DOI: *http://dx.doi.org/10.18502/cjn.v23i4.???*

Current Journal of Neurology

Original Paper

Curr J Neurol 2024; 23(4): 233-9

Podcast

Migraine and its relation with eating attitudes: A cross-sectional study

Received: 08 June 2024
Accepted: 04 Aug. 2024

Selcen Duran, Asuman Celikbilek, Burc Esra Sahin, Aysu Yetis, Deniz Ay Ak

Department of Neurology, Faculty of Medicine, Kirsehir Ahi Evran University, Kirsehir, Turkey

Keywords
Anxiety; Disordered Eating Behavior; Depression; Fatigue; Migraine; Sleep Quality

Abstract

Background: Data on the eating attitudes in patients with migraine are limited. We aimed to investigate the eating attitude, anxiety, depression, fatigue, and sleep quality in patients with migraine, and assess their relationships with attack frequency, attack severity, and migraine-related disability.

Methods: 71 patients with migraine and 57 controls were included in this cross-sectional prospective study. Migraineurs were evaluated according to attack frequency (number of attacks per month), attack severity [average visual analog scale (VAS)], and migraine-related disability [Migraine Disability Assessment Scale (MIDAS)]. All patients and controls were given the Eating Attitude Test (EAT-40), Beck Anxiety Inventory (BAI), Beck Depression Inventory (BDI), Fatigue Severity Scale (FSS), and Pittsburgh Sleep Quality Index (PSQI).

Results: EAT-40, BAI, BDI, and PSQI scores were significantly higher in patients with migraine than in control group ($P < 0.05$), whereas FSS scores were similar between the groups ($P > 0.05$). In patients with migraine, male migraineurs had significantly higher attack frequency when compared to women ($P = 0.012$). However, MIDAS scores were higher in female migraineurs than in men ($P = 0.046$). VAS scores were similar according to gender ($P = 0.382$). In the correlation analysis, VAS was positively correlated with EAT-40 ($r = 0.240$, $P = 0.044$) and BAI ($r = 0.250$, $P = 0.036$). In the multivariate analysis, BAI score was found to affect the EAT-40 score in the whole population [odds ratio (OR) = 1.08, 95% confidence interval (CI) = 1.03-1.13, $P = 0.001$].

Conclusion: Psychiatric comorbidities and poor sleep are common in migraine sufferers, which also contribute to the development of disordered eating attitude in these patients. The close link between anxiety, headache, and eating attitude warrants further research.

Introduction

Affecting approximately 1 billion people worldwide, migraine is one of the leading causes of disability among young adults.[1]

How to cite this article: Duran S, Celikbilek A, Sahin BE, Yetis A, Ay Ak D. Migraine and its relation with eating attitudes: A cross-sectional study. Curr J Neurol 2024; 23(4): 233-9.

Corresponding Author: Selcen Duran
Email: drselcenduran@gmail.com

Migraine is more common in women, occurring two to three times more frequently than in men. Its highest prevalence occurs among individuals aged 18 to 44.[2,3] There are two major subtypes of migraine based on the presence of aura [unilateral fully reversible visual, sensory, or other central nervous system (CNS) symptoms]: with or without aura.[4] Migraine is described as chronic in case of occurring on 15 or more days per month for more than three months, which, on at least eight days per month, exhibits the features of a migraine headache.[4]

It is known that foods such as chocolate, cheese, alcohol, and hunger trigger migraines.[3,5,6] While fasting is a known trigger for migraine, overeating can also elevate the lifetime risk of developing migraine.[3] It has also been demonstrated that overeating and obesity are notably associated with migraine attacks.[3,7,8] Migraine and eating disorders (ED) share similar demographic characteristics, such as a higher prevalence in women and younger age groups, as well as common psychiatric comorbidities like anxiety, depressive symptoms, and body image disorders.[9] It has also been claimed that these two diseases share a common underlying mechanism.[10] Dysfunction of serotonin and catecholamine metabolism, which is implicated in the pathophysiology of ED, has also been shown in migraine pathways.[10,11] This may indicate the involvement of limbic and hypothalamic dysfunction as common underlying pathology in both diseases.[12] In addition, calcitonin gene-related peptide, which plays a crucial role in migraine pathophysiology, is elevated in obese patients and increases with weight gain.[13]

Anxiety and depression are more common in patients with migraine than in the population in general, and stress is one of the most frequently reported migraine triggers.[14-16] In addition, fatigue was described as difficulties in initiating or resuming volunteer activities.[17] Some studies have shown that patients with migraine have higher fatigue compared to healthy controls.[18,19] Moreover, migraineurs almost have poor sleep quality and lack of sleep triggers migraine attacks; these together indicate a bidirectional interaction between migraine and sleep.[20] Literature has shown the presence of psychiatric comorbidities and sleep disorders in migraineurs.[20-22] However, data focusing on the eating attitudes in patients with migraine are limited. Several tests have been developed to assess eating attitudes.[23] Actually, these are not diagnostic, just as they measure the behaviour towards food and show the ones who are at risk of eating behavior disorder.[14]

In the present study, we aimed to investigate the eating attitude, anxiety, depression, fatigue, and sleep quality in patients with migraine, and assess their relationships with attack frequency, attack severity, and migraine-related disability, in the Kirsehir Province of Turkey.

Materials and Methods

Study population: A total of 71 consecutive patients with migraine, and 57 age- and sex-matched healthy subjects were enrolled in this prospective cross-sectional study. The study was conducted at Kirsehir Training and Research Hospital (Kirsehir, Turkey) in the winter of 2024. We included literate, newly-diagnosed patients with migraine, recruited from a neurology outpatient clinic, ranging from 18 to 50 years old. All patients with migraine were studied during a headache-free period and they were not on any medication. Patients with malignancies, psychiatric disorders, neurological diseases such as epilepsy and multiple sclerosis, endocrine diseases such as diabetes, and thyroid disease were excluded. Pregnant women, morbidly obese subjects [body mass index (BMI) > 40 kg/m^2], and night shift workers were also excluded. The control subjects, recruited from hospital staff, were healthy individuals who did not work in shifts and those with no headache of any kind.

Baseline data included age, gender, and BMI.[24] The same neurologist performed the medical history, physical, and neurological evaluation of the patients with migraine. The migraine diagnosis was made according to the International Classification of Headache Disorders-3rd edition (ICHD-3).[4] Of the patients, 9 had migraine with aura, while the remainder had migraine without aura. Migraineurs were evaluated according to headache properties, including attack frequency, attack severity, and migraine-related disability. Attack frequency was recorded as the number of attacks per month.[25] Attack severity was determined according to the average score of visual analog scale (VAS) during attacks.[26] Migraine-related disability was evaluated according to Migraine Disability Assessment Scale (MIDAS) scores as grade I (0-5 points), grade II (6-10 points), grade III (11-20 points), and grade IV (above 21 points) in the past three months.[27]

The study was conducted with the approval of the Kirsehir Ahi Evran University Local Research Ethics Committee (date of approval: 01/23/2024;

approval no. 2024-03/06) and in line with the Declaration of Helsinki. Written informed consent was obtained from all participants.

Measures

Eating Attitude Test (EAT-40): This test is a tool used to assess eating attitudes. It is a self-report questionnaire that includes 40 questions. Each question is answered using a 6-point Likert scale, where responses are assigned scores from 0 to 3. A higher total score indicates a greater presence of disordered eating behaviors. A total score ≥ 30 was considered indicative of potential disordered eating patterns.[28] The total score was analyzed along with four subdomains as dieting behavior, oral control, food preoccupation, and body image.[29] Dieting behavior is characterized by the avoidance of food and an intense focus on becoming thinner. Oral control refers to an individual's self-discipline in eating, as well as the perceived pressure from others to gain weight. Food preoccupation encompasses persistent thoughts about food, including tendencies associated with bulimia. Finally, body image relates to how an individual perceives their own physical appearance. The validity and reliability of the Turkish version have been established.[30]

Beck Anxiety Inventory (BAI): It is used to estimate the severity of anxiety symptoms in individuals. It consists of 21 questions, with each question scored between 0 and 3 points. Total scores of 8 and above indicate the presence of anxiety.[31] The validity and reliability of the Turkish version have been established.[32]

Beck Depression Inventory (BDI): It is used to estimate the severity of depressive symptoms in individuals. It consists of 21 questions in which each question is scored from 0 to 3 points, and a score of 10 and above indicates the presence of depression.[33] The validity and reliability of the Turkish version have been established.[34]

Fatigue Severity Scale (FSS): This scale is used to assess the fatigue of individuals. It includes 9 questions where each question is scored between 1 and 7 and the total score ranges from 9 to 63 points. A high score indicates significant fatigue.[35]

Pittsburgh Sleep Quality Index (PSQI): It is a self-report questionnaire designed to assess sleep quality over the last month. Subjective sleep quality includes seven items: duration of sleep, sleep latency, habitual sleep efficiency, sleep disturbances, medication use, and daytime functional impairment. A score of 6 and above indicates poor sleep quality.[36] The validity and reliability of the Turkish version have been established.[37]

According to a similar study in the literature,[9] the mean score of EAT-40 was found as 20.18 ± 8.91 in patients with migraine (n = 59) and 14.19 ± 6.36 in control group (n = 47). In the G*Power 3.1 software, as a result of 0.95 power, 0.05 margin of error, and 0.80 effect size, it was calculated that a total of 72 participants should be included in whole study, at least 36 for each group.

Histogram and quantile-quantile (q-q) plots were examined and Kolmogorov-Smirnov test was performed to assess the data normality. Values were expressed as frequencies (n) and percentages (%), means and standard deviations (SD), or medians (25^{th}-75^{th} percentile). Chi-square analyses were used to determine the associations between categorical variables. Non-normally-distributed variables were compared using the Mann-Whitney U test. Spearman's correlation coefficient was calculated to analyze the relationships between numerical variables. Multivariate logistic regression test was performed to determine the factors affecting disordered eating attitude in the whole population. Analyses were conducted using SPSS software (version 25, IBM Corporation, Armonk, NY, USA) with considering a $P < 0.05$ as statistically significant.

Results

71 patients with migraine and 57 control subjects were included in this study. There was no significant difference in age, gender, or BMI between the groups ($P > 0.050$). EAT-40, BAI, BDI, and PSQI scores were considerably higher in patients with migraine than in control group ($P < 0.050$) whereas FSS scores were similar between the groups ($P > 0.050$). Regarding EAT-40 subdomains, compared with the control group, the dieting behavior ($P < 0.001$) and oral control ($P = 0.004$) scores were significantly higher in the migraine group, while the food preoccupation ($P = 0.015$) score was lower. There was no difference in the body image between the two groups. The percentages of the patients with migraine with disordered eating attitude, anxiety, depression, fatigue, and poor sleep quality were found as 19.7%, 80.3%, 53.5%, 78.9%, and 59.2%, respectively. Demographic data and clinical scales were presented in table 1.

In patients with migraine, male migraineurs had significantly higher attack frequency when compared to women ($P = 0.012$).

Table 1. Demographic data and clinical scales of patients with migraine and control group

Variable	Migraine (n = 71)	Control (n = 57)	P
Age (year)	38 (30.0-44.0)	34 (24.5-42.0)	0.147
Female gender	54 (76.1)	37 (64.9)	0.167
BMI (kg/m^2)	25.5 ± 4.4	24.4 ± 3.9	0.148
PSQI	6 (4.0-9.0)	3 (3.0-5.0)	< 0.001
Poor sleep quality	42 (59.2)	13 (22.8)	
EAT	17 (11.0-24.0)	12 (8.0-16.5)	< 0.001
Disordered eating attitude	14 (19.7)	4 (7.0)	0.040
EAT			
Dieting behavior	6 (3.0-10.0)	2 (1.0-6.0)	< 0.001
Oral control	3 (0-6.0)	1 (0-2.5)	0.004
Food preoccupation	2 (0-3.0)	3 (0-3.5)	0.015
Body image	2 (0-3.0)	0 (1.0-3.0)	0.286
FSS	4.5 ± 1.7	3.9 ± 1.5	> 0.050
Presence of fatigue	56 (78.9)	42 (73.7)	
BAI	13 (8.0-21.0)	6 (4.0-10.0)	< 0.001
Presence of anxiety	57 (80.3)	20 (35.1)	
BDI	10 (7.0-15.0)	5 (3.0-8.5)	< 0.001
Presence of depression	38 (53.5)	11 (19.3)	

Values are expressed as n (%), mean ± standard deviation (SD), or median (25th-75th percentile).
BMI: Body mass index; PSQI: Pittsburgh Sleep Quality Index; EAT: Eating Attitude Test; FSS: Fatigue Severity Scale; BAI: Beck Anxiety Inventory; BDI: Beck Depression Inventory

However, MIDAS scores were higher in female migraineurs than in men (P = 0.046). VAS scores were similar according to gender (P = 0.382). Among the clinical scales, fatigue rate was the only different parameter as being higher in female migraineurs than in men (P = 0.005). Migraine characteristics and clinical scales according to gender in patients with migraine were summarized in table 2.

In the correlation analysis, VAS was positively correlated with EAT-40 (r = 0.240, P = 0.044) and BAI (r = 0.250, P = 0.036); MIDAS was positively correlated with FSS (r = 0.245, P = 0.040), as shown in table 3. In the multivariate analysis, among the scales, BAI score was the only parameter to affect the EAT-40 score in the whole population studied [odds ratio (OR) = 1.08, 95% confidence interval (CI) = 1.03-1.13, P = 0.001].

Discussion

Multiple studies have revealed an association between migraine and ED in several aspects, including clinical approach and pathogenesis.[3] This association is not surprising, considering that they share similar pathophysiology, patient profiles, and common psychiatric comorbidities among patients with migraine.

In a study examining the possible relationship between migraine and ED, D'Andrea et al. found significantly lower levels of noradrenaline but higher levels of dopamine and tyramine in patients with ED compared to the control group.[10] They also found very high prevalence of migraine (> 75%) in the ED sufferers suggesting that migraine might be a risk factor for ED occurrence in young women.[10] Increasing evidence has shown the imbalance between the levels of neurotransmitters and elusive amines synthesis in patients with migraine, thus suggesting that migraine and ED are characterized by a common abnormality of limbic, hypothalamic, and dopaminergic circuitries.[12]

Table 2. Migraine characteristics and clinical scales according to gender in patients with migraine

	Women (n = 54)	Men (n = 17)	P
Attack frequency	4 (3.0-5.0)	6 (4.0-8.0)	0.012
VAS	8 (6.0-9.0)	7 (6.0-9.0)	0.382
MIDAS	3 (2.7-4.0)	2 (2.0-3.5)	0.046
Poor sleep quality	30 (55.6)	12 (70.6)	0.271
Disordered eating attitude	13 (24.1)	1 (5.9)	0.162
Presence of fatigue	47 (87.0)	9 (52.9)	0.005
Presence of anxiety	42 (77.8)	15 (88.2)	0.493
Presence of depression	30 (55.6)	8 (47.1)	0.540

Values are expressed as n (%) or median (25th-75th percentile).
VAS: Visual analog scale; MIDAS: Migraine Disability Assessment

Table 3. Correlation of clinical scales with migraine characteristics in patients with migraine

	Attack frequency		VAS		MIDAS	
	r	P	r	P	r	P
PSQI	-0.032	0.788	0.151	0.210	0.176	0.142
EAT	0.114	0.343	0.240	0.044	0.027	0.822
FSS	-0.005	0.968	0.226	0.059	0.245	0.040
BAI	0.205	0.087	0.250	0.036	-0.061	0.613
BDI	-0.140	0.246	0.126	0.296	-0.029	0.810

PSQI: Pittsburgh Sleep Quality Index; EAT: Eating Attitude Test; FSS: Fatigue Severity Scale; BAI: Beck Anxiety Inventory; BDI: Beck Depression Inventory; VAS: Visual analog scale; MIDAS: Migraine Disability Assessment

Moreover, serotonin is a neuropeptide that regulates energy intake by inducing a feeling of satiety and exhibits temporary increases during migraine attacks. Hypothetically, this can lead to an increased urge to eat and the development of obesity in individuals with migraines.[14] Demirci et al. compared individuals with migraines to matched healthy controls in terms of eating attitudes measured by the EAT-40. They found high EAT-40 scores as well as high anxiety and depression scores in patients with migraine.[9] Hamamci et al. reported a high presence of disordered eating attitudes in patients with episodic migraine than in control group.[38] İnanç et al. studied EAT-40 scores in patients with migraine or tension-type headache, and they found significantly high scores in these patients when compared to the controls, in whom the migraineurs had the highest score.[14] In line with the literature, EAT-40 scores were significantly higher in the migraine group compared to the control group in our study. In the subgroup analysis of the EAT-40, migraineurs had high scores on dieting behavior which indicates a high effort to avoid food in order to become thin, and oral control which involves a high self-discipline against food intake. Both parameters may support the involvement of the central pathways including serotonin and dopamine regulation. Further research is needed to explore whether these eating attitudes accompany migraine or result from associated stress and psychiatric factors. We also found that EAT-40 scores were positively correlated with VAS which means that severe migraine attack goes with severe disordered eating attitude.

Migraine is associated with several psychiatric disorders, such as major depression, bipolar disorder, and anxiety disorder,[14,15] which have been also linked to ED.[3] Łangowska-Grodzka et al. proposed that there was a strong association between migraine, depression, anxiety, and ED, all of which might impact the outcomes.[3] Similarly, we also found significantly high prevalence of both depression and anxiety in migraineurs, which did not vary by gender, compared to controls. A meta-analysis reported by Lee et al. showed that, compared to anxiety, depression was more strongly linked to migraine.[22] Contrarily, we found that anxiety scores were positively correlated with VAS, indicating that severe migraine attack goes with high anxiety. Additionally, anxiety scores were found to significantly affect the EAT-40 scores in the multivariate model. Not yet to be determined which developed first, a close but complex relation appears between high anxiety, severe headache, and abnormal eating attitude. Certain foods like sweets, carbohydrates, and chocolate, which have anxiolytic effects, are known to cause migraine attacks.[39] Considered together, one may suppose that anxiety comes first, and excessive caloric food intake is likely to be secondary as to manage the anxiety, but at the same time, triggers headache episodes. Therefore, reducing carbohydrates may be useful in migraine management, reducing migraine frequency and disability.[40] More importantly, when anxiety is treated in the first place, abnormal eating attitude may not occur, and this probably prevent the individual from a subsequent migraine attack; hence, it substantially improves quality of life, to some degree. Further studies are needed to draw a conclusion.

On the other hand, poor sleep was reported to be a factor in aggravating migraine attacks in half of the cases, and this effect was greater in chronic cases.[20] In a meta-analysis, sleep quality was found to be poorer in patients with migraines compared to controls.[20] In accordance with the literature, we found that sleep quality was worse in migraineurs than in control group. It has been suggested that there is a bidirectional relationship between migraine and sleep.[41] Sleep and migraines primarily share common anatomical and

physiological underlying mechanisms, that wakefulness and sleep both influence cortical firing. Accordingly, sleep deprivation can lead to an increased susceptibility to cortical spreading depression, which promotes the occurrence of migraine attacks.[42] Accumulating data have shown that poor sleep almost coexists with fatigue.[17] Recent studies have found that migrainours have higher fatigue levels than healthy controls.[18,19] Axonal projections from the trigeminovascular spinal trigeminal nucleus project signals to the brainstem, hypothalamic, and basal ganglia nuclei, resulting in headache-induced symptoms such as nausea, vomiting, yawning, tearing, psycho-behavioral issues, and fatigue.[17] In the present study, fatigue scores were positively correlated with disability scores in migraineurs which may be linked to poor sleep.[17] However, the presence of fatigue is more pronounced in female patients while the attack frequency is higher in male ones which needs explanation.

Several limitations should be discussed. First, the sample size is small and single-centered; it needs to be confirmed with a larger cohort. Second, self-report questionnaires were used, whereas a comprehensive psychiatric battery would offer better accuracy. Third, it is cross-sectional; however, a longitudinal study could establish causality. Fourth, our patients with migraine exhibited a low frequency of attack and a low average MIDAS score; therefore, the associations might be different or even greater in those with more severe migraine presentations.

Conclusion

Despite the abovementioned limitations, our findings demonstrated that psychiatric comorbidities and poor sleep were common in migraine sufferers, which also contributed to the development of disordered eating attitude in these patients. Future large-scale longitudinal studies will present a more detailed view of mechanisms for the close link between anxiety, headache, and eating attitude in patients with migraine.

Conflict of Interests

The authors declare no conflict of interest in this study.

Acknowledgments

None.

References

1. Zhang N, Robbins MS. Migraine. Ann Intern Med 2023; 176(1): Itc1-itc16.
2. Vetvik KG, MacGregor EA. Sex differences in the epidemiology, clinical features, and pathophysiology of migraine. Lancet Neurol 2017; 16(1): 76-87.
3. Łangowska-Grodzka B, Grodzka O, Czarnecki D, Domitrz I. Is there a correlation between migraine and eating disorders? A systematic literature review. Neurol Neurochir Pol 2023; 57(6): 457-64.
4. Headache Classification Committee of the International Headache Society (IHS) The International Classification of Headache Disorders, 3rd edition. Cephalalgia 2018; 38(1): 1-211.
5. Marmura MJ. Triggers, Protectors, and Predictors in Episodic Migraine. Curr Pain Headache Rep 2018; 22(12): 81.
6. Martami F, Togha M, Qorbani M, Shahamati D, Salami Z, Shab-Bidar S. Association of dietary patterns with migraine: A matched case-control study. Curr J Neurol 2023; 22(2): 87-95.
7. Chorążka K, Janoska M, Domitrz I. Body mass index and its impact on migraine prevalence and severity in female patients: preliminary results. Neurol Neurochir Pol 2014; 48(3): 163-6.
8. Celikbilek A, Börekci E, Kozan M, Celikbilek M. Assessment of Metabolic Syndrome in Patients with Migraine in Central Anatolia. Eur J Gen Med 2015; 12(2): 152-6.
9. Demirci K, Demirci S, Akpinar A, Demirdaş A, Atay IM. Migren Hastalarında Yeme Tutumunun Değerlendirilmesi Evaluation of Eating Attitude in Patients with Migraine. Noro Psikiyatr Ars 2015; 52(4): 367-70.
10. D'Andrea G, Ostuzzi R, Bolner A, Colavito D, Leon A. Is migraine a risk factor for the occurrence of eating disorders? Prevalence and biochemical evidences. Neurol Sci 2012; 33 Suppl 1: S71-6.
11. D'Andrea G, Leon A. Pathogenesis of migraine: from neurotransmitters to neuromodulators and beyond. Neurol Sci 2010; 31 Suppl 1: S1-7.
12. D'Andrea G, Gucciardi A, Leon A. Elusive amines: migraine depends on biochemical abnormalities. Neurol Sci 2022; 43(11): 6299-304.
13. Bond DS, Roth J, Nash JM, Wing RR. Migraine and obesity: epidemiology, possible mechanisms and the potential role of weight loss treatment. Obes Rev 2011; 12(5): e362-71.
14. İnanç Y, Orhan FÖ, Erdoğan A, Gökçe M, İnanç Y, Özyurt E. An evaluation of eating attitudes in patients with migraine and tension type headache. Eur J Res 2019; 5(3): 484-9.
15. Caponnetto V, Deodato M, Robotti M, Koutsokera M, Pozzilli V, Galati C, et al. Comorbidities of primary headache disorders: A literature review with meta-analysis. J Headache Pain 2021; 22(1): 71.
16. Burrowes SAB, Goloubeva O, Stafford K, McArdle PF, Goyal M, Peterlin BL, et al. Enhanced mindfulness-based stress reduction in episodic migraine-effects on sleep quality, anxiety, stress, and depression: a secondary analysis of a randomized clinical trial. Pain 2022; 163(3): 436-44.
17. Seo JG, Park SP. Significance of fatigue in patients with migraine. J Clin Neurosci 2018; 50: 69-73.
18. Fattahzadeh-Ardalani G, Aghazadeh V, Atalu A, Abbasi V. Somatoform Dissociation, Fatigue Severity and Pain Behavior Compared in Patients with Migraine Headache and in Healthy Individuals. Neurol Int 2017; 9(2): 7015.
19. Delva M, Delva I, Pinchuk V, Kryvchun A, Purdenko T. Prevalence and Predictors of Fatigue in Patients with Episodic Migraine. Wiad Lek 2022; 75(8 pt 2): 1970-4.
20. Stanyer EC, Creeney H, Nesbitt AD, Holland PR, Hoffmann J. Subjective Sleep Quality and Sleep Architecture in Patients With Migraine: A Meta-analysis. Neurology 2021; 97(16): e1620-e31.
21. Minen MT, Begasse De Dhaem O, Kroon Van Diest A, Powers S, Schwedt TJ, Lipton R, et al. Migraine and its psychiatric comorbidities. J Neurol Neurosurg Psychiatry 2016; 87(7): 741-9.
22. Lee H, Kim S, Chang MC. Associations

Between Headache (Migraine and Tension-Type Headache) and Psychological Symptoms (Depression and Anxiety) in Pediatrics: A Systematic Review and Meta-analysis. Pain Physician 2023; 26(6): E617-e26.
23. Urhan M, Cengisiz C, Türk M, Akanalçı C. Can mindful eating be a psycho-marker of obesity in bipolar disorder? Nutr Hosp 2024; 41(5): 1082-90.
24. World Health Organization. Obesity: preventing and managing the global epidemic. Report of a WHO consultation. World Health Organ Tech Rep Ser 2000; 894: i-xii, 1-253.
25. Guldiken S, Guldiken B, Demir M, Kabayel L, Ozkan H, Turgut N, et al. Soluble CD40 ligand and prolactin levels in migraine patients during interictal period. J Headache Pain 2011; 12(3): 355-60.
26. Celikbilek A, Sabah S, Tanik N, Ak H, Atalay T, Yilmaz N. Is serum S100B protein an useful biomarker in migraine? Neurol Sci 2014; 35(8): 1197-201.
27. Ertaş M, Siva A, Dalkara T, Uzuner N, Dora B, Inan L, et al. Validity and reliability of the Turkish Migraine Disability Assessment (MIDAS) questionnaire. Headache 2004; 44(8): 786-93.
28. Garner DM, Garfinkel PE. The Eating Attitudes Test: an index of the symptoms of anorexia nervosa. Psychol Med 1979; 9(2): 273-9.
29. Talwar P. Factorial Analysis of The Eating Attitude Test (EAT-40) among a group of Malaysian University Students. Malays J Med 2011; 20(2).
30. Savaşır I, Enyt T. Anoreksi Nervoza belirtileri indeksi. Psikoloji Dergisi 1989; 7(23): 19-25.
31. Beck AT, Epstein N, Brown G, Steer RA. An inventory for measuring clinical anxiety: psychometric properties. J Consult Clin Psychol 1988; 56(6): 893-7.
32. Ulusoy M, Sahin NH, Erkmen H. Turkish version of the Beck Anxiety Inventory: psychometric properties. J Cogn Psychother 1998; 12(2): 163.
33. Beck AT, Ward CH, Mendelson M, Mock J, Erbaugh J. An inventory for measuring depression. Arch Gen Psychiatry 1961; 4: 561-71.
34. Hisli N. Beck Depresyon Ölçeği'nin bir Türk örnekleminde geçerlilik ve güvenilirliği. Psikol Derg 1988; 6(22): 118-22.
35. Krupp LB, LaRocca NG, Muir-Nash J, Steinberg AD. The fatigue severity scale. Application to patients with multiple sclerosis and systemic lupus erythematosus. Arch Neurol 1989; 46(10): 1121-3.
36. Buysse DJ, Reynolds CF, 3rd, Monk TH, Berman SR, Kupfer DJ. The Pittsburgh Sleep Quality Index: a new instrument for psychiatric practice and research. Psychiatry Res 1989; 28(2): 193-213.
37. Yücel Ağargün M, Kara H, Anlar Ö. Validity and reliability of the Pittsburgh sleep quality index. Turk Psikiyatri Derg 1996; 7(2): 107-15.
38. Hamamci M, Karasalan Ö, İnan LE. Can personality traits, obesity, depression, anxiety, and quality of life explain the association between migraine and disordered eating attitudes? Arq Neuropsiquiatr 2020; 78(9): 541-8.
39. Peres MFP. One more bite in the understanding of migraine psychiatric comorbidity: the role of eating attitudes. Arq Neuropsiquiatr 2020; 78(9): 533-4.
40. Altamura C, Cecchi G, Bravo M, Brunelli N, Laudisio A, Caprio PD, et al. The Healthy Eating Plate Advice for Migraine Prevention: An Interventional Study. Nutrients 2020; 12(6).
41. Vgontzas A, Pavlović JM. Sleep Disorders and Migraine: Review of Literature and Potential Pathophysiology Mechanisms. Headache 2018; 58(7): 1030-9.
42. Duan S, Ren Z, Xia H, Wang Z, Zheng T, Liu Z. Association between sleep quality, migraine and migraine burden. Front Neurol 2022; 13: 955298.