasyona daha fazla ve yüksek seviyelerde maruz kalma riski ile karşı karşıya kalmıştır. Uygun endikasyon konulmadan yapılan tetkik istemleri, hastaların acil serviste kalış süresini arttırarak acil servis yoğunluğuna yol açmakta ve sağlık harcamalarının artmasına neden olmaktadır.[4,5]

Acil serviste görüntüleme yöntemlerinin aşırı ve gereksiz kullanımı, başka bir merkeze sevk edilen hastalarda (özellikle travma nedenli) tekrarlayan taramalar ve acil servise başvuran hastada uygunsuz ve defansif görüntüleme şeklinde iki ana grupta incelenebilir. Her iki grupta da bu duruma neden olan hasta ilişkili faktörler, hekim ilişkili faktörler ve çevresel-sistemsel faktörler bulunmaktadır.[5]Aşırı istenen radyolojik tetkikler ve acil servis yoğunluğu arasında çift yönlü ilişki mevcuttur. Son zamanlarda artan malpraktis endişesi de aşırı görüntülemeye neden olan faktörlerin başında gelmektedir.[5,6]

Acil servislerde verimli, güvenli ve etkili bir görüntüleme hizmeti sunmada üç temel faktör göz önüne çıkmaktadır; farkındalık, uygunluk ve denetim. Radyasyonun zararlı etkileri konusunda hem sağlık çalışanları hem de hastalar bilinçlendirilmeli, görüntüleme isterken kılavuzlara ve uygunluk kriterlerine uyulmalı, rutin klinik denetimlerle kontrolü sağlanmalıdır. Aşırı görüntülemeye neden olan faktörler irdelenerek gerekli düzenlemeler sağlanabilir. Bu sayede hastalar ve sağlık çalışanları radyasyonun zararlı etkilerinden korunabilir, acil servis yoğunluğu bir ölçüde azaltılabilir ve sağlık harcamaları azaltılabilir.[4]

Çalışmamızda, son 1 ay içerisinde çeşitli sebeplerle Adıyaman Eğitim ve Araştırma Hastanesi acil servisine başvurmuş ve BT veya difüzyon MRG istenen hastalar değerlendirilmiştir. Çalışmamızdaki amaç; acil serviste istenen BT ve diffüzyon MRG görüntülemelerinin demografik analizi ile görüntülemelerde patolojinin var olup olmadığı ve varsa saptanan patolojilerin incelenmesi amaçlanmıştır. Ayrıca bu istemlerin maliyetleri değerlendirilmiştir.

Gereç ve Yöntem

Bu çalışma, retrospektif kesitsel bir çalışma olup Adıyaman Üniversitesi Tıp Fakültesi Acil Tıp Anabilim Dalı'nda yapıldı. Çalışma için Adıyaman Üniversitesi Tıp Fakültesi Girişimsel Olmayan Klinik Araştırmalar Etik Kurulu tarafından 16/12/2019 tarih ve 2465 sayılı kararı ile etik kurul onayı alındı ve Helsinki İlkeler Deklarasyonuna uyularak gerçekleştirildi.

Bu çalışmaya 01 Temmuz 2019 ile 01 Ağustos 2019 tarihleri arasında Adıyaman Eğitim ve Araştırma Hastanesi Acil Tıp Servisi'ne başvuran ve tanısal amaçlı BT veya difüzyon MRG tetkiki istenmiş tüm yaş grubundaki hastalar dahil edildi. BT veya difüzyon MRG istemi olup radyolojik görüntülemesi olmayan, BT veya difüzyon MRG'si olan ancak radyoloji kliniği tarafından raporlanmamış ve görüntüleme verileri eksik olan hastalar çalışma dışında bırakıldı.

Hastaların dosyalarından ve hastane bilgi sistemi üzerinden yaş ve cinsiyet bilgileri, BT

istenen hastalarda tetkik istem nedeni (travmatik, non-travmatik- etiyolojisi belli olmayan vb.), istenen BT tipi (kranial, abdominopelvik, toraks, omurga, ekstremite, tüm vücut, maksillofasial, toraks-anjiyo, orbita, abdomen-anjiyo, boyun, paranazal sinüs, temporal, beyin anjiyo, ekstremite anjiyo), BT veya difüzyon MRG tetkiklerini isteyen hekimin branşı, BT ve difüzyon MRG raporlarının sonuçları, patoloji izlenen hastalarda patolojinin izlendiği vücut bölgesi, izlenen patolojinin ne olduğu, kontrol difüzyon MRG varlığı ve kontrol difüzyon MRG'de patoloji olup olmadığı araştırıldı. Çalışmamızda acil serviste istenen tek MRG tipi difüzyon MRG olduğu için sadece difüzyon MRG sonuçları analiz edilmiştir.

Tetkik sonuçlarında patoloji varlığına göre tetkikler, patoloji olanlar (+) ve patoloji olmayanlar (-) şeklinde ayrıldı. Çalışmanın birincil sonuç ölçütü istenen BT ve diffüzyon MRG görüntülemelerindeki patoloji saptanma oranı idi. Çalışmanın ikincil sonuç ölçütü istenen BT ve diffüzyon MRG görüntülemelerinin demografik analizi ve hastaların verilerinin karşılaştırılması idi.

Analizlerde BT ve difüzyon MRG istenen hastalar; sosyodemografik verileri, görüntüleme sonuçlarında patoloji varlığı ve tetkiki isteyen hekim açısından karşılaştırıldı. Hasta yaşları dekadlara göre ayrılarak tekrar kaydedildi. BT istenen hastalar, kendi grupları içerisinde BT tipleri ve yaş gruplarına göre incelendi. Patoloji izlenen ve izlenmeyen hastalar, her iki grup içerisinde ayrı ayrı tekrar analiz edildi.

İstatiksel analiz

İstatistiksel analizler SPSS versiyon 20.0 (IBM®, Chicago, ABD) ile yapılmıştır. Değişkenlerin normal dağılımına uygunluğu, görsel (histogram ve olasılık grafikleri) ve analitik yöntemler (Shapiro-Wilk testi) kullanılarak incelenmiştir. Tanımlayıcı istatistikler; normal dağılan sayısal verilerde ortalama ve standart sapma, normal dağılmayanlarda ortanca ve alt-üst değer şeklinde, nominal verilerde sayı ve yüzde şeklinde ifade edildi. Normal dağılan değişkenler, iki grup arasında "bağımsız gruplarda t testi" ile; normal dağılmayan değişkenler, iki grup arasında "Mann Whitney U testi" ile analiz edildi. Nominal veriler, iki grup arasında "Ki-kare testi" ve "Fisher exact test" kullanılarak değerlendirilmiştir. Korelasyon analizlerinde "Pearson ve Spearman korelasyon analizleri" tercih edildi. Çalışmadaki istatistiksel analizlerde, p değeri 0.05'in altındaki karşılaştırmalar istatistiksel olarak anlamlı kabul edildi.

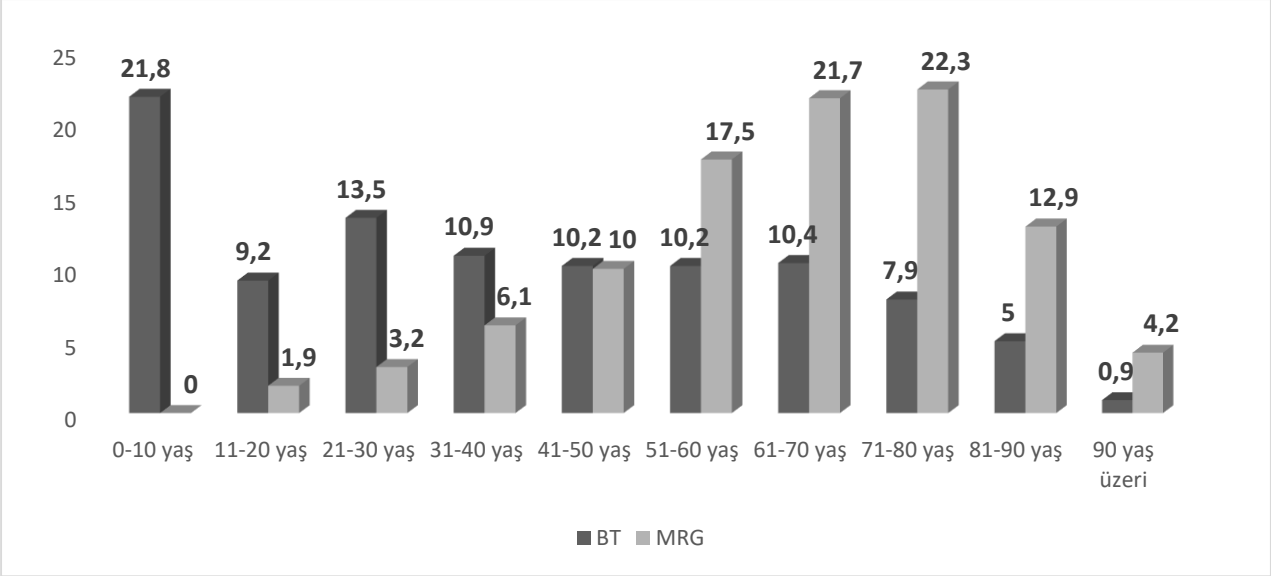
Bulgular

Çalışmaya dahil edilen toplam 2321 BT ve MR görüntülemesi yapılmış olan hastaların yaş ortalaması 41,3±26,6 yıl (0-100 yıl aralığında) idi. Hastaların %51,2'si (n=1188) erkek idi. Görüntüleme tetkikleri; hastaların %53,3'ünde (n=1237) pratisyen hekim, %46,7'sinde (n=1084) acil tıp uzmanı tarafından istenmişti. Hastaların %76,7'sinde (n=1781) istenen görüntüleme tetkiklerinde patoloji izlenmezken, %23,3'ünde (n=540) patoloji izlenmişti.

Çalışmaya dahil edilen toplam 2321 BT ve MR görüntülemesinin %86,7'sine (n=2012) BT, %13,3 'üne difüzyon MRG (n=309) istenmiş olup BT ve difüzyon MRG istenen hastaların yaş gruplarına göre dağılımı Şekil 1'de gösterilmiştir.

BT istenen hastaların %41,9'unda (n=843) travmatik, %55,9'unda (n=1125) non-travmatik, %2,2'sinde (n=44) ise etiyolojisi bilinmeyen nedenlerle BT istenmişti. Travmatik nedenler çoğunlukla düşme (n=705, %83,7) non-travmatik nedenler ise çoğunlukla nörolojik semptomlar (n=604, %53,6) idi. (Tablo 1) Hastalardan istenen en sık BT türü (n=1294, %64,3) kranial BT olup diğer BT istemleri sırasıyla abdominopelvik (n=502, %25,0), toraks (n=253, %12,6), omurga (n=125, %6,2) ve ekstremite (n=100, %5) BT idi.

BT istenen hastaların %76,1'inde (n=1531) patoloji izlenmezken, MRG istenen hastaların %80,9'unda (n=250) patoloji izlenmedi. BT ve MRG arasında patoloji varlığı açısından anlamlı farklılık izlenmedi (p=0,062).



Şekil 1. BT ve difüzyon MRG istenen hastaların yaş gruplarına (yıl) göre dağılımı.

Tablo 1. BT çekilen 2012 hastanın BT istem nedenleri.

BT istem nedeni	n (%)
Travmatik	843 (41,9)
Düşme	705 (83,7)
Trafik kazası	79 (9,4)
Darp	44 (5,2)
Diğer*	14 (1,7)
Non-travmatik	1125 (55,9)
Nörolojik	604 (53,6)
Gastrointestinal	363 (32,2)
Pulmoner	150 (13,3)
Ürolojik	35 (3,1)
Diğer**	28 (2,4)
Etiyolojisi bilinmeyen	44(2,2)

***** *Keskin cisimle yaralanma, göze yabancı cisim batması, intihar, iş kazası*
***Arteryal oklüzyon/ diseksiyon, kardiyak, akut ağrı*

En sık abdominopelvik BT istenenlerde %54,5 (n=262) ve toraks BT istenenlerde %20,4 (n=98) patoloji izlenmişti. En sık izlenen patolojiler bölgelere göre değerlendirildiğinde abdominopelvik patolojilerden gastrointestinal sistem (n=94, %35,9) hastalıkları; toraks patolojilerinden plevralefüzyon (n=39, %39,8) ve infiltrasyon (n=38, %38,8); Kranial patolojilerden intrakranial kanama (n=17, %21,2) ve akut iskemi (n=17, %18,8); Maksillofasial patolojilerden; inflamatuvar değişiklikler (n=23, %59), nazal kırık (n=7, %17,8); ekstremite patolojilerinden alt ekstremite kırığı (n=11, %47,9); omurga patolojilerinden ise lomber kırık (n=8, %72,7) izlenmişti. BT sonuçlarında izlenen patolojilerin anatomik bölgelere göre dağılımı tablo 2 de gösterilmiştir.

Difüzyon MRG'de patoloji izlenen 59 hastanın %76,3'ünde (n=45) akut iskemi, %13,6'sında (n=8) kronik iskemi, %6,8'inde (n=4) şüpheli infarkt alanı, %3,4'ünde (n=2) kitle izlendi. Altı hastaya (%1,9) kontrol difüzyon MRG çekildi, sadece bir hastanın (%16,7) kontrol difüzyon MRG'sinde patoloji izlendi.

Difüzyon MRG istenen hastaların yaş ortalaması, BT istenen hastalardan daha büyüktü (p<0,001). BT istenen hastaların %21,7'si (n=436) 0-10 yaş arasındayken, bu yaş grubunda kimseden MRG istenmemişti. BT istenen hastalarda erkek cinsiyet sıklığı, MRG istenen hastalardan anlamlı derecede daha yüksekti (p=0,021). BT istenen hastaların %54,7'si(n=1101) pratisyen hekim, %45,3'ü (n=911) acil tıp uzmanı tarafından planlanmıştı. Difüzyon MRG istemi hastaların %44'ünde (n=136) pratisyen hekim tarafından, %56'sında (n=173) acil tıp uzmanı tarafından planlanmıştı. BT daha çok pratisyen hekimler tarafından istenirken, difüzyon MRG daha çok acil tıp uzmanı tarafından istenmişti (p=0,018). BT veya difüzyon MRG istenen hastaların karşılaştırılması Tablo 3'de gösterilmiştir.

BT istenen hastalarda patoloji izlenenlerin yaş ortalamasının, patoloji izlenmeyenlerden anlamlı derecede daha yüksek olduğu görüldü (p<0,001). Özellikle birinci dekadda çekilen BT'lerde patolojik olma oranı anlamlı derecede düşük bulundu (p<0,001).BT istenen hastalarda, patoloji varlığına göre cinsiyetler

arasında anlamlı bir farklılık görülmedi (p=0,122). Acil tıp uzmanlarının istediği BT tetkiklerindeki patoloji sıklığı, pratisyen hekimlerinkinden anlamlı derecede daha yüksek bulundu (p<0,001, Tablo 4).

Difüzyon MRG istenen hastalarda, patoloji izlenenlerin yaş ortalamasının patoloji izlenmeyenlerden anlamlı derecede daha yüksek olduğu görüldü (p=0,039). Yaş gruplarında, patoloji izlenme oranları açısından anlamlı farklılık olmadığı görüldü. Patoloji varlığı, cinsiyetler arasında farklılık göstermiyordu (p=0,060). Tetkiki isteyen hekimin branşına göre karşılaştırıldığında Acil tıp uzmanlarının istediği difüzyon MRG'lerin sonuçlarında izlenen pozitiflik oranı pratisyen hekimlerinkinden anlamlı derecede daha yüksekti (p=0,020, Tablo5).

Tablo 2. BT sonuçlarında izlenen patolojilerin anatomik bölgelere göre dağılımı.

Bölge	Patoloji (n=481)	n (%)
Abdominopelvik		262 (54,5)
	Gastrointestinal	94 (35,9)
	Ürogenital	77 (29,4)
	Jinekolojik	62 (23,7)
	Hepatobiliyer	51 (19,5)
	Onkolojik	3 (1,1)
	Solid organ yaralanması	2 (1)
	Diğer*	3 (1,1)
Toraks		98 (20,4)
	Plevralefüzyon	39 (39,8)
	İnfiltrasyon	38 (38,8)
	Metastaz	10 (10,2)
	Perikardiyalefüzyon	9 (9,1)
	Kot fraktürü	9 (9,1)
	Pnömotoraks	7 (7,1)
	Kontüzyon	6 (6,1)
	Pulmoneremboli	4 (4,1)
	Hemotoraks	3 (3,1)
	Diğer**	7 (7,1)
Kranial		80 (16,6)
	Kanama	17 (21,2)
	Akut iskemi	15 (18,8)
	Kitle	14 (17,5)
	Subduralefüzyon	11 (13,7)
	Kist	8 (10)
	Fraktür	8 (10)
	Hidrosefali	4 (5)
	Parankimalkontüzyon	3 (3,8)
	Diğer***	7 (8,8)
Maksillofasial		39 (8,1)
	İnflamatuar değişiklikler	23 (59)
	Nazal kırık	7 (17,8)
	Kitle/kist	5 (12,9)
	Orbital kırık	1 (2,6)
	Zigomatik kırık	1 (2,6)
	Maksiller kırık	1 (2,6)
	Etmoid kırık	1 (2,6)
	Temporomandibular kırık	1 (2,6)
Ekstremite		23 (4,8)
	Alt ekstremite kırığı	11 (47,9)
	Üst ekstremite kırığı	7 (30,4)
	Alt ekstremiteoklüzyonu	1 (4,3)
	Pelvis kırığı	1 (4,3)
Omurga		11 (2,3)
	Lomber kırık	8 (72,7)
	Torakal kırık	4 (36,4)
	Servikal kırık	1(9,1)

**Metastatik kitle, aort diseksiyonu **İnterstisyel akciğer hastalığı, amfizematöz değişiklik, fibrotik değişiklik, Ac parankiminde nodüler değişiklik, guatr, aort diseksiyonu ***Kronik iskemik değişiklikler, kasifikasyon, kraniotomi defekti*

Tablo 3. BT veya difüzyon MRG istenen hastaların karşılaştırılması.

Özellik	**BT (n=2012)**	**Difüzyon MRG (n=309)**	***p*-değeri**
Yaş,yıl	37,8 ± 26,1	63,9 ± 17,5	***<0,001****
Yaş grupları,yıl			
0-10	436 (21,7)	-	
11-20	186 (9,2)	6 (1,9)	
21-30	272 (13,5)	10 (3,2)	
31-40	220 (10,9)	19 (6,1)	
41-50	205 (10,2)	31 (10)	
51-60	205 (10,2)	54 (17,5)	
61-70	209 (10,4)	67 (21,7)	
71-80	159 (7,9)	69 (22,3)	
81-90	101 (5,0)	40 (12,9)	
90 +	19 (0,9)	13 (4,2)	
Cinsiyet n(%)			
Erkek	1049 (52,1)	139 (45)	***0,021***
Kadın	963 (47,9)	170 (55)	
Tetkik isteyen hekim,n(%)			
Pratisyen Hekim	1101(54,7)	136 (44)	
Acil tıp uzmanı	911 (45,3)	173 (56)	**0,018****
Görüntüleme Sonucu, n(%)			
Patoloji (-)	1531(75,7)	250 (80,9)	
Patoloji (+)	481 (23,8)	59 (19,1)	0,062**

*Bağımsız gruplarda t testi **Ki-kare testi

Tablo 4. BT 'de patoloji varlığı ile sosyo-demografik ve klinik özelliklerin ilişkisi.

Özellik	**Patoloji (-)** (n=1531)	**Patoloji (+)** (n=481)	***p*-değeri**
Yaş, yıl **Ortalama ± SS**	35,1 ± 26,2	46,6 ± 23,8	***<0,001****
Yaşgrupları,yıl n(%)			
0-10	410 (26,8)	26 (5,4)	***<0,001****
11-20	135 (8,8)	49 (10,2)	0,363**
21-30	198 (12,9)	76 (15,8)	0,110**
31-40	157 (10,3)	63 (13,1)	0,081**
41-50	149 (9,7)	55 (11,4)	0,281**
51-60	152 (9,9)	54 (11,2)	0,413**
61-70	143 (9,3)	65 (3,2)	***0,009****
71-80	114 (7,4)	45 (9,4)	0,176**
81-90	65 (4,2)	38 (7,9)	***0,002****
90+	8 (0,5)	10 (2,1)	***0,004*****
Cinsiyet, n(%)			0,122**
Erkek	813(53,1)	236(49,1)	
Kadın	718(46,9)	245(50,9)	
Tetkik isteyen hekim branşı, n(%)			
Pratisyen Hekim	880(57,5)	221(45,9)	***<0,001****
Acil Tıp -Uzmanı	651(42,5)	260(54,1)	

SS: Standard sapma, *Bağımsız gruplarda t testi, **Ki-kare testi, ***FisherExact test

Hastanemizdeki difüzyon MRG ve BT maliyetlerine göre istenen tetkiklerin maliyeti hesaplandı. Buna göre toplam difüzyon MRG maliyeti 40170,00 TL, toplam BT maliyeti 396642,00 TL olarak hesaplandı. Patoloji saptanmasına göre görüntülemeler dikkate alındığında; patoloji izlenmeyen difüzyon MRG maliyeti 32500,00 TL, patoloji izlenmeyen BT maliyeti 287643,00 TL olarak hesaplandı.

Tablo 5. Difüzyon MRG'dapatoloji varlığı ve sosyo-demografik-klinik özelliklerin ilişkisi.

Özellik	**Patoloji (-)** (n=250)	**Patoloji (+)** (n=59)	***p*-değeri**
Yaş, yıl, **Ortalama± SS**	62,8 ± 17,9	68,1 ± 15,1	***0,039****
Yaş grupları, yıl n(%)			
0-10	-	-	
11-20	6 (2,4)	0	0,229**
21-30	9 (3,6)	1 (1,7)	0,457**
31-40	18 (7,2)	1 (1,7)	0,821**
41-50	24 (9,6)	7 (11,9)	0,603**
51-60	46 (18,4)	8 (13,6)	0,378**
61-70	51 (20,4)	16 (27,1)	0,260**
71-80	53 (21,2)	16 (27,1)	0326**
81-90	34 (13,6)	6 (10,2)	0,480**
90 +	9 (3,6)	4 (6,8)	0,274**
Cinsiyet, n(%)			0,060**
Erkek	106(42,4)	33 (55,9)	
Kadın	144(57,6)	26 (44,1)	
Tetkik isteyen hekim branşı, n(%)			***0,020***
Pratisyen Hekim	118 (47,2)	18 (30,5)	
Acil Tıp Uzmanı	132 (52,8)	41 (69,5)	

*SS: Standard sapma, *Bağımsız gruplarda t testi, **Ki-kare testi*

Tartışma

Acil servislerde görüntüleme yöntemlerinin kullanımındaki artış, uluslararası anlamda dikkat çekmeye başlamıştır. Bu artışı inceleyen çalışmaların bir kısmında, özellikle BT kullanımındaki artışa rağmen elde edilen kar/zarar oranında belirgin artış olmadığı ifade edilmiştir.[7,8] Bununla birlikte acil servislere başvuru oranının yaklaşık 15 yıl içerisinde iki katına çıktığı yönünde veriler bulunmaktadır. Başvuru sayısındaki artış ise, tetkik istemleri üzerinde lineer bir artışla sonuçlanmaktadır.[9]

Çalışmamızda, BT istemlerinin %20'sinin 0-10 yaş arasındakiler için istenmesinde bazı nedenler etkili olmuş olabilir. Özellikle yenidoğan ve infantlarda nörolojik muayenenin zor olması, mevcut bulguların her zaman spesifik olmaması, ebeveynlerin kaygısı, ayırıcı tanıların daha kesin şekilde dışlanmak istenmesi ve malpraktis korkusu gibi nedenler bu yaş grubunda istem sıklığını arttırabilmektedir.[10]Malpraktis davalarının yüksek meblağlı olması malpraktis kaygısını arttırdığı düşünülebilir.

Çocuklarda BT istem nedenlerinin başında minör kafa travmaları yer almaktadır. Ancak minör kafa travmalarının yaklaşık %5'inde intrakranial bir patoloji izlenmektedir.[11] Pediyatrik travma hastalarında Glasgow koma skorunun 13'ün altında olması, fokal nörolojik defisit ve bilinç değişikliği durumunda BT çekilmesi önerilmektedir; ancak daha hafif vakalar için bir uzlaşı sağlanamamıştır.[12]

İstenen ileri görüntüleme kullanımının oranı, etkinliği ve sonuçları önemli bir araştırma konusudur. Avrupa Birliği (AB) Sağlık İstatistikleri raporuna göre Türkiye; 2011-2014 yılları arasında MRG taramalarında birinci, BT taramalarında ise 8. sırada yer aldı. BT kullanımında AB ortalamasındaki artış %49 olurken, Türkiye'de artış %60 oldu. MRG kullanımında AB ortalamasında artış %38 olurken, Türkiye'de %134 artış oldu.[13]

Acil servislerde ise, Oğuz ve ark'ının çalışmasında 1998 yılında acil servise başvuran hasta sayısı 2000 yılında %3,6 artış gösterirken, BT istem sıklığında %69 artış izlenmiştir. Çalışmada kranial, maksillofasial ve servikal BT görüntülemelerinde, 2000 yılında normal sonuçlar artış gösterirken, majör bulgularda ve minör bulgularda azalma izlenmiştir[14]. Çalışmamızın primer amacı, acil serviste bir ay içerisinde istenen BT ve diffüzyon MR görüntülemelerinin ne kadarında patoloji izlendiğini göstermekti. Çalışmamızda yıllara göre istenen tekik sayısı

araştırılmadı. Fakat bulgularımız, acil servislerde istenen tanısal görüntülemelerin çoğunun normal sonuçlandığına işaret etmekteydi.

Yıldız ve ark'ı tarafından 2019 yılında Bursa'da yapılan çalışmada, ikinci basamak bir hastanenin acil servisine başvuran ve tanısal olarak BT istenen 1700 hasta incelenmiştir.[15] Çalışmada travma nedeniyle en sık kranial BT istenmişti. Kranial BT istenen hastaların %7'sinde, toraks BT istenen hastaların %10,7'sinde, abdominopelvik BT istenenlerin %7,9'unda patoloji izlenmişti. Ayrıca çalışmada, çocukluk yaş döneminde travma nedeniyle yapılan kranial görüntülemelerin %98,5'inde patoloji izlenmediği ifade edilmiştir. Tüm nedenler dikkate alındığında abdominopelvik BT'lerin yaklaşık %65'inde patoloji izlenmişti. Çalışmamızda, benzer şekilde kranial BT en sık istenen BT türüydü. Çalışmamızda izlenen kranial BT ve abdominopelvik BT sonuçlarında patoloji varlığı, bu sonuçlarla benzer düzeydeydi.

Ozturk ve ark'ının 2018 yılındaki çalışmasında, senkopla acil servise başvuran hastalardan MRG veya BT istenenler incelenmiş, hastalardan sadece %3,8'inde görüntüleme sonucunda anormal patolojiler izlenmiştir.[16] Çalışmanın sonucunda senkopla acil servise başvuran hastalarda, kranial BT'lerin rutin kullanımında azalma sağlayacak yöntemlerin araştırılması gerektiği bildirilmiştir. Benzer şekilde, Kapoor ve ark'ı, senkop şikayetiyle acil servislere başvuran hastaların %4'ünde BT'nin fayda sağladığını ifade etmiştir.[11]Goyal ve ark'ı ise, senkopla acil servise başvuran 117 hastanın hiçbirinde kranial BT'de patoloji izlenmediğini ifade etmiştir.[17] Ancak bu çalışmada travma, nöbet, mental durum değişikliği ve fokal nörolojik defisit varlığı olan hastalar çalışmadan dışlanmıştır.

Swartzberg ve Goldstein, 2018 yılında 4 aylık bir süre içerisinde yetişkin acil servise başvuran hastalarda BT istemlerini değerlendirmiştir.[18] Başvuran hastaların %4,6'sında BT istenen çalışmada, tetkiklerin çoğu travma hastalarından istenmiştir. Kranial BT'lerin çoğunluğu oluşturduğu çalışmada, tüm BT'lerin %53,8'inde pozitif sonuçlara ulaşılmıştır. Travma hastalarında bu oran %47,1, non-travma hastalarında ise %61,8 olarak bildirilmiştir. Bu bulgular ışığında acil serviste istenen görüntülemelerin; sadece ülkemizde değil diğer ülkelerde de yapılan çalışmalarda yüksek oranda negatif sonuçlandığı, bu sorunun yerel veya ulusal boyutta değil, global anlamda sorun teşkil ettiği söylenebilir.

Acil servislerde kranial BT ve difüzyon MRG tetkikleri sıklıkla birlikte istenmektedir. Hammoud ve ark'ının 2016 yılındaki çalışmasında, acil servise atipik inme semptomlarıyla başvuran BT görüntülemesi negatif 152 hasta MRG görüntüleme ile de değerlendirilmiştir.[19] Çalışmada hastaların sadece %11,5'inde MRG görüntüleme ile akut veya subakutinfarkt tespit edilmiştir. Pozitif MRG sonuçlarında; hiperlipidemi, hipertansiyon, diyabet, antikoagülan kullanımı ve inme öyküsünün belirleyici olduğu bildirilmiştir. MRG bulguları pozitif olan olguların yaşlarının, negatif olanlara kıyasla daha fazla olduğu (74,1 yıl & 57,5 yıl) görülmüştür. Benzer şekilde MRG görüntülemesi pozitif olan hastaların daha yaşlı olduğu, çalışmamızda da izlenmiştir. Acil servis hekimleri hastaların tanı sürecinde bir taraftan en hızlı ve en doğru tanıyı bulmakla yükümlüyken, diğer taraftan tetkiklerin maliyeti ve tetkik ilişkili zararların oluşturduğu bir üçgen içerisinde sıkışmaktadır. Tetkik maliyetlerinin de düşürülmesi adına, yaşlı ve kardiyovasküler hastalıkları olan hastalarda MRG görüntüleme dikkate alınabilir. Ayrıca çalışmamızda izlenen diğer önemli bir bulgu, acil tıp uzmanlarının istediği BT veya difüzyon MRG tetkiklerinin, pratisyen hekimlerinkinden daha çok pozitif sonuçlanmasıdır. Acil tıp uzmanlarının daha üstün eğitimleri, MRG görüntüleme için bildirilen kılavuzlara daha fazla uyum içerisinde olmaları ve daha fazla tecrübeye sahip olmaları görüntüleme sonuçlarının daha yüksek oranda pozitif olmasıyla sonuçlanmış olabilir. Bulgularımız ışığında, ileri görüntülemelerin acil tıp uzmanları tarafından istenmesi yahut radyoloji bölümüyle tetkik istemi konusunda iş birliği yapılması ve radyolojik eğitimlerin

arttırılması yoluyla sağlık maliyetlerinin azalacağı söylenebilir.

Çalışmamızda difüzyon MRG istenen hastaların sadece 6'sına tekrar MRG istenmişti. Bu hastaların sadece birinde patoloji izlenmişti. Tekrarlayan MRG istemlerinin çalışmamızda oldukça nadir olduğu görüldü. Literatürde fazladan tekrarlayan çekimlerin; maliyeti, görüntüleme ilişkili zararlara maruziyeti arttırdığı ve acil serviste kalış süresini uzattığı bildirilmiştir. Tung ve ark'ı 2018 yılında yaptıkları derlemede tekrarlayan çekimlerde etkili olan faktörlerin; görüntülerin travma merkezine ulaşmaması, ulaşan görüntülerin yeterli kalitede olmaması, hekimlerin tercihi, tekrarlı çekimlerin spesifik hastalarda rutin bakımın bir parçası olması ve konsültan hekimin isteği şeklinde bildirmiştir.[5] Ayrıca 65 yaşından büyük hastalar, küçük yaştaki çocuklar, yaralanma skoru yüksek olanlar, yaralanma mekanizması, sağlık güvencesinin olması, travma merkezine olan uzaklık ve hastanın hava taşımacılığı ile transferinin görüntüleme istemini arttırabileceği ifade edilmiştir.

BT görüntülemenin fazla istenmesinin önüne geçilmesi için bazı önlemler önerilmiştir. Travma hastalarında merkezi sinir sistemi görüntülemesinde "New Orleans" ve "Canadian CT HeadRule" kritelerinin yüksek sensitiviteye sahip olduğu ifade edilmiştir. Non-travmatik hastalar için de benzer rehberler tanımlanmıştır.[20] Kanzaria ve ark'ının 2015 yılındaki çalışmasında, 435 acil servis hekimi değerlendirilmiştir. Çalışmada hekimlerin %85'i çalıştıkları acil serviste çok fazla tanısal test istendiğine inandıklarını belirtmişlerdir. Hekimlerin neredeyse tamamı istedikleri ileri görüntülemelerin bazılarının medikal olarak gereksiz olduğunu ifade etmiştir. Hekimler gereksiz düşündükleri bu fazladan istenen görüntüleme tetkik sayılarının; malpraktis reformu, hastaların eğitilmesi, test isteme konusunda hekimlere geri dönüş sağlanması ve hekimlerin tanısal görüntüleme testleri hakkında eğitilmesi ile azaltılabileceğini belirtmiştir.[21]

Çalışmamızda maliyetler bir ay süre içerisinde patoloji izlenmeyen difüzyon MRG için 32500,00 TL, patoloji izlenmeyen BT için 287463,00 TL olarak hesaplanmıştır. Acil serviste BT ve difüzyon MRG'nin yıllık maliyeti ise yaklaşık 4 milyon TL'yi bulmaktadır. Bu nedenle patoloji saptanmayan BT ve difüzyon MRG'lerin önemli bir sağlık maliyetine neden olduğu söylenebilir.

Araştırmanın kısıtlılıkları

Çalışmamızın bazı kısıtlılıkları vardı. Birincisi, difüzyon MRG ve BT istemleri sadece bir aylık süre içerisindeki başvurular için değerlendirilmiştir. Daha uzun süreli bir değerlendirme daha kapsamlı sonuçlar verebilirdi. İkincisi, bu çalışma, retrospektif olarak yapılan bir çalışma olmasından dolayı hastaların klinik bulguları değerlendirilememiştir. Bunun yerine tetkik istem gerekçesi belirtilmiş ve tetkik sonuçlarında patoloji izlenip izlenmemesi dikkate alınmıştır. Çalışmamızdaki diğer bir kısıtlılık da hasta sayısına göre BT ve difüzyon MRG istem sıklığı ve acil servis hasta yoğunluğu değerlendirilememiştir.

Hastaların klinik bulguları ve acil servis hasta yoğunluğu verilerini de kapsayacak olan yeni çalışmalarla; ülkemizde acil servislerde BT ve MRG istem sıklıkları, acil servis hekimlerinin BT ve MRG istem nedenleri, malpraktis korkusu ve defansif tıbbın ülkemizdeki boyutu değerlendirilebilir.

Sonuç

En sık istenen BT türünün kranial BT olması, ancak en yüksek negatif sonuçların kranial BT'de izlenmesi, özellikle kranial BT istemlerinde dikkatli olunması ve kranial BT istem nedenlerinin iyi analiz edilmesi gerektiğine işaret etmektedir. Ayrıca acil serviste fazla sayıda istenen ve patoloji saptanmayan BT ve difüzyon MRG tetkikleri, sağlık harcamalarında ciddi bir maliyet oluşturmaktadır.

Hekimlerin radyolojik görüntüleme isterken uluslararası kabul görmüş kılavuzlardan yararlanması, tetkik istemlerinin sayısının ve sağlık masraflarının azalmasını sağlayabilir.

Araştırmanın Etik Boyutu

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Bilgilendirilmiş Onam

Çalışmamız retrospektif çalışma olduğundan bilgilendirilmiş hasta onamı alınmadı.

Yazar katkıları

Fikir, tasarım: E.A, İ.A Verilerin toplanması ve işlemesi, analiz ve yorum: U.G, K.T, E.Y Literatür taraması: E.A, C.S Makale yazımı: E.A, İ.A, U.G Eleştirel inceleme: E.Y, K.T

Çıkar Çatışması Beyanı

Yazarların herhangi bir çıkara dayalı ilişkisi yoktur.

Araştırma Desteği

Çalışmayı maddi olarak destekleyen kişi/kuruluş yoktur.

Hakem Değerlendirmesi

Dış bağımsız.

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Research Article/Özgün Araştırma

Evaluation of the use and awareness of herbal products of the patients applying to the faculty of dentistry

Diş hekimliği fakültesine başvuran hastaların bitkisel ürün kullanımı ve farkındalıklarının değerlendirilmesi

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Abstract

Aim: This study aims to investigate the awareness and knowledge level of patients about the use of herbal products in dentistry.

Materials and Methods: Present study was carried out on a total of 200 patients who applied to the Faculty of Dentistry Oral and Maxillofacial Surgery Clinic in 2020. Data were collected using questionnaires. Herbal product usage levels, attitudes towards phytotherapy and general opinions of the patients were evaluated.

Results: Herbal products used for oral and dental health were found to be at lower levels than herbal products used in the prevention or treatment of other diseases. The patients preferred these products for halitosis and wounds. The most commonly used plants for oral health were mint, clove, thyme and black mulberry.

Conclusion: The results of present study showed that patients are willing to use herbal products. This result suggests that it would be beneficial for dentists to integrate phytotherapy into treatment protocols.

Keywords: Phytotherapy; Herbal products; Dentistry; Patients; Knowledge level.

Öz

Amaç: Bu çalışmanın amacı diş hekimliğinde bitkisel ürün kullanımı hakkında hastaların farkındalık ve bilgi düzeyini araştırmaktır.

Gereç ve Yöntem: Çalışmamız 2020 yılında Diş Hekimliği Fakültesi Ağız Diş ve Çene Cerrahisi Kliniğine başvuran toplam 200 hasta üzerinde gerçekleştirildi. Veriler anket formları kullanılarak toplandı ve hastaların bitkisel ürün kullanım düzeyleri, fitoterapiye yönelik tutumları ve genel görüşleri değerlendirildi.

Bulgular: Ağız ve diş sağlığı için kullanılan bitkisel ürünlerin diğer hastalıkların önlenmesi veya tedavisinde kullanılan bitkisel ürünlere göre daha düşük düzeylerde olduğu tespit edildi. Hastalar ağız ve diş sağlığına yönelik bu ürünleri daha çok ağız kokusu ve yaraları için tercih etmişlerdir. Ağız sağlığı için en çok kullanılan bitkiler sırasıyla nane, karanfil, kekik ve karadut olarak belirlendi.

Sonuç: Çalışmamızın sonuçları, hastaların bitkisel ürünleri kullanmaya istekli olduklarını göstermektedir. Bu sonuç, diş hekimlerinin fitoterapiyi tedavi protokollerine entegre etmelerinin faydalı olacağını göstermektedir.

Anahtar Kelimeler: Fitoterapi; Bitkisel ürünler; Diş hekimliği; Hastalar; Bilgi düzeyi.

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Introduction

Phytotherapy, which means the treatment of diseases with herbs and herbal products, is one of the most preferred traditional and holistic treatment methods by patients. Treatment with plants is as old as human history and plants have been the source of the discovery of many synthetic drugs. Despite the advances in modern medicine and synthetic drug technology, herbs are still one of the most preferred treatment options for patients. Today, the interest of patients and doctors in more natural and harmless treatment options makes herbal products more interesting.

Generally, patients find herbal products safer and prefer these products to be therapeutic or preventive in many diseases without doctor's advice. However, herbal products are not always safe, and many plants have toxic effects and drug interactions.[1] Improper use of herbal products without the knowledge and advice of a doctor can cause serious problems, especially in patient groups treated with different drugs. In addition, the availability of many herbal products that do not meet the quality standards determined by the authorities poses a threat to patients. Most of these types of products either do not contain the correct plant in sufficient amount or contain synthetic drugs or are contaminated due to their production under inappropriate conditions. In this case, the patient is harmed instead of benefit.[2] In order to prevent this negative situation, both patients and doctors should be conscious about the rational use of herbal products.

Due to the recent increase in the number of patients using herbal products, it is inevitable that physicians will encounter more frequently patients using these products in their daily practice. Patients prefer more natural products because they avoid the side effects of many drugs. This situation has made phytotherapy popular in dentistry as in all branches of medicine. For this reason, dentists should be better equipped in phytotherapy and have sufficient knowledge about the interactions with existing treatments and side effects of herbal products.[3,4] Integrative dentistry based on the preventive therapeutic model has made phytotherapy more preferred by both patients and dentists over time.[5] However, this situation requires an increase in the current level of knowledge for patients and dentists on the correct use of herbal products. For this purpose, patients should share their use of herbal products with their doctor. At the same time, doctors should provide them the necessary information on this subject.

In the literature there are studies examining the use of traditional medicine and herbal products in many branches. However, there is no study examining the use of herbal products on patients applying to dentistry clinics. Therefore, in present study, it was aimed to evaluate the patients' herbal product usage and preferences in terms of oral and dental health which is an integral part of general health. In addition, within the scope of present research, the use of herbal products, the frequency of use, the damage from the product and the sources of information were investigated in patients who applied to clinic for treatment.

Material and Methods

The type of the research

This research is a descriptive and cross-sectional study.

The samples of the research

The study included 200 literate patients who applied to the Faculty of Dentistry, Department of Oral and Maxillofacial Surgery with various dental complaints. Before the study, the patients were informed about the purpose of the study and that participation in the study was voluntary. Subsequently, informed consent form was received from the patients that they would participate in the study.

Data collection tools

Before starting the study, a preliminary research was conducted on a group of independent volunteers for the patients to understand the questionnaire forms more easily and clearly. Thus, the necessary changes were made on the surveys and the survey forms were finalized. The

questionnaire forms were prepared under four different headings to examine the demographic information of the patients, the use of herbal products for medicinal purposes and the use of herbal products for dentistry and the attitudes and behaviors about herbal products. All these questionnaires were distributed to patients before their treatment and collected after they were filled. In the study, socio-demographic information such as age, gender, educational status, occupation, place of residence, marital status, income status of the patients, and descriptive information about their general health conditions such as systemic disease, drug use, smoking or alcohol use, and how often they visited the dentist were recorded. In addition, with the help of various questions, the use of herbal products and their general attitude towards phytotherapy were evaluated.

Statistical analysis

Statistical Package for the Social Sciences (SPSS) version 25.0 statistical package program was used for statistical analysis of the data. Descriptive statistical methods were used to determine the demographic characteristics of the participants and the frequency of their responses to the questionnaires. In addition, descriptive statistical methods were used in the SPSS program to calculate the mean ages of the volunteers.

The ethical aspect of research

This study was conducted by obtaining the necessary approval from the Non-Interventional Research Ethics Committee (Decision number: 2019/7-18) And in accordance with the 2008 Declaration of Helsinki principles.

Results

97 (48.5%) of 200 patients included in the study were male; 103 of them (51.5%) were women. The age of the patients ranged from 18 to 54 and the mean age was 27.9±7,28. The socio-demographic characteristics of the patients were examined and it was found that 68% (n:136) of them were university graduates, 23.5% did not work professionally, 13% were housewives, and the rest of the patients were mostly students. The largest percentage of patients (75.5%) lived in provinces, the proportion of married and single patients was close to each other, 37% (n=74) had children, 30.5% (n=61) had insufficient income found to be.

When examined in terms of general health conditions, it was found that 91% (n=182) of the patients were systemically healthy, 13.5% (n=27) of them were using chronic medication. It was found that 38% of the patients (n=76) have been smoking and 11% (n=22) of them have been using alcohol. It was determined that 8.5% (n=17) of the patients visited the dentist every three months, 12% (n=24) every six months, and 15.5% (n=31) once a year. 64% of the patients (n=128) were found to visit the dentist only when they had complaints. The distribution of all these socio-demographic and general health information of the patients is given in Table 1 in detail.

Table 1. Distribution of patients according to their demographic information

Demographic features		n	%
Gender	Male	97	48.5%
	Female	103	51.5%
	Total	200	100%
Age range / Mean age	18-54/27.9±7.28		
Educational status	Primary education	17	8.5%
	High school	38	19%
	University	136	68%
	Master	9	4.5%
Job	Unemployed	47	23.5%
	Housewife	26	13%
	Self-employment	45	22.5%
	Student	82	41%

Residential area	City	151	75.5%
	District	36	18%
	Village	13	6.5%
Marital status	Married	91	45.5%
	Single	107	53.5%
	Divorced	2	1%
Income status	Enough	67	33.5%
	Partly enough	72	36%
	Insufficient	61	30.5%
Systemic disease	Yes	18	9%
	No	182	91%
Drug use	Yes	27	13.5%
	No	173	86.5%
Smoking	Yes	76	38%
	No	124	62%
Alcohol	Yes	22	11%
	No	178	89%
Frequency of visits to the dentist	Quarterly	17	8.5%
	Once in a six month	24	12%
	Once a year	31	15.5%
	If have a complaint	128	64%

While 54.5% (n: 109) of the patients thought that herbal products were generally beneficial; 31% (n: 62) of them stated that they were undecided about this issue and 14.5% of them did not agree with this idea. 51% (n: 102) of the patients stated that they used herbal products and thought that these products were good for diseases. It was observed that these products were used most frequently for treatment (51%), protection (45.1%), relief (32.3%), support (29.4%) and other (7.8%) purposes, respectively. It was observed that 49% (n:98) of the patients did not use these products (Table 2).

Table 2. The use of herbal products for medicinal purposes of patients

Herbal products are generally beneficial	**n, (%)**
Disagree	29 (14.5%)
Undecided	62 (31%)
Agree	109 (54.5%)
Have you used any herbal products before?	**n. (%)**
Yes	102 (%51)
No	98 (%49)
For what purpose did you use the herbal product? *	**n. (%)**
Treatment	52 (51%)
Dermatological (skin diseases or cosmetics)	32
Hypertension	4
Diabetes	8
Kidney diseases	0
Gynecological diseases	8
Supportive	30 (29.4%)
Slimming	22
Aphrodisiac	8
Protection from diseases (common cold. flu)	46 (45.1%)
Relaxation (Sedative)	33 (32.3%)
Others	8 (7.8%)

* Multiple answers were given.

Patients who stated that they used herbal products for medicinal purposes were also evaluated in terms of the medicinal plants they used. The most commonly used plants are linden (54%), sage (42%), black mulberry (39.5%), carob (34%), lemon and green tea (33%), mint (32%), lemon + linden (30.5%), thyme and garlic (30%), black elderberry and parsley (28%) and ginger (26%) (Table 3).

Table 3. Herbal products used for medicinal purposes and their percentage distributions *

Herbal products (n (%))							
Hawthorn	16 (8%)	**Artichoke**	2 (1%)	**Carob**	68 (34%)	**Fennel**	20 (10%)
Anise	20 (10%)	**Apple vinegar**	50 (25%)	**Rosehip**	16 (8%)	**St. John's Wort**	26 (13%)
Sage	84 (42%)	**Guelder-rose**	0 (0%)	**Bitter melon**	2 (1%)	**Senna**	21 (10.5%)
Juniper	8 (4%)	**Ginseng**	29 (14.5%)	**Lemon**	66 (33%)	**Sumac**	29 (14.5%)
Aloe vera	28 (14%)	**Gingko biloba**	12 (6%)	**Lavender**	24 (12%)	**Garlic**	60 (30%)
Calendula	6 (3%)	**Rose**	36 (18%)	**Linden- lemon**	61 (30.5%)	**Onion**	14 (7%)
Lady's mantle	7 (3.5%)	**Jujube**	0 (0%)	**Lemon+garlic**	16 (8%)	**Cinnamon**	22 (11%)
White cabbage	11 (5.5%)	**Chaste tree**	7 (3.5%)	**Parsley**	56 (28%)	**Grape seed**	19 (9.5%)
Almond oil	36 (18%)	**Nettle**	8 (4%)	**Miswak**	47 (23.5%)	**Blueberry**	13 (6.5%)
Okra seed	4 (2%)	**Linden**	108 (54%)	**Parsley + walnut**	7 (3.5%)	**Green tea**	66 (33%)
Walnut	10 (5%)	**Fig**	24 (12%)	**Corn tassel**	11 (5.5%)	**Turmeric**	36 (18%)
Yarrow	6 (3%)	**Swedish bitter**	1 (0.5%)	**Parsley + quince**	5 (2.5%)	**Ginger**	52 (26%)
Black seed	44 (22%)	**Clove**	37 (18.5%)	**Peppermint**	64 (32%)	**Olive leaf**	17 (8.5%)
Sycamore leaves	4 (2%)	**Topped Lavender**	6 (3%)	**Peppermint-lemon**	48 (24%)		
Fenugreek	3 (1.5%)	**Black elderberry**	56 (28%)	**Pomegranate**	36 (18%)		
Dill	42 (21%)	**Cherry stalk**	32 (16%)	**Lemon balm**	33 (16.5%)		
Laurel	35 (17.5%)	**Flax seed**	12 (6%)	**Chamomile**	36 (18%)		
Mulberry	79 (39.5%)	**Thyme, thyme oil**	60 (30%)	**Sweet basil**	15 (7.5%)		

71.6% (n:73) of 102 patients who stated that they used any herbal product for medicinal purposes stated that these products were beneficial; 28.4% (n:29) stated that the product they used was not beneficial. In addition, 53.9% (n:55) of the patients stated that herbal products treated their pain or diseases, while 46.1% (n:47) of the patients did not. In addition, 96.1% (n:98) of the patients stated that they did not see any harmful effects after use, and 3.9% (n=4) stated that they saw harmful effects after use (Table 4).

61.8% (n=63) of the patients using herbal products stated that they researched on herbal products and phytotherapy before using. The patients stated that they obtained information about herbal products from the family-relative circle of 90.5% (n=57), from the media communication sources 42.8% (n=27), and from the circle of friends 23.8% (n=15), respectively. The number of people who get information through pharmacists is at a very low level of 9.5% (n:6) (Table 4).

It was determined that 56.8% (n=58) of the patients using herbal products used these products without consulting a doctor. Upon this, all patients were asked whether they would like to receive consultancy service on phytotherapy. It was seen that only 12% (n:24) of the patients wanted to receive this support, 50.5% (n:101) did not want this support, and 37.5% (n:75) were undecided about this issue. It was determined that the patients also wanted to receive this counseling service from doctors (68%), pharmacists (27.5%) and assistant healthpersonnel (4.5%), respectively (Table 5).

Table 4. Attitudes of the patients after using phytotherapy and herbal products and sources of information.

Did you benefit from using herbal products?	**n (%)**
Yes	73 (71.6%)
No	29 (28.4%)
Has the herbal product you used cured the existing disease?	**n (%)**
Yes	55 (53.9%)
No	47 (46.1%)
Did you suffer any damage after use?	**n (%)**
Yes	4 (3.9%)
No	98 (96.1%)
Have you done research before using herbal products?	**n (%)**
Yes	63 (61.8%)
No	39 (38.2%)
Information resources *	**n (%)**
Family-relative	57 (90.5%)
Media-communication resources	27 (42.8%)
Friends	15 (23.8%)
Herbalists	11 (17.5%)
Health personnel	8 (13%)
Pharmacist	6 (9.5%)

* Multiple answers were given

Table 5. Patients' approaches to rational use of phytotherapy.

Consulting a doctor before use	**n (%)**
Yes	44 (43.1%)
No	58 (56.8%)
Would you like to receive consultancy on herbal products?	**n (%)**
Yes	24 (12%)
No	101 (50.5%)
Undecided	75 (37.5%)
Who should provide consultancy services on herbal products?	**n (%)**
Doctors	136 (68%)
Pharmacists	55 (27.5%)
Other Health Personnel	9 (4.5%)
Herbalists	0 (0%)

In addition to all these medical uses, the use of herbal products for oral and dental health was also investigated and it was found that only 19% (n: 38) of all patients preferred herbal products. It was determined that patients using herbal products for oral and dental health most frequently used for problems such as bad breath (76.3%), oral aphthae (63.2%), bleeding gums (50%) and toothache (36.8%), respectively. It was found that they used it less frequently for sensitivity and teeth whitening. The plants most frequently used by patients for all these purposes are mint (81.6%), clove (73.7%), thyme (65.8%), black mulberry (55.3%), green tea (50%) and sage (39.5%) was found to be present. Less frequently, it was found that they used lemon, apple cider vinegar, cinnamon, miswak and ginger (Table 6).

Finally, the attitude evaluations of all patients regarding phytotherapy and herbal treatment products are shown in detail in Table 7.

Table 6. Phytotherapy and herbal product use of patients for oral and dental health

Have you used herbal products for your oral and dental health?	**n (%)**
Yes	38 (19%)
No	162 (81%)
Purpose of usage *	**n (%)**
Halitosis	29 (76.3%)
Aphthous ulcer	24 (63.2%)
Bleeding gums	19 (50%)
Toothache	14 (36.8%)
Tooth Sensitivity	9 (23.7%)
Tooth bleaching	5 (13.2%)
Most commonly used herbal products *	**n (%)**
Peppermint	31 (81.6%)
Clove	28 (73.7%)
Thyme	25 (65.8%)
Mulberry (Black mulberry)	21 (55.3%)
Green tea	19 (50%)
Sage	15 (39.5%)
Lemon	9 (23.7%)
Apple Vinegar	9 (23.7%)
Cinnamon	7 (18.4%)
Miswak	5 (13.2%)
Ginger	3 7.9%)

* Multiple answers were given

Table 7. General attitude levels of patients about phytotherapy applications.

Patients' attitudes and behaviors towards the use of herbal products	**Disagree**	**Agree**	**Partly Agree**	**Undecided**
	n. (%)	**n. (%)**	**n, (%)**	**n, (%)**
I believe that herbal products will protect or cure diseases	6 (3%)	108 (54%)	76 (38%)	10 (5%)
Herbal products do not provide treatment but can only be supportive. Treatment is provided only with medicines	87 (43.5%)	24 (12%)	67 (33.5%)	22 (11%)
Herbal products have no harmful effects	76 (38%)	36 (18%)	60 (30%)	30 (15%)
Herbal products do not interact with drugs. They can be used together	90 (45%)	26 (13%)	20 (10%)	64 (32%)
The use of herbal products can be dangerous. as they will hinder existing drug therapy	62 (31%)	32 (16%)	64 (32%)	42 (21%)
Herbal products can be used as a last resort to diseases	113 (56.5%)	31 (15.5%)	34 (17%)	22 (11%)
I think it is worth trying herbal products before going to the doctor	78 (39%)	58 (29%)	44 (22%)	20 (10%)
Herbal products should not be used in the treatment of serious diseases.	82 (41%)	43 (21.5%)	46 (23%)	29 (14.5%)
I think that herbal products will treat and prevent diseases such as cancer.	30 (15%)	52 (26%)	55 (27.5%)	63 (31.5%)

Herbal products benefit in the treatment of oral and dental diseases	5 (2.5%)	125 (62.5%)	52 (26%)	18 (9%)
I believe that herbal products can be useful in preventive dentistry	8 (4%)	138 (69%)	36 (18%)	18 (9%)
I can recommend herbal sourced paste and mouthwash to those around me	10 (5%)	136 (68%)	40 (20%)	14 (7%)
I hesitate to use herbal products as they need to be subjected to more scientific experimentation	16 (8%)	106 (53%)	32 (16%)	46 (23%)
Herbal products should be sold only in pharmacies	28 (14%)	96 (48%)	58 (29%)	18 (9%)
Herbal products should be prescribed by doctors	28 (14%)	112 (56%)	42 (21%)	18 (9%)
If herbal products are prescribed by doctors like medicines. I prefer to be treated with herbal products	6 (3%)	127 (63.5%)	38 (19%)	29 (14.5%)
I find herbal products more expensive	30 (15%)	28 (14%)	73 (36.5%)	69 (34.5%)

Discussion

In the literature, there are studies investigating the use of herbal products by patients in various medical branches and health problems. However, there is no study evaluating the use of herbal products in dentistry in terms of both oral and dental health and other medical purposes.

In a study evaluating the use of herbal products by adult individuals, it was stated that 54.5% of the patients who applied to herbal products had chronic diseases.[6] 9% of the patients participating in present study had a systemic disease and 13.5% of them had chronic drug use. The rate of systemic disease was found to be lower than the literature, as the participants in the survey consisted of a younger population.

In the study of Biçen et al. examining the use of herbal products in hypertensive patients, 61% of the patients stated that they believed that herbs healed the hypertension.[7] Similarly, in present study, 54% of the patients stated that they found herbal products useful in general, 31% of them were undecided about this and a small portion of them thought that these products were not beneficial.

51% of the patients participating in the study stated that they had used herbal products for protection from diseases or for therapeutic purposes. In the study conducted by Tulunay et al. with chronic patients, the rate of using herbal products was 29%, and this rate was 53% in the study conducted by Biçen et al. with hypertension patients.[7,8] In the study conducted by Tuna et al. with cancer patients, the use of herbal products was found to be 68.2%.[9] In these studies conducted in various clinics, it is seen that patients prefer herbal products to be therapeutic or preventive for a wide spectrum of diseases, from minor indications to major indications such as cancer. Most of these patients use herbal products with their current treatments and often do not share these preferences with their doctors.[7] This can negatively affect the treatment process of the patients, as well as lead to dangerous consequences in terms of drug interactions and side effects.

Considering herbal products completely safe and using them without the advice of a doctor or pharmacist may cause negative consequences. Because some plants may have toxic components and many herbal products also interact with drugs. Warfarin, which is used as an anticoagulant, has interactions with many known herbal products. 58 different plants have been identified that can alter blood hemostasis and anticoagulation by interacting with warfarin. Plants that show the greatest potential to interact with warfarin include herbs used for food or therapeutic purposes, such as garlic, ginger, grapefruit, ginkgo, St. John's wort, and ginseng.[10] It is known that the traditionally used licorice and St. John's Wort also interact with many drugs with different

mechanisms.[11-13] In addition, it should be kept in mind that essential oils such as clove, mint and thyme, which are frequently preferred for oral and dental health, can irritate the mucosa when applied directly.[14]

Pınar et al. stated in their study with patients who applied to the cardiology clinic that 56.3% of the patients used herbal products for hypertension and 34.2% for cardiovascular diseases.[15] In present study, 45.1% of the patients stated that they used herbal products for protection from diseases (colds, flu) and they were mostly used for dermatological diseases for therapeutic purposes. The presence of herbs such as sage and linden, which are used in conditions such as colds and flu, among the plants that are frequently used, confirms their usage characteristics. Therefore, it was thought that results of present study will contribute to meaningful and advanced studies.

One of the important issues investigated in studies conducted with patients is the state of benefiting from the herbal products used by patients. Tulunay et al. found in their studies that 68.3% of the patients using herbal products found it quite beneficial.[8] In the study conducted by Tuna et al. with cancer patients, it was found that 38 of 322 patients using herbal products had various side effects such as nausea and abdominal pain. However, most of the patients stated that they benefited and only 24% of those using herbal products shared this situation with their doctors.[9] Biçen et al. stated in their study with hypertension patients using herbal products that 72% of the patients benefited from these products. However, similarly, the majority of these patients (87%) did not inform their doctor about the herbal product they used.[7] In another study conducted by Biçen et al. with chronic kidney patients, it was determined that 37% of the patients benefited from herbal products. 78.4% of the participants, including patients with kidney transplantation, did not inform their doctors about the products they used.[16] In the study conducted by Pınar et al. with diabetic patients, it was stated that not all patients consult a doctor about using herbal products. In this study, patients stated that they were not harmed by herbal products.[17] In present study, 71.6% of the patients using herbal products stated that they benefited from the product they used, and 53.9% stated that their diseases were treated with herbal products without using drugs. 3.9% of the patients using herbal products stated that they were harmed by the product they used, but the details of this damage were not specified. More detailed research is required on the side effects, drug interactions and harms of herbal products. In addition, similar to the literature, 56.8% of the patients in our study did not consult a doctor while using herbal products, and approximately half of the patients stated that they did not need to seek medical advice while using these products. The results of our study are compatible with the literature and, as seen in the studies, the majority of patients benefit from herbal products, while most patients did not receive a doctor's advice on this issue. Which herbal products with harmful effects are taken by patients, whether these products comply with the quality standards, whether they use them together with conventional medicines, and the details of the damage should be investigated separately with further studies.

Since the indications, contraindications, dose ranges, drug interactions, safety profile, frequency of side effects of many herbal products are not determined by clinical studies, their place in the treatment of many diseases is based on traditional usage data.[18-20] For this reason, it is necessary to raise awareness of both patients and doctors in order to provide the best treatment conditions and to prevent possible damages. It is extremely important for doctors to have comprehensive training in phytotherapy, to have sufficient knowledge and skills in terms of increasing effectiveness in treatment and preventing unwanted results.

One of the important issues regarding the use of herbal products is from which sources patients learn about these products. In general, it is observed that patients do not consult their doctors about this issue. In our study, when the patients were asked if they did any research before using herbal products, 61.8% of the patients stated that they did research. In the study conducted by Biçen et

al., 83% of the patients using herbal treatment stated that they used the product without any research on the product. Most of these patients indicated sources of information about the herbal product they used were neighbors, relatives, friends or television and radio.[7] Similarly, in the study of Pınar et al. with patients who came to the cardiology clinic, it was stated that they used herbal products at the suggestion of their relatives, friends, neighbors.[15] The rate of patients using it by being affected by the visual media was 33.3%, and the rate of use with the doctor's advice was 3.5%.[15] Similarly, in our study, most of the patients (90.5%) stated that they obtained information from their family and relatives. At the same time, the rate of obtaining information from the media and herbalists was found to be higher than the pharmacists and doctors, who should be the main consultation center in this field.

The recent popularity of herbal products has increased the marketing and advertising of these products. Especially many herbal products are promoted with exaggerated promises such as a definitive solution to the disease, 100% harmless, natural treatment without side effects.[21] Particularly serious patient groups such as cancer and people with chronic diseases such as diabetes, hypertension, depression and rheumatism and who need to use drugs continuously become the target audience of these advertisements.[22] The popularity of herbal products often causes people who have no education in the field to turn to this field and these people pose a serious threat to patients by producing or marketing herbal products. Studies conducted show clearly the negative effects of the media or social networks in this area.[22-24] For this reason, stricter regulations should be introduced by the relevant authorities in the sale and advertisements of herbal products with therapeutic properties.

In our study, when the patients were asked whether they would like to receive consultancy about herbal products, about half (50.5%) stated that they did not want to receive counseling, while some of the patients were undecided about this issue (37.5%), others (12%) stated that they wanted to get counseling. However, when asked who should give counseling to patients regarding herbal products, most of the patients think that doctors (68%) and pharmacists (27.5%) should provide them. These results actually suggested that if the patients were given professional consultancy before using herbal products, the number of people using the products without consulting a doctor could decrease. More studies are needed to support this prediction.

When we questioned the use of herbal products for oral and dental health, it was found that 19% of the patients had used herbal products for this purpose before. Similarly, in the study conducted by Abebe et al. with dentistry patients, this rate was found to be 12.6%.[25] In the study of Yoon et al., it was stated that 65% of the patients who applied to the dentistry faculty used herbal products.[26] However, in these studies, the use of herbal products in general was questioned and no specific question was asked about their use for oral and dental health.

In our study, the majority of the patients stated that they believed that herbal products would protect or cure diseases. Approximately half of the patients disagreed with the opinion that treatment can only be provided with medicines and herbal products can only be supportive. When we evaluate these opinions, it is seen that patients generally find herbal products beneficial.

Soner et al. found in their study that 53.2% of participants believed herbal remedies were harmless, had fewer side effects, or were completely safe.[27] In our study, 38% of the patients did not agree with the view that herbal products do not have harmful effects, but some of the remaining patients partially agreed with this view or remained undecided. These results actually suggest that patients do not have enough information about toxic plants or their toxicity in inappropriate use. Similarly, in the present study 31% of the patients disagreed with the opinion that herbal products can affect the process negatively or prevent the treatment by changing the effectiveness of the treatment while receiving any treatment. In addition, some of the patients disagree with the opinion that

medicines and herbal products may interact, or their indecisive opinions indicate that there is a deficiency in this regard.

41% of the patients disagreed with the opinion that herbal products should not be used in the treatment of serious diseases. 26% of the patients stated that herbal products can be used as therapeutic or preventive in diseases that involve long treatment processes such as cancer. Some of the patients partially agreed with this view and some remained undecided. This result suggests that some patients consider herbal products quite safe and ignore possible side effects. However, the use of complementary therapies and herbal products in such patient groups should be used under the supervision of a doctor.

Mutlu et al. stated in their study on cancer patients that 62% of the cases used complementary and alternative medicine methods.[28] In another study conducted on cancer patients, herbal products were reported to constitute 95% of complementary and alternative medicine methods and *Urtica dioica* (nettle) was specified as the most commonly used herbal product.[29] In our study, while the patients were positive about the use of herbal products in cancer treatment, approximately 30% of the patients stated that they partially or completely agreed with the opinion that herbs could be used as a last resort.

Considering the patients' attitudes towards the application of herbal products in the field of dentistry, most of the patients expressed a positive opinion. Only 2.5% of the patients disagreed with the opinion that herbal products would benefit oral and dental diseases. Other patients think that herbal products will be useful in dental diseases. In addition, they found herbal products useful in preventive dentistry, and they gave a very positive opinion about the use of herbal-based paste or mouthwash. These results show that dentists should be better equipped with phytotherapy practices and herbal products as in other branches. The results of our study show that patients are willing to use more natural and holistic treatments in the treatment of oral and dental diseases. This shows that it will be beneficial for dentists to integrate natural treatment methods and herbal products into treatment protocols.

Limitation of the study

The patients' use of herbal products and their attitudes towards the products were questioned. Although results have been obtained regarding which plants are used frequently, it has not been asked which plant they use for which diseases. In addition, the study covers a limited patient population. For this reason, it should be investigated which plants are preferred for which disease in a larger patient population. In addition, more comprehensive studies should be conducted examining the benefit and harm profiles of herbal products.

Conclusions

In our study, it was observed that patients who applied to the faculty of dentistry had a positive approach towards phytotherapy and herbal products. Considering to the increasing popularity of phytotherapy and other holistic treatment approaches, it clearly shows that dentists may encounter patients using herbal products while performing their profession.

It is very important for dentists to routinely ask patients about the use of herbal products during dental anamnesis and inform patients about the risks and benefits of these products to obtain better treatment results. In order to ensure that patients benefit from phytotherapy at an optimum level and to prevent damages that may occur as a result of their misuse, it will be beneficial to provide evidence-based training for doctors and dentists that will increase their basic knowledge and skill levels in phytotherapy.

Ethics Committee Approval

Ethical permission was obtained from the Non-Interventional Research Ethics Committee in the province where the study was conducted (2019/7-18) and written permission was obtained from the institution. The research was conducted according to the principles of the Declaration of Helsinki.

Informed Consent

Informed consent forms were obtained from all participants included in the study.

Authors' Contributions

Conception – M.E., B.E.; Design – M.E., M.K., S.Y.; Supervision – M.K., S.Y.; Materials – B.E.; M.K.; Data Collection and/or Processing- M.Y.K., B.E.; Analysis and/or Interpretation – M.E., B.E.; Literature Review – B.E., M.Y.K., M.E.; Writer – M.E., B.E.; Critical Review –M.K., S.Y.

Conflict of Interest

No conflict of interest was declared by the authors.

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Statements

The results of this research have not been presented previously.

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Research Article/Özgün Araştırma

Determination of chronic illness care and healthy lifestyles of patients hospitalized in internal medicine clinics

Dahili kliniklerde yatan hastaların kronik hastalık bakımı ve sağlıklı yaşam biçimlerinin belirlenmesi

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Abstract

Aim: This study aimed to determine the chronic disease care and healthy lifestyles of patients hospitalized in internal medicine clinics.

Materials and Methods: A descriptive and cross-sectional study was conducted from May 1 to August 31, 2019. The study population consisted of 207 patients with chronic diseases.

Results: It was found that there was a statistically significant, and positively significant relationship was found between the chronic disease care assessment scale and the healthy lifestyle behaviors scale of the patients included in the study.

Conclusion: Positive association was detected between care satisfaction and healthy lifestyle behaviours of individuals with chronic disease. It may be recommended to provide training that supports the healthy lifestyles of these individuals who have to live with chronic diseases.

Keywords: Chronic illness; Healthy life; Internal clinic.

Öz

Amaç: Bu çalışma, dahili kliniklerde yatan hastaların kronik hastalık bakımı ve sağlıklı yaşam biçimlerinin belirlenmesi amacıyla yapıldı.

Gereç ve Yöntem: Tanımlayıcı ve kesitsel olarak yapılan çalışma, Mayıs–Ağustos 2019 tarihleri arasında yürütülmüştür. Çalışmanın örneklemini ise kronik hastalığı olan 207 hasta oluşturdu.

Bulgular: Çalışmaya dahil edilen hastaların kronik hastalık bakımını değerlendirme ölçeği ile sağlıklı yaşam biçimi davranışları ölçeği arasında istatistiksel olarak önemli, pozitif yönde anlamlı bir ilişki olduğu saptandı.

Sonuç: Kronik hastalığı olan bireylerin bakım memnuniyetleri ve sağlıklı yaşam biçimi davranışları arasında pozitif bir ilişki olduğu saptandı. Kronik hastalıkla yaşamak zorunda olan bu bireylerin sağlıklı yaşam biçimlerini destekleyici eğitimler verilmesi önerilmektedir.

Anahtar Kelimeler: Kronik hastalık; Sağlıklı yaşam; Dahili klinik.

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Introduction

Chronic diseases (CI) are those that involve a long life span, require continuous medical care and treatment, are slow and progressive, and cause irreversible changes in normal physiological functions.[1] In western countries, chronic CI is rapidly growing and it is associated with increased number of days in the intensive care unit (ICU), prolonged hospitalization in post-acute(weaning) centers, and poor prognosis in the long term, which is also valid for our country.[2]

The factors causing increase in the incidence and prevalence of chronic illnesses are listed as the aging world population, stressors caused by rapid urbanization and decrease in physical activity with developing technology and changes in lifestyle such as changes in dietary habits.[3]

Although a great number of diseases such as cardiovascular diseases, diabetes, obesity, some cancers and chronic respiratory system diseases are among chronic illness group, most of them have common risk factors and prevention strategies.[4] According to WHO, health systems which are structured to provide mainly acute care services in chronic health problems are insufficient. More focus is placed on acute health problems than protective and preventive health services in the world and treatment services are mostly conducted through medication and technological interventions.[5] Similarly, health system also focuses on treatment services in Turkey. Chronic diseases can be controlled significantly with programs targeting good health by focusing on protection measures and controlling risk factors.[2] The most important characteristic of chronic illnesses is that a great number of underlying reasons except for some irreversible reasons such as family history and genetic background are completely preventable risk factors. Behavioural risk factors such as tobacco use, immobility and unhealthy diet are responsible for the occurrence of coronary heart disease and cerebrovascular diseases with a rate of 80%.[3]

Today, it is known that morbidity and mortality in chronic illnesses such as cardiovascular diseases, cancer, heart diseases, hypertension and diabetes can be decreased significantly with changes in lifestyle.[6] In this context, it is important for individuals with chronic illness to adopt healthy lifestyle behaviours from the moment they are diagnosed. Healthy lifestyle behaviours are defined as behaviours which serve individuals to maintain and increase their levels of well-being. These behaviours include having a sufficient and balanced diet, not smoking, stress management, regular physical activity, effective spiritual development, positive interpersonal relationships and taking responsibility to maintain and develop health.[7]

Among the health team, nurses have important responsibilities such as creating awareness in society about the prevention of cardiovascular and other chronic illnesses, delaying the occurrence of the disease in risky individuals and decreasing possible complications and educating individuals, introducing them with healthy lifestyle habits and consulting them to adopt to treatment when they get ill.[8]

In the management of chronic illness, it is important to adopt healthy lifestyle behaviours, to control all behaviours that can influence the individual's health and to adopt daily activities according to the individual's health status.[9] In this respect, it is thought that the present study would be a guide in planning and preparing a content for trainings and health practices to be conducted to inform individuals with chronic illness about the risk factors and the complications that may develop as a result of the illness and to prevent these complications. It is also thought that all these outcomes will contribute to the nursing care provided to individuals.

Materials and Methods

Study design and sampling

This descriptive and cross-sectional study was conducted to determine the chronic illness care and health lifestyles of patients hospitalized in internal medicine clinics.

Population and sample of the study

The population of the study consisted of 300 patients hospitalized in the internal clinics of a university hospital between May and August 2019.

The study sample consisted of 207 hospitalized patients with chronic diseases like respiratory system, diabetes, cardiovascular system treated in Internal Medicine Department of University from May 1 to August 31, 2019.

All patients were ≥18 years old, and had no audial, visual and mental problems, volunteered to participate in the study and who had the cognitive competence to answer the questions.

17 patients in the hospital did not want to participate in the study, and 14 patients did not meet the research criteria. In the power analysis performed to determine the adequacy of the sample size, it was determined that the effect size was 2.25 (high level) and the power was 0.99 at the 95% confidence interval at the 0.05 significance level. These values show that the sample size is at the desired level.

Data collection tools

The data were collected by the researchers through face-to-face interview technique by using "Descriptive Information Form", "Patient Assessment of Chronic Illness Care" and "Healthy Lifestyle Behaviour Scale".

Descriptive information form: This form, consisting of 13 questions about the socio-demographic characteristics of individuals, was prepared using the relevant literature and studies.

Patient assessment of chronic illness care (PACIC): Turkish validity and reliability of the scale which was developed by Glasgow et al based on the Chronic Care Model of Wagner, was conducted by İncirkuş and Nahcivan.[10,11] It is an easily applicable short instrument allowing patients to assess the health care services and at the same time which provides information about the quality of care services given. It is a Likert type scale with 20 items and it includes five sub-dimensions as patient activation (questions 1-3), decision support (questions 4-6), goal setting (questions 7-11); problem solving (questions 12-15) and follow-up/coordination (questions 16-20). The scale is scored as "1=never, 2=rarely, 3=sometimes, 4=most of the time and 5=always". The total score of the scale is calculated from the average score of all 20 questions. Increased scale scores show that individual with chronic illness have high level of satisfaction from the care they receive and that chronic illness management is sufficient.[11] According to the Turkish validity and reliability study of the scale; the Cronbach Alpha value is 0.91.[11]

Healthy lifestyle behaviour scale (HLBS II): It was revised by Walker et al. and named HLBS II. [12] Validity and reliability studies of the scale were conducted by Bahar et al. [13] HLBS II is a 4-Likert type scale with 52 items and options of "never", "sometimes", "frequently" and "regularly". The scale consists of six sub-dimensions titled "health responsibility", "physical activity", "nutrition", "spiritual development", "interpersonal relations" and "stress management". The lowest score one can get from the scale is 52, while the highest score is 208. As the total score increases, it is accepted that the patient has healthier lifestyle behaviours. Chronbach Alpha value for HLBS II total scale is 0.92.[13]

Assessment of data

Descriptive statistics in the study were given as numbers, percentage, arithmetic mean and standard deviation. Independent Correlation Coefficient was used to assess the data obtained. SPSS 25 program was used for statistical analyses and level of significance was taken as 0,05 (p-value) in statistical analyses.

Ethical principles of the study

Approval was taken from the Ethical Board of the State University the study was conducted in (21/05/2019 date and 2019/03-01 number) and written permission was taken from University. In addition, written and oral consent was taken from the individuals participating the study after the purpose of the study was explained. Written permission was obtained from the authors who conducted the Turkish validity and reliability of the study.

The study was conducted in accordance with the Helsinki declaration principles.

Results

It was found that of the 207 individuals included in the study, 45.41% were female; 37.68% were illiterate; 69.57% were married and 84.06 were not working. It was also found that 36.71% were living in village and 44.93% had low level of income. Table 1 demonstrates demographic and chronic illness related information of the patients included in the study.

Table 1. Demographic information of patients included in the study.

		n (%)
Age	18-44 years	100 (48.31)
	≥45 years	107 (51.69)
Gender	Female	94 (45.41)
	Male	113 (54.59)
Level of education	Illiterate	78 (37.68)
	Primary	78 (37.68)
	High School	32 (15.46)
	Undergraduate and higher	19 (9.18)
Marital status	Married	144 (69.57)
	Single	63 (30.43)
Employment	Employed	33 (15.94)
	Unemployed	174 (84.06)
Social security	Yes	108 (52.17)
	No	99 (47.83)
Level of income	Low	93 (44.93)
	Moderate	114 (55.07)
Place of residence	Village	76 (36.71)
	Town	60 (28.99)
	City	71 (34.3)
Treatment unit	Internal medicine (DM, Cancer GİS)	76 (36.71)
	Cardiology	18 (8.7)
	Neurology	20 (9.66)
	Chest Diseases	27 (13.04)
	Other units (Infectious Diseases, Dermatology, Physical Therapy and Rehabilitation Center)	66 (31.88)
Length of hospital stay	1-29 days	170 (82.13)
	≥30 days	37 (17.87)
Chronic illness	Respiratory system	80 (38.65)
	Diabetes	36 (17.39)
	Cardiovascular system	41 (19.81)
	Cancer	9 (4.35)
	GİS	41 (19.81)
Individual opinion about personal health	Perfect	4 (1.93)
	Very good	7 (3.38)
	Good	73 (35.27)
	Not bad	86 (41.55)
	Bad	37 (17.87)
State of smoking	Yes	41 (19.81)
	No	128 (61.84)
	Quit	38 (18.36)

In this study, the distribution of scores taken from PACIC was not given in any table; however, average score was found to be 2.94±0.49. Average scores taken from patient activation sub-dimension was 3.32±0.84; average score taken from decision support sub-dimension was 2.65±0.66; average score taken from goal setting sub-dimension was 2.67±0.62; average score taken from problem solving sub-dimension was 3.40±0.77; while average score taken from follow-up and coordination sub-dimension was 2.78±0.56 In

this study, Cronbach Alpha value was calculated as 0.82. (Table 2).

In the study, general total score from HLSBS-II was found to be 122.87±14.38. Also, Cronbach Alpha value was calculated as 0.85.The total score taken from health responsibility sub-dimension was 22.14±3.49; the total score taken from physical activity sub-dimension was 15.16±3.02; the total score taken from nutrition sub-dimension was 20.24±3.07; the total score taken from spiritual development sub-dimension was 24.31±3.96; the total score taken from interpersonal relationships sub-dimension was 22.56±3.69 and the total score taken from stress management sub-dimension was 18.45±3.56 (Table 2).

Table 2. Mean scores of HLSBS-II *, PACIC ** total and sub-dimensions score.

HLSBS-II Scale	Mean ± SD	PACIC Scale	Mean ± SD
Health responsibility	22.14±3.49	Patient activation	3.32±0.84
Physical activity	15.16±3.02	Decision making support	2.65±0.66
Nutrition	20.24±3.07	Goal setting/ tailoring	2.67±0.62
Spiritual development	24.31±3.96	Problem solving	3.40±0.77
Interpersonal relationships	22.56±3.69	Follow-up/coordination	2.78±0.56
Stress management	18.45±3.56.		
Total	122.87±14.38		2.94±0.49

* HLSBS-II: Healthy Lifestyle Behaviour Scale, PACIC: Patient Assessment of Chronic Illness Care

Statistically significant difference was found the patients' PACIC total score averages of the patients who had an educational status of undergraduate and higher were found to be significantly higher when compared to those having "primary education" as educational status (p=0.016). Patient activation score averages of patients having hospital stay periods of 1-29 days were significantly higher compared to those of patients who had ≥30 days of hospital stay (p=0.010). Goal setting/tailoring score averages of the patients in chest diseases, internal diseases and neurology units were significantly higher than those of the patients treated in other units (p=0.016). Problem solving average scores of male patients were significantly higher when compared with those of female patients (p=0.041). Similarly, it was concluded that problem solving average scores of the patients with an educational status of undergraduate and higher (p=0.034). Follow-up/ coordination average scores of the patients with an educational status of undergraduate and higher were significantly higher when compared to those with an educational status of high school (p=0.008) (Table 3).

Statistically significant difference were found HLBS-II total score averages of the patients who were ≥45 years old (p=0.008), employed (p=0.007), treated in cardiology units (p=0.020), and those who assessed their general health condition as perfect (p=0.024). Statistically significant difference was found health responsibility average scores of the patients between 18 and 44 years of age (p=0.015). Spiritual development average scores of the patients who were employed were significantly higher than those who were not employed (p=0.019). Interpersonal relationships average scores of the patients who were between 18 and 44 years of age were significantly higher than those who were 45 years and older (p=0.030). In addition, interpersonal relationships average scores of patients who were high school graduates (p=0.008) and who were employed (p=0.005) were significantly higher. Stress management average scores of the patients who were employed were significantly higher than those of the patients who were unemployed (p=0.004) (Table 3). Similarly, stress management average scores of the patients who had moderate level of income (p=0.040), who were treated in cardiology unit (p=0.009) or those having a hospital stay between 1

to 29 days (p=0.017) were significantly higher (Table 4). There was no statistically significant relationship between other sociodemographic characteristics and HLBS-II and sub-dimensions.

Table 3. Comparison of PACIC total and sub-dimension scores in terms of the demographic characteristics of the patients included in the study.

		PACIC Total	Patient Activation	Decision Making Support	Goal Setting/ Tailoring	Problem Solving	Follow-up/ Coordination
Age	18-44 years	2.97±0.42	3.39±0.71	2.7±0.66	2.71±0.59	3.44±0.78	2.75±0.56
	≥45 years	2.91±0.54	3.25±0.94	2.61±0.66	2.63±0.64	3.36±0.76	2.81±0.56
	p	0.582	0.414	0.140	0.419	0.903	0.536
Gender	Female	2.9±0.49	3.25±0.85	2.66±0.65	2.66±0.62	3.3±0.8	2.76±0.59
	Male	2.97±0.48	3.38±0.82	2.65±0.67	2.68±0.62	3.48±0.74	2.79±0.54
	p	0.270	0.407	0.424	0.995	[a] **0.041**	0.674
Level of education	Illiterate	2.97±0.49	3.37±0.86	2.63±0.63	2.64±0.62	3.43±0.65	2.91±0.51
	Primary	2.84±0.47	3.23±0.82	2.63±0.66	2.6±0.6	3.22±0.78	2.66±0.58
	High school	2.96±0.51	3.36±0.85	2.67±0.67	2.75±0.57	3.55±0.92	2.63±0.56
	Undergraduate and higher	3.15±0.41	3.44±0.82	2.81±0.81	2.92±0.68	3.71±0.79	2.97±0.55
	p	[b] **0.016**	0.560	0.952	0.295	[b] **0.034**	[b] **0.008**
Marital status	Married	2.91±0.51	3.26±0.91	2.65±0.69	2.66±0.63	3.34±0.78	2.77±0.59
	Single	3±0.41	3.47±0.63	2.66±0.58	2.7±0.58	3.54±0.72	2.81±0.49
	p	0.311	0.241	0.993	0.916	0.053	0.582
Employment	Employed	3.05±0.42	3.52±0.69	2.74±0.7	2.79±0.65	3.6±0.72	2.78±0.56
	Unemployed	2.92±0.49	3.28±0.86	2.64±0.65	2.65±0.61	3.36±0.77	2.78±0.56
	p	0.131	0.213	0.645	0.329	0.134	0.744
Level of income	Low	2.88±0.47	3.21±0.85	2.61±0.58	2.63±0.61	3.31±0.74	2.77±0.54
	Moderate	2.98±0.49	3.41±0.82	2.69±0.72	2.7±0.62	3.47±0.78	2.78±0.58
	p	0.370	0.169	0.967	0.669	0.230	0.806
Treatment unit	Internal medicine	2.97±0.37	3.37±0.72	2.64±0.62	2.74±0.53	3.35±0.76	2.86±0.44
	Cardiology	2.99±0.44	3.35±0.8	2.74±0.54	2.64±0.68	3.58±0.65	2.78±0.54
	Neurology	2.99±0.6	3.47±0.95	2.88±0.82	2.85±0.85	3.25±0.82	2.69±0.69
	Chest diseases	2.91±0.49	3.2±0.9	2.62±0.71	2.73±0.51	3.31±0.72	2.78±0.69
	Other	2.88±0.58	3.25±0.92	2.59±0.66	2.52±0.63	3.48±0.81	2.71±0.6
	p	0.820	0.597	0.558	[b] **0.016**	0.329	0.719
Length of hospital stay	1-29 days	2.96±0.46	3.39±0.8	2.68±0.62	2.69±0.6	3.4±0.77	2.78±0.55
	≥30 days	2.84±0.58	2.97±0.94	2.53±0.8	2.56±0.69	3.41±0.76	2.76±0.63
	p	0.480	[a] **0.010**	0.089	0.227	0.746	0.929
Chronic illness	Respiratory system	2.89±0.49	3.24±0.86	2.68±0.67	2.69±0.62	3.27±0.84	2.71±0.59
	Diabetes	3.03±0.46	3.41±0.82	2.73±0.75	2.69±0.62	3.64±0.61	2.83±0.58
	Cardiovascular system	2.95±0.48	3.32±0.81	2.63±0.66	2.76±0.59	3.44±0.75	2.73±0.52
	Cancer	2.75±0.96	3±1.4	2.7±1.09	2.47±1.12	3±1.12	2.71±0.79
	GIS	2.97±0.35	3.46±0.68	2.54±0.41	2.57±0.47	3.48±0.6	2.93±0.45
	p	0.651	0.583	0.670	0.495	0.111	0.211

Descriptive statistics were given as average ± standard deviation. a. $p<0.05$ and Mann-Whitney U test were used. b. $p<0.05$ and Kruskal-Wallis H test were used.

Table 4. Comparison of total score and sub-dimension scores of HLBS-II in patients included in the study in terms of demographic characteristics.

		HLBS Total	Health Responsibility	Physical Activity	Nutrition	Spiritual Development	Interpersonal Relationships	Stress Management
Age	18-44 years	125.19±13.82	22.8±3.07	15.44±2.88	20.38±2.92	24.81±3.35	23.13±3.44	18.63±3.67
	≥45 years	120.7±14.62	21.53±3.75	14.91±3.14	20.11±3.22	23.84±4.43	22.02±3.85	18.29±3.47
	p	[a] **0.008**	[a] **0.015**	0.205	0.436	0.076	[c] **0.030**	0.374
Gender	Female	123.72±17.08	22.47±3.73	15.47±3.21	20.31±3.21	24.37±4.47	22.34±3.96	18.77±4.09
	Male	122.16±11.71	21.88±3.27	14.91±2.85	20.19±2.97	24.26±3.5	22.73±3.46	18.19±3.05
	p	0.439	0.248	0.187	0.934	0.838	0.446	0.647
Level of education	Illiterate	121.03±15.93	21.5±3.82	15.13±3.18	20.26±3.28	24.13±4.5	21.67±3.87	18.35±3.6
	Primary	121.69±12.97	21.99±3.42	14.96±2.95	19.94±2.99	24±3.75	22.59±3.3	18.22±3.52
	High school	127.34±12.95	23.59±2.73	15±2.9	20.63±2.43	24.97±3.42	24.22±3.26	18.94±3.73
	Undergraduate and higher	127.74±13.87	23±2.73	16.42±2.76	20.79±3.54	25.21±3.26	23.26±4.23	19.05±3.41
	p	[b] **0.028**	0.077	0.291	0.472	0.477	[d] **0.008**	0.472
Marital status	Married	123.76±16	22.01±3.9	15.3±3.32	20.51±3.41	24.31±4.26	22.82±3.81	18.81±3.85
	Single	120.84±9.52	22.46±2.28	14.86±2.18	19.62±2.02	24.3±3.22	21.95±3.36	17.65±2.66
	p	0.679	0.653	0.259	0.166	0.984	0.120	0.086
Employment status	Employed	129.55±13.96	23.42±2.85	15.67±3.54	20.45±3.26	25.79±3.04	24.21±3.24	20±3.87
	Unemployed	121.6±14.15	21.9±3.55	15.07±2.91	20.2±3.04	24.03±4.06	22.24±3.7	18.16±3.43
	p	[a] **0.007**	0.083	0.298	0.988	[c] **0.019**	[c] **0.005**	[a] **0.004**
Level of income	Low	121.49±14.16	21.66±3.44	15.02±2.74	20.24±3.08	24.02±4.36	22.49±3.6	18.06±3.6
	Moderate	123.99±14.52	22.54±3.48	15.28±3.24	20.25±3.08	24.54±3.61	22.61±3.78	18.77±3.51
	p	0.177	0.076	0.540	0.854	0.356	0.831	[a] **0.040**
Unit of treatment	Internal medicine	125.93±15.27	22.38±3.32	15.74±2.99	20.84±3.31	24.88±3.87	23.01±3.38	19.08±3.76
	Cardiology	126.39±12.3	24.17±3.09	15.56±2.75	19.78±2.05	24.89±4.01	22.72±2.95	19.28±3.18
	Neurology	124.25±14.26	22.05±3.27	15.3±3.44	20.8±3.38	24.2±4.73	22.75±3.67	19.15±4.69
	Chest diseases	116.67±15.14	20.89±3.38	14.22±3.65	20.15±2.4	23.07±4.11	21.26±4.38	17.07±3.02
	Other	120.5±12.62	21.86±3.7	14.74±2.62	19.55±3.07	24.03±3.71	22.45±3.9	17.86±3.03
	p	[b] **0.020**	[b] **0.020**	0.135	0.102	0.295	0.328	[b] **0.009**
Length of hospital stay	1-29 days	124.01±14.58	22.48±3.4	15.28±2.99	20.25±3	24.54±4.04	22.75±3.72	18.72±3.73
	≥30 days	117.65±12.3	20.62±3.51	14.65±3.13	20.22±3.42	23.27±3.45	21.68±3.47	17.22±2.3
	p	[a] **0.009**	[a] **0.003**	0.253	0.998	0.078	0.110	[a] **0.017**
Chronic illness	Respiratory system	123.03±14.95	22.05±3.45	14.98±3.15	20.63±3.03	24.23±4.03	22.53±3.89	18.63±3.76
	Diabetes	123.25±13.27	22.33±3.25	14.64±3.13	20.47±3.58	24.28±4.05	22.92±3.83	18.61±3.7
	Cardiovascular system	126.15±14.76	22.71±3.32	15.9±2.98	20.2±2.78	25.29±3.99	23.29±3.92	18.76±3.86
	Cancer	108.56±13.7	17.78±5.74	14.67±4	18±2.18	20.67±4.44	20.78±1.86	16.67±2
	GIS	122.1±12.51	22.56±2.72	15.37±2.4	19.83±2.99	24.32±3.25	21.95±3.1	18.07±2.95
	p	0.065	0.079	0.279	0.085	0.099	0.176	0.643

Descriptive statistics were given as average ± standard deviation. a. $p<0.05$ and Mann-Whitney U test was used. b. $p<0.05$ and Kruskal-Wallis H test was used. c. $p<0.05$ and Independent Samples T test was used.d. $p<0.05$ and One-Way ANOVA test was used.

As a conclusion, a statistically significant, linear and weak association was found between chronic patient care assessment scale total scores and the scores of patient activation, decision making support, goal setting/tailoring, problem solving an follow-up coordination sub-dimensions. Also a statistically significant, linear and weak association was found between healthy lifestyle behaviours scale general total scores and the scores of health responsibility, physical activity, nutrition, spiritual development and stress management sub-dimensions (Table 5).

Table 5. Correlation between scale in general and sub-dimensions of the scale.

	PACIC Total	**Patient activation**	**Decision making support**	**Goal setting/tailoring**	**Problem solving**	**Follow-up/ Coordination**
HLSBS-II Total	**0.282***	**0.238***	**0.182***	**0.370***	0.118	0.050
Health responsibility	**0.269***	**0.266***	0.126	**0.247***	**0.217***	0.118
Physical activity	**0.160***	0.122	-0.107	**0.185***	0.085	**0.188***
Nutrition	**0.165***	0.048	**0.163***	**0.326***	-0.036	0.048
Spiritual development	**0.309***	**0.273***	**0.141***	**0.202***	**0.241***	0.122
Interpersonal relationships	0.110	0.113	**0.236***	**0.212***	-0.003	-0.084
Stress management	**0.137***	0.114	**0.169***	**0.287***	-0.039	-0.070

**. p<0.05 and Spearman's correlation coefficient were used.*

Discussion

In our study evaluating a mixed patient group, PACIC score average was found 2.94±0.49. This result shows that patients included in the study had moderate level of care satisfaction and chronic illness management. When studies performed in similar patient groups were reviewed, average PACIC score was found between 2.44 and 3.17. The total average PACIC score in our study was similar to many studies in the literature, except other reports showing lower scores.[14–16]

It was determined that the highest score patients received from PACIC sub-dimensions was in "problem-solving" sub-dimension (3.40±0.77), while the lowest score was in "decision making support" sub-dimension (2.65±0.66). Unlike the results of our study, it was found in many studies that the patients got the highest score in "decision making support" sub-dimension; while the lowest score was in "follow-up/coordination" sub-dimension[17–20] This result shows that patients included in the study should be supported in terms of deciding for their self-care.

When the patients' PACIC total and sub-dimension score averages were examined in terms of their level of education, it was found that total score of the scale and the sub-dimensions of problem solving and follow-up and coordination influenced level of education significantly and average scores increased as level of education increased. Similar results were found in studies in literature analysing mixed or specific patient groups.[15,20,21] This can be related with the fact that educated individuals are better in receiving the necessary care, adaptation and self-management.

In our study, it was found that gender affected only the sub-dimension of problem solving significantly and it was found to be higher in males *($p<0.05$)*. In a study conducted with a mixed patient group. It found that gender influenced only the sub-dimension of goal setting significantly and that it was higher in males.[2] In a study conducted on Type 2 diabetes patients, found that gender influenced total scale score and it was found to be higher in males.[22] In some studies conducted, it was found that gender did not have any significant influence on PACIC total and sub-dimension score averages.[23–31]

In our study, HLBS II total score average was found as 122.87±14.38. In a study performed on patients with diabetes, found HLBS II total score average as 127.98±18.91.[7] But in another study found HLBS II total score average as 127.45±20.51 in cardiac patients.[24] Considering that the highest score one can get from HLBS II is 208, it may be suggested that the patients in the present study have moderately healthy lifestyle behaviours.

When the sub-dimensions of HLBS II were examined, it was found that the highest score averages were in spiritual development (24.31±3.36) and interpersonal relationships (22.56±3.69), followed by health responsibility (22.14±3.49), nutritional habits (20.24±3.07) and stress management (18.45±3.56). On the other hand, the lowest score average was found in physical activity sub-dimension (15.16±3.02). In literature, sub-dimension score averages from the highest to the lowest are similar to our study results.[9,25,26] In recent years, exercise has been recognized as an important intervention tool in preventing and rehabilitating chronic diseases. However, patients lead an inactive life due to the physical problems they experience.[27] These results present that the habit of doing exercise is low in our patients.

In our study, when focusing on the patients' ages and their HLBS II score averages, it was found that as age increased, interpersonal relationships, health responsibility and HLBS II total scores decreased. In a study performed in cardiac patients, found that physical activity score decreased as age increased.[24] But while another study detected that health responsibility, interpersonal relationships, physical activity, nutrition and HLBS II decreased with age in a study including nurses working in a surgical clinic.[28] This result may be due to functional impairments that occur with increasing age, as well as decreased life satisfaction due to concomitant chronic diseases and thus a decrease in quality of life.

Unlike our study, it was found that age did not influence HLBS II total score and sub-dimension score averages in a study conducted on coronary artery patients.[25] Similarly a study reported on healthy individuals.[8] This difference might be due to the mixed patient group assessed in our study. When the association between patients' level of education and their HLBS II score averages was evaluated, it was found that HLBS II total score average and interpersonal relationships score average increased as the level of education increased. In a study they conducted on colorectal cancer patients, found that as the level of education increased, patients' spiritual development increased.[29] In a study was conducted on cardiac patients, found that as the level of education increased.[4] Patients' healthy life style behaviours and quality of life increased. Our findings are parallel to the results of the studies in the literature. Therefore, it might be suggested that there is a directly proportional relationship between the level of education and teaching healthy lifestyle behaviours.

In our study, HLBS II total score, and sub-dimensions of spiritual development, interpersonal relationship and stress management were found to be higher in patients working when compared with those who were not working. In a study was detected HLBS II total score and sub-dimensions of spiritual development and physical activity to be higher in their study with heart patients.[24] It is an expected result that disease metabolic states and thus physical functional abilities of patients who are working are better since working environment provides spiritual development.[30] In addition, it was found in our study that the patients with

social security had significantly higher health responsibility when compared with those who did not have any social security. Similarly, it was found in another study that HLBS total score average and averages of sub-dimensions of health responsibility, physical activity, spiritual development and interpersonal relationships were significantly higher in women who migrated and who had social security *($p<0.05$).*[31] Similarly, it can be said that it is an expected situation for patients with social security to have high healthy lifestyle behaviours.

In our study, a significant association was found between HLBS II score averages in terms of the length of hospital stay and it was found that the patients whose length of hospital stay was 1-29 days had higher HLBS II total score and sub-dimension scores of health responsibility and stress management than those whose length of hospital stay was 30 days and longer. The results of the study show that individuals who are hospitalized for a long time do not care about healthy lifestyle behaviour.

Statistically significant and positive association was found between the chronic illness care assessment scale total score and patient activation, decision support, goal setting/tailoring, problem solving and follow-up/coordination scores of the patients included in the study and their healthy lifestyle behaviours scale total scores and health responsibility, physical activity, nutrition, spiritual development and stress management scores. In line with these findings, it can be thought that as care satisfaction of individuals with chronic illness and illness management increases, these will also cause positive changes in their healthy lifestyle behaviour.

Limitations of the study

This study is limited to patients hospitalized in internal medicine clinics of a single centre. The sample in this study reflects only one area of Turkey.

Conclusion

It was found that patients had moderate level of chronic illness care satisfaction. In addition, it was found that the highest score in the study was from problem solving sub-dimension, while the lowest score was detected in decision making support sub-dimension. It was found that patients had moderate level of healthy lifestyle behaviours and the highest score was in spiritual development sub-dimension, while the lowest score was in physical activity sub-dimension. In addition, it was determined in both scales that care satisfaction and healthy lifestyle behaviours increased when educational status increased and length of hospital stay was 1-29 days. Positive association was detected between care satisfaction and healthy lifestyle behaviours of individuals with chronic disease. In parallel with all these results, it may be suggested that the study be conducted with a larger sample group. In this case, it will be possible to provide a healthy review of the care given to the patients with chronic diseases and their results. In addition, it may be recommended to provide training that supports the healthy lifestyles of these individuals who have to live with chronic diseases.

Ethics Committee Approval

Approval was taken from the Ethical Board of the State University the study was conducted in (21/05/2019 date and 2019/03-01 number) and written permission was taken from University. The study was conducted in accordance with the Helsinki declaration principles.

Informed Consent

All participants signed the Informed Consent Form and their consent was obtained.

Author Contributions

Idea, design, collection of resources, analysis and interpretation of results and literature, written and critical: GA, GBT and ZÖ.

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Conflict of Interest

There is no conflict of interest to declare.

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Research Article/Özgün Araştırma

The effects of mothers' babies feeding practices on postpartum depression

Annelerin bebeklerini besleme uygulamalarının postpartum depresyona etkisi

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Abstract

Aim: This study was conducted to determine the effect of the baby feeding practices of mothers on their postpartum depression.

Materials and Methods: This is a descriptive and correlational study. The population of the study consisted of mothers with 1-24-month-old babies registered at a Family Health Center. The data of the study were collected by using a questionnaire form and the Edinburgh Postnatal Depression Scale.

Results: The mean EPDS score of the mothers was 8.48±5.74, and it was determined that there was a risk of postpartum depression in 18.8%. Postpartum depression risk rate in the mothers who fed their babies with formula and additional food was significantly higher than those who fed their babies with breast milk only and those who fed their babies with breast milk and formula/additional food.

Conclusion: The results of the study showed that breast milk has a positive effect in preventing postpartum depression.

Keywords: Babies feeding practices; Breast milk; Postpartum depression.

Öz

Amaç: Bu çalışma, annelerin bebeklerini besleme şeklinin postpartum depresyona etkisini belirlemek amacıyla planlanmıştır.

Gereç ve Yöntem: Çalışma tanımlayıcı ve ilişki arayıcı türdedir. Araştırmanın evrenini bir Aile Sağlığı Merkezi'ne kayıtlı 1-24 aylık bebeği olan anneler oluşturmaktadır. Araştırma verileri anket formu ve Edinburgh Doğum Sonrası Depresyon Ölçeği kullanılmıştır.

Bulgular: Çalışmaya katılan annelerin Edinburgh Doğum Sonrası Depresyon Ölçeği puan ortalaması 8,48±5,74 olup, %18,8'inde postpartum depresyon riski olduğu belirlenmiştir. Bebeği mama ve ek gıda ile beslenen annelerde postpartum depresyon riski oranının hem sadece anne sütü ile beslenen, hem de anne sütü ve mama/ek gıda ile beslenenlere göre anlamlı düzeyde yüksek olduğu bulunmuştur.

Sonuç: Çalışma, anne sütünün postpartum depresyonu önlemede pozitif etkileri olduğunu göstermiştir.

Anahtar Kelimeler: Bebek besleme uygulamaları; Anne sütü; Postpartum depresyon.

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Introduction

The postpartum period is one of the most significant stages of a woman's life. In this period, the mother experiences significant changes in the physical and psychological sense. This period that involves many changes for the mother is also the period of adaptation to her new roles. While some mothers adapt to these changes, some are not able to. The psychological health of mothers who cannot adapt is affected, and postpartum depression may develop.[1,2]

Postpartum depression, which is among "Mood Disorders" in DSM-V, is defined as "the onset of episodes within the first four postpartum weeks"[3] While postpartum depression emerges mostly in the 4-6 weeks after delivery, it may also be seen up to one year. Studies conducted in various countries have reported the prevalence of postpartum depression between 8.6% and 44.8%.[4-7] Studies in Turkey reported this prevalence to be 14.6% to 27.7%.[8-10] It is reported that biological, psychological and sociocultural factors are effective in the etiology of postpartum depression.[1,11] Studies have stated that baby feeding practices affect postpartum depression symptoms, and the best way of reducing risk is to feed the baby only with breast milk.[11,12] It was reported that the risk of postpartum depression in mothers who breastfeed their babies is lower than that in those who feed their babies with formula or additional foods.[13,14] This study, which was planned on this basis, it was aimed to determine the effects of mothers' baby feeding practices on postpartum depression.

Materials and Methods

The type of the study

This is a descriptive and correlational study.

The population and the sample of the study

The population of the study consisted of mothers with 1-24-month-old babies registered at a Family Health Center. The sample of the study was calculated by using the G*POWER 3.1.9.4 statistical software based on a Type I error of 0.05, Type II error of 0.20 (80% power) and 0.20 effect size as at least 240 individuals. The inclusion criteria were having had a natural conception and having a healthy, term and single baby. The exclusion criteria were having a history of a chronic disease in the mother or the baby, having experienced a circumstantial crisis like death, accident, migration, etc. in the last one year and having a history of a psychiatric disease (based on self-reporting or medical diagnosis).

Data collection tools

The data of the study were collected between 20 April and 20 June 2019 by the researchers with the face-to-face interview method.

The data of the study were collected by using a questionnaire form developed by the researcher in line with the literature and the Edinburgh Postnatal Depression Scale. The questionnaire form consisted of 28 questions and 4 sections as sociodemographic characteristics, obstetric characteristics, baby-related information and baby feeding characteristics.

The "Edinburgh Postnatal Depression Scale (EPDS)" is a scale developed by Cox and Holden (1987) that is used to determine the risk of depression in the postpartum period. The four-point Likert-type scale includes a total of 10 items. The internal consistency coefficient of the scale (Cronbach's alpha) is 0.87, and its cutoff point is 12/13.[15] The validity and reliability of the Turkish form of EPDS in Turkey were tested by Engin Deniz et al. (1997). The internal consistency coefficient of EPDS (Cronbach's alpha) was 0.79, and its cutoff point was taken as 12/13. The total score of the scale is obtained by addition of all item scores. The minimum and maximum possible scores in the scale are respectively 0 and 30.[16] The Cronbach's alpha value of EPDS was calculated as 0.84 in this study.

Data analysis

The data were analyzed in the SPSS 25 software. Frequencies, percentages, means and standard deviations were used as the descriptive statistics. Pearson's chi-squared test was used to compare the postpartum

depression risk rates based on the groups, and effect sizes (Cramer's V) were calculated. $p<0.05$ was accepted as statistically significant.

Ethical considerations

Before starting the study, written approval by Ethics Committee (Decision No:2019/658). While collecting the data, first of all, the mothers included in the study were explained the purpose of the study, and based on the "Helsinki Declaration of Principles", they were told that they were free to exclude themselves from the study.

Results

The mean age of the mothers was 28.69±5.09 years, most of them were high school graduates, and most were not employed at a job (Table 1).

Table 1. Sociodemographic characteristics of mothers (n: 240).

Characteristics	Min– Max	$\bar{X}\pm SS$
Age	19-42	28.69±5.09
	n	**%**
Educational Status		
Literate/ primary school	24	10.0
High school	119	49.6
University	97	40.4
Working status		
Working	75	31.3
Not working	165	68.7
Evaluating monthly income		
Good	74	30.8
Bad	129	53.8
Middle	37	15.4
Family type		
Nuclear family	47	19.6
Extended family	193	80.4

While the mean duration of marriage of the mothers was 6.46±4.70 years, most of them were multiparous, and the latest pregnancy of most was planned (Table 2).

Among the mothers, 56.3% had c-section deliveries, whereas 72.1% breastfed their babies within the first one hour. While 32.5% of the mothers fed their babies with breast milk, 85.8% had received breastfeeding training before delivery, and most stated the source of the training as a nurse/midwife (70%) (Table 3).

Table 2. Obstetric characteristics of mothers (n: 240).

Characteristics	Min– Max	$\bar{X}\pm SS$
Duration of marriage (year)	1-23	6.46±4.70
	n	**%**
Parity		
Primipar	84	35.0
Multiparous	156	65.0
Number of children		
Only child	97	40.4
≥ 2 child	143	59.6
Planned pregnancy *		
Yes	204	85.0
No	36	15.0

* last pregnancy questioned.

The mean EPDS score of the mothers was 8.48±5.74, and it was determined that there was a risk of postpartum depression in 18.8% (Table 4).

When the status of postpartum depression risk in the mothers was examined based on how they fed their babies, it was determined that the risk of postpartum depression was 12.8% in the group that fed their babies with breast milk only, 19.1% in the group that fed their babies with breast milk and formula/additional food and 34.6% in the group that fed their babies with formula/additional food. It was observed that the difference in the postpartum depression rates was significant based on the mothers' babies feeding practices ($p<0.05$, Table 5). In further analysis, it was seen that the postpartum depression risk rate in the mothers who fed their babies with formula and additional food was significantly higher than those who fed their babies with breast milk only and those who fed their babies with breast milk and formula/additional food ($p<0.05$). The difference between the group that fed their babies with breast milk only and the group that fed their babies with breast milk and formula/additional food was not significant ($p<0.05$). The difference in the postpartum depression risk levels of the mothers based on how they fed their babies had a small effect size (C.V: .16, Table 5).

Table 3. Characteristics of babies (n: 240).

Characteristics	Min– Max	$\bar{X}$ ±SS
Birth weight (gram)	1260-4500	3026.81±528.42
	n	**%**
Baby age		
1-6 months	100	41.7
7-24 months	140	58.3
Baby's gender		
Girl	121	50.4
Male	119	49.6
Form of delivery		
Vaginal Delivery	105	43.8
c-section deliver	135	56.2
First time to feed the baby		
Within the first hour	173	72.1
After the first hour	67	27.9
Babies Feeding Practices at the moment		
Breast milk	78	32.5
Breast milk + formula/additional food	136	56.7
Formula/additional food	26	10.8
Status of having received training on babies feeding practices		
Yes	206	85.8
No	34	14.2
Source of training on babies feeding practices*		
Doctor	48	20.0
Nurse/midwife	168	70.0
Family/friend	27	11.3
Internet / TV / book	21	8.7

* More than one option was marked, the percentages were given over 240 people

Table 4. Mothers' scores and risk status from EPDS (n: 240).

Scale	Min-Max*	$\bar{X}$ ±SS
EPDS**	0-26	8.48±5.74
Postpartum Depression Risk	**n**	**%**
No risk (≤ 12 point)	195	81.2
Risk (≥ 13 point)	45	18.8

* Possible score range is 0-30 points.
** Edinburgh Postnatal Depression Scale

Table 5. Comparison of postpartum depression risk according to baby feeding practices (n: 240).

	Postpartum Depression Risk						
	No risk		Risk			*p*	Cramer's
Babies feeding practices	**n**	**%**	**n**	**%**	χ^2	**(difference)**	**V/ Power**
Breastmilk [a] (n: 78)	68	87.2	10	12.8			
Breastmilk+formula/additional food [a] (n: 136)	110	80.9	26	19.1	6.108	**.047**	.16/ .59
Formula/additional food [b] (n: 26)	17	65.4	9	34.6		(a< b)	

χ^2: Pearson's chi-squared test, SD: Standart deviation: 2

Discussion

Postpartum depression has many effects on the health of the baby and the mother. Postpartum depression affects the family, work and social life of the mother negatively by causing mental and physical energy loss. In particular, it affects the way of the mother to feed her baby by influencing the connection between the mother and the baby. The best way of mitigating or eliminating the risk of postpartum depression is to start breastfeeding right after delivery and feed babies with only breast milk for the first six postpartum months.

In infant nutrition, the food that meets all requirements of the baby in the first six

months after birth by itself and has no alternative is breast milk. Breastfeeding the baby in the shortest time possible following birth is also important in terms of postpartum depression. In this study, it was found that 72.1% of the mothers breastfed their babies within the first hour. In the world in general, 43% of babies are breastfed within one hour following birth, and this rate is aimed to be increased to 70% until 2030.[17] In Turkey, 71% of children under the age of two were breastfed within one hour after birth.[18] The finding of this study was higher than the mean values reported for Turkey and the world. The results of the study also met the global breastfeeding target. This is a pleasing situation for Turkey. It was thought that the high rate was caused by that all hospitals in the province where the study was conducted were baby-friendly hospitals. This is because one of the criteria for baby-friendly hospitals is breastfeeding of the baby within one hour after birth.

Most of the mothers (85.8%) stated that they had received training on breastfeeding before delivery, and most stated the source of this training to be a nurse/midwife (70%). Similarly, Tüğdür et al. reported that 79.6% of mothers had received training on breast milk and breastfeeding, and this training was provided mostly (82.5%) by nurses[19] In another study Güner and Koruk determined that 80.8% of mothers had received training on breast milk and breastfeeding.[20] It may be stated that breast milk trainings were on a very high level, but the Ministry of Health has targeted that these trainings should be provided for all pregnant women after the 32nd week of their pregnancy. This is why it is thought that more studies are needed on this issue.

Among the mothers in this study, 32.5% fed their babies with breast milk, 56.7% provided formula/additional food alongside breast milk, and 10.8% fed their babies only with formula/additional food. Gümüştakım et al. reported that, among 0-24-month-old babies, 22.3% were fed with breast milk, 6.6% were fed with both breast milk and formula, 41.3% were fed with both breast milk and additional food, 0.82% were fed with formula, 22.7% were fed with both formula and additional food, 5.7% were fed with additional food, and 0.4% were fed with both breast milk and additional food/formula.[21] A study conducted in Manisa in Turkey found that 67.1% of 0-24-month-old babies were still being fed with breast milk.[22] In comparison to the literature, the breast milk feeding rate in this study was higher. However, these rates are still not on a desired level.

The mean EPDS score of the mothers who participated in this study was 8.48±5.74, whereas it was determined that 18.8% had a risk of postpartum depression. The risk of postpartum depression was reported as 8.6%-44.8% in the world[4,7] and 14.6%-27.7% in Turkey.[8-10,23] The result of the study was compatible with the literature. The reason for the differences in the prevalence of postpartum depression in both the world and Turkey may have been caused by different studies being conducted with different assessment times, sample sizes and cutoff points.

In this study, a significant relationship was found between the mothers' babies feeding practices and their postpartum depression risk. The postpartum depression risk of the mothers who fed their babies with breast milk only was lower than those who fed their babies with both breast milk and formula/additional food and those who fed their babies with formula/additional food only. Madeghe et al. reported that the postpartum depression risk of non-breastfeeding mothers is 5.91 higher.[24] In similarity to the finding of our study, it has been stated in the literature that the postpartum depression risk of mothers who breastfeed their babies is lower in comparison to those who feed their babies in other ways (formula, additional food, both breast milk and formula/additional food).[14,15] It is considered that this situation might have been related to the oxytocin secreted during breastfeeding. Studies have reported that oxytocin has a positive effect on the mental state of mothers in the postpartum period.[25,26]

Conclusion

The results of the study showed that feeding one's baby with only breast milk has a positive effect in preventing postpartum depression. This result is highly important in terms of mother and baby health. For this reason, it is very important to investigate ways of feeding babies, inform mothers on this issue and determine those who are under risk of postpartum depression. In the COVID-19 pandemic process that we are in, it is recommended for nurses to support mothers in initiating the breastfeeding process at the earliest moment possible after birth and continue this support through telephone/web/internet after the mothers are discharged.

Limitations of the study

The limitations of the study included that the data were collected from one region in Turkey, and the mothers responded to the questions by remembering their retrospective information.

Ethics Committee Approval

This study was approved by Ethics Committee (Decision No:2019/658).

Informed Consent

The purpose of the study was explained to the women who volunteered to participate in the study and their consents were obtained.

Author Contributions

The conception and design of the study, or acquisition of data, or analysis and interpretation of data: HA, RM; drafting the article or revising it critically for important intellectual content: HA, RM; final approval of the version to be submitted: HA, RM.

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Conflict of interest

The authors have no conflicts of interest to declare.

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Peer-review

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