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ARTICLE

Can personality traits, obesity, depression, anxiety, and quality of life explain the association between migraine and disordered eating attitudes?

Traços de personalidade, obesidade, depressão, ansiedade e qualidade de vida podem explicar a associação entre migrânea e hábitos alimentares inadequados?

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ABSTRACT

Background: Few studies have explored the coexistence of migraine and disordered eating attitudes. Furthermore, the underlying pathophysiological mechanisms of migraine and disordered eating attitude comorbidity are not clearly understood. **Objective:** This study aimed to investigate the association between migraine and disordered eating attitudes in relation to personality traits, obesity, quality of life, migraine severity, depression, and anxiety. **Methods:** This study included 91 patients with episodic migraine and 84 healthy control subjects. Self-report questionnaires were used to evaluate anxiety, depression, migraine-related disability, personality traits, quality of life, and eating disorders. **Results:** The Eating Attitude Test (EAT) showed disordered eating attitudes in 21 patients (23.1%) in the migraine group and eight patients (9.5%) in the control group. Migraine-related disability, anxiety, depression, neuroticism, and quality of life scores were significantly worse in migraine patients with disordered eating attitudes compared to migraine patients without disordered eating attitudes. In migraine patients, eating attitude test scores were positively correlated with migraine-related disability, anxiety, depression, and neuroticism scores, and negatively correlated with quality of life scores. **Conclusion:** The association of migraine and disordered eating attitudes was shown to be related to depression, anxiety, quality of life and personality traits and may also indicate a more clinically severe migraine. To the best of our knowledge, there is no literature study that deals with all these relevant data together. However, neuropsychiatry-based biological studies are required to better understand this multifaceted association.

Keywords: Headache; Neuroticism; Body Mass Index; Comorbidity; Pain.

RESUMO

Introdução: Poucos estudos exploraram a coexistência de migrânea e hábitos alimentares inadequados. Além disso, os mecanismos fisiopatológicos subjacentes da migrânea e da comorbidade da atitude alimentar inadequada não são claramente entendidos. **Objetivo:** Este estudo teve como objetivo investigar a associação entre migrânea e atitudes alimentares inadequadas em relação aos traços de personalidade, obesidade, qualidade de vida, gravidade da migrânea, depressão e ansiedade. **Métodos:** Este estudo incluiu 91 pacientes com migrânea episódica e 84 indivíduos saudáveis. Questionários de autorrelato foram utilizados para avaliar ansiedade, depressão, incapacidade relacionada à enxaqueca, traços de personalidade, qualidade de vida e distúrbios alimentares. **Resultados:** O Teste de Hábito Alimentar (THA) mostrou hábitos alimentares inadequados em 21 pacientes (23,1%) no grupo com migrânea e 8 pacientes (9,5%) no grupo controle. Os índices de incapacidade, ansiedade, depressão, neuroticismo e qualidade de vida relacionados à migrânea foram significativamente piores em pacientes com migrânea com hábitos alimentares inadequados em comparação com pacientes com migrânea sem hábitos alimentares inadequados. Em pacientes com migrânea, os escores dos testes de hábito alimentar foram correlacionados positivamente com os escores de incapacidade, ansiedade, depressão e neuroticismo relacionados à migrânea e negativamente com os escores de qualidade de vida. **Conclusão:** A associação de migrânea e atitudes alimentares inadequadas mostrou-se relacionada à

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depressão, ansiedade, qualidade de vida e traços de personalidade, podendo também indicar uma migrânea mais clinicamente grave. Até onde sabemos, não há estudo de literatura que lide com todos esses dados relevantes juntos. No entanto, são necessários estudos biológicos baseados em neuropsiquiatria para entender melhor essa associação multifacetada.

Palavras-chave: Cefaleia; Neuroticismo; Comorbidade; Índice de Massa Corporal; Dor.

INTRODUCTION

Migraine is a neurological disorder characterized by moderate or severe recurrent headache episodes accompanied by various combinations of neurological, psychiatric, gastrointestinal, and autonomic symptoms[1,2].

Recurrent complaints, such as those of migraine, may impair coping skills and lead to additional life difficulties, causing predisposition to several psychiatric disorders such as major depression, bipolar disorder, and anxiety disorder[2,3]. Both migraine attacks and comorbid psychiatric disorders result in significant work loss and a negative impact on quality of life[2,3]. In addition, psychiatric disorders and poor quality of life often trigger migraine attacks[2,3].

The higher prevalence of episodic migraine in obese individuals suggests that obesity and migraine may have a common etiological factor[4,5]. Although headache incidence is higher in obese or overweight individuals, the literature indicates increased risk of migraine in individuals with low body weight[5,6].

Many biological, psychological and sociocultural variables are known to be effective in the development of eating disorders[7]. Studies have shown that there is a relationship between certain personality traits and eating attitudes/disorders[7]. Studies have reported that migraine patients have a higher incidence of perfectionism, rigidity, regularity, ambitiousness and competitiveness, as well as extreme physical fatigue and apathy[8,9].

These results and data from other studies indicate a possible relationship between migraine and eating disorders and the presence of a common neuropsychiatric predisposition to these conditions.

There is a limited number of studies investigating the relationship between eating disorders and attitudes in migraine. Furthermore, the pathophysiological mechanism underlying migraine and eating disorders is not fully understood.

In this study aimed to investigate the association between disordered eating attitudes and migraine, and to evaluate the effect of personality traits, obesity, quality of life, degree of migraine-related disability, depression and anxiety in this association. As far as we know, there is no study in the literature which has collectively addressed all of these variables.

MATERIALS AND METHODS

This study was conducted at the Neurology and Psychiatry outpatient clinic of a tertiary hospital between February 1st, 2018, and April 1st, 2019. The study was conducted in accordance to the principles of the Helsinki Declaration and written informed consent was obtained from all participants. The study was approved by the Ethics Committee of University (protocol number: 2018-KAEK-189_2018.01.25_15).

Study population

The study included 91 patients diagnosed with episodic migraine according to the beta version of the 3rd edition of the International Classification of Headache Disorders 2013[10] and 84 healthy volunteers.

Study participants were volunteers between 18 and 60 years of age, who had at least primary education, with the mental ability to complete surveys and understand the scope of the study, and who did not use any drugs, including migraine prophylaxis.

Individuals with a history of head trauma, smokers, pregnant or breastfeeding women, and patients with neurological, endocrine or systemic diseases other than migraine were excluded from the study.

The control group consisted of 84 healthy volunteers who were age- and gender-matched to their migraine group. Exclusion criteria for migraine patients listed above were also applied to the control group. In addition, individuals with a history of headache diagnosis or those who experienced headaches over the past year were also excluded from the study.

Detailed history was obtained from the participants, and systemic physical and neurological examinations were carried out. All patients were examined on a day without a headache. The duration, frequency, and severity of migraine episodes were recorded. Height and weight of all participants were measured and their body mass indexes (BMI) were calculated according to the World Health Organization's classification[11].

All study participants completed the: Beck Depression Inventory (BDI), Beck Anxiety Inventory (BAI), 36-Item Short Form Health Survey questionnaire (SF-36), Eysenck Personality Questionnaire Revised/Abbreviated Form (EPQR-A), and Eating Attitude Test (EAT). Migraine patients additionally completed the Migraine Disability Assessment Scale (MIDAS) and the Headache Impact Test (HIT), and were divided into two groups for comparison, namely, those with EAT score of ≥30 and of <30.

Assessment tools

Data collection tools

The data collection form is a detailed interview form prepared by the researchers for study purposes and includes questions about the lifestyles of the participants. This form, which was

administered at initial admission collected data including age, gender, marital status, educational level, employment, and BMI, as well as age of migraine onset, frequency of headaches, and duration of headache episodes in migraine patients.

Migraine Disability Assessment Scale

The MIDAS scale was developed to measure migraine-related disability in the activity areas of people over the past 3 months[12].

Headache Impact Test

The Headache Impact Test is an approved test to assess the impact of headache on the life of individuals (Range: 36–78)[13]. According to the scoring system of this scale, a score of ≤48 indicates little to no impact, 49–55 moderate impact, scores of 56–59 indicate substantial impact, and a score of ≥60 indicates severe impact.

Beck Depression Inventory

BDI was developed to measure the behavioral symptoms of depression[14]. It consists of 21 items, in which each item is scored from 0 to 3 points and the total score ranges from 0 to 63 points.

Beck Anxiety Inventory

BAI measures the severity of the anxiety symptoms experienced by individuals. This self-report scale, consists of 21 items, in which each item is scored from 0 to 3 points and the total score ranges from 0 to 63 points[15].

36-Item Short Form Health Survey questionnaire

SF-36 is used to measure quality of life. The 36-item scale assesses eight quality of life parameters, including physical functioning, role physical, bodily pain, general health, vitality, social functioning, role emotional, and mental health[16]. A score of 100 indicates a good health status, while a score of zero indicates poor health status.

Eysenck Personality Questionnaire Revised/Abbreviated Form

EPQR-A is a 24-item scale used to assess personality traits of adults[17]. EPQR-A assesses 4 dimensions, including Extraversion/Introversion, Neuroticism/Stability, Psychoticism/Socialization, and Lie/Social Desirability through 6 items.

Eating Attitude Test

EAT is used to screen and evaluate eating attitudes of subjects with and without eating disorder diagnosis. EAT is a self-report scale which can be applied to individuals over 11 years of age. The scale determines the predisposition and attitudes to disordered eating on a clinical level. Increased overall score is associated with a disordered eating attitude. Cut-off score has been specified as 30, in which a score of 30 and higher indicates abnormal eating behavior, and a score below 30 is considered "normal eating behavior"[18].

Statistical analysis

All statistical analyzes were performed using SPSS (Statistical Package for Social Sciences, IBM Inc., Chicago, IL, USA) version 22.0. Normality distribution of continuous variables was assessed using the Kolmogorov–Smirnov test. Descriptive statistics of continuous variables were presented as mean (standard deviation) or median (min–max). Categorical variables were compared using the χ^2 test. Intergroup statistically significant differences for continuous variables were analyzed by the Student-t test for parametric variables and Mann-Whitney U test for non-parametric ones. The Spearman's Correlation Test was used to determine the correlation between groups. A p value of <0.05 was considered statistically significant.

RESULTS

There was no statistically significant difference between the migraine patients and the healthy control group in terms of age and gender (p=0.748; p=0.399, respectively). The sociodemographic and clinical features of the migraine and control groups are presented in Table 1. Twenty-one (23.1%) of the

Table 1. Sociodemographic and clinical features of migraine and control groups.

	Migraine (n=91)	Control (n=84)	p-value
Age (years), mean±SD	33.14±9.86	32.65±10.19	p=0.748 t= 0.322
Gender, n (%)			
Female	66 (72.5%)	56 (66.7%)	p=0.399
Male	25 (27.5%)	28 (33.3%)	χ^2=0.711
Educational level (years), median (min–max)	11 (5–17)	11 (5–17)	p=0.290 U=3,477.5
Marital status, n (%)			
Married	67 (73.6%)	52 (61.9%)	p=0.097
Single	24 (26.4%)	32 (38.1%)	χ^2=2.758
BMI, mean±SD	26.60±4.85	25.66±5.14	p=0.218 t=1.236
Migraine duration (years), median (min–max)	3 (1–29)		
Frequency of episodes (episode/month), median (min–max)	3 (1–12)		
Duration of episodes (hours), median (min–max)	12 (4–72)		
Migraine with aura	25 (27.5%)		
MIDAS, median (min–max)	19 (6–69)		
HIT, median (min–max)	62 (42–72)		

SD: standard deviation; BMI: body mass index; MIDAS: Migraine Disability Assessment Scale; HIT: Headache Impact Test; U: Mann-Whitney U test, t: Student's t-test; χ^2: chi-square test.

migraine patients and only 8 of the control subjects (9.5%) had an EAT score of 30 or higher; this difference was statistically significant (p=0.027).

There was no significant difference between migraine patients and the control group according to BMI (p=0.679) (Table 2). While 37 patients in the migraine group had normal BMI (18.5–24.9 kg/m^2), 22 were obese (BMI≥30). Median monthly headache frequency was the median value of 3 (min:1, max:12) in obese migraine patients, and also 3 (min:1, max:10) in migraine patients with normal weight; this difference was not statistically significant (p=0.968). Median HIT score was 62.5 (min:54, max:70) in obese migraine patients compared to 58 (min:46, max:72) in migraine patients with normal weight; however, this difference was not statistically significant (p=0.094). Median MIDAS score was 20.5 (min:8, max:32) in obese migraine patients compared to 16 (min:6, max:41) in migraine patients with normal weight; however, this difference was not statistically significant (p=0.252).

EAT, BAI, BDI, and the neuroticism subscale scores were significantly higher and quality of life subscale scores were significantly lower in migraine patients compared to the control group. EAT, BAI, BDI, SF-36, and EPQR-A scores and intergroup comparisons are presented in Table 3.

Migraine patients were divided into two groups according to EAT score of ≥30 and <30, and these two groups were compared. There was no significant difference between migraine patients with an EAT score of ≥30 and <30 according to age and gender (p=0.748; p=0.399, respectively). BAI, BDI, neuroticism subscale scores were significantly higher and all quality of life subscale scores except for physical functioning were significantly lower in migraine patients with an EAT score of ≥30 compared to those with an EAT score of <30. BAI, BDI, MIDAS, SF-36, and neuroticism subscale scores of migraine patients with an EAT score of ≥30 and <30 and the comparison between these two groups are presented in Table 4.

In migraine patients, EAT scores correlated positively with age and BAI, BDI, MIDAS, and neuroticism subscale scores, and negatively with education level and all quality of life subscales. Table 5 shows the correlation between EAT scores and age, BMI, education level, and scores from HIT, MIDAS, BAI, BDI, SF-36, and neuroticism subscale scores.

Table 2. Body mass index distribution of migraine and control groups.

	Underweight n (%)	Normal n (%)	Overweight n (%)	Obese n (%)	p-value
Migraine (n=91)	3 (3.3)	37 (40.7)	29 (31.9)	22 (24.2)	p=0.679 χ^2=1.514
Control (n=84)	3 (3.6)	38 (45.2)	29 (34.5)	14 (16.7)	

χ^2: chi-square test.

DISCUSSION

According to the results of the Eating Attitudes Test, migraine patients showed a significantly higher rate of disordered eating behavior and total EAT scores compared to healthy controls. The pathophysiology of both migraine and eating disorders is not yet fully understood. It has been suggested that these two diseases share common pathophysiological features such as serotonin dysfunction, therefore leading to increased rates of psychiatric disorders, especially depression and anxiety disorders, in these diseases[19,20]. Few studies have tested the hypothesis that disordered

Table 3. Eating Attitude Test, Beck Anxiety Inventory, Beck Depression Inventory, 36-Item Short Form Health Survey questionnaire and Eysenck Personality Questionnaire Revised Form scores of migraine and control groups, median (min–max).

	Migraine (n=91)	Control (n=84)	p-value
EAT	17 (0–41)	9 (0–42)	**p<0.001** U=2,326
BAI	12 (2–50)	6 (0–38)	**p<0.001** U=1,803.5
BDI	11 (3–37)	5.5 (0–36)	**p<0.001** U=1,966
Quality of life subdimensions			
Physical functioning	55 (10–100)	80 (50–100)	**p<0.001** U=1,401
Role physical	50 (0–100)	100 (25–100)	**p<0.001** U=1,836
Role emotional	66.67 (0–100)	100 (0–100)	**p<0.001** U=2,163.5
Vitality	40 (10–100)	75 (25–100)	**p<0.001** U=1,463.5
Mental health	52 (16–100)	88 (20–100)	**p<0.001** U=1,519
Social functioning	62.5 (12.5–100)	87.5 (37.5–100)	**p<0.001** U=1,691.5
Bodily pain	45 (12.50–100)	87 (35–100)	**p<0.001** U=1,073
General health	50 (15–100)	80 (35–100)	**p<0.001** U=1,393.5
Personality traits subdimensions			
Neuroticism	4 (0–6)	2 (0–6)	**p<0.001** U=1,960
Extraversion	4 (0–6)	3 (0–1)	p=0.066 U=3,221.5
Psychoticism	1 (0–3)	1 (0–5)	p=0.633 U=3,673
Lying	4 (0–6)	4 (1–6)	p=0.442 U=3,572.5

EAT: Eating Attitude Test; BAI: Beck Anxiety Inventory; BDI: Beck Depression Inventory; U: Mann-Whitney U test. Bold values represent significant findings at p<0.05.

eating behaviors are more frequent in migraine patients due to these shared mechanisms[21,22]. Our study found higher rates of disordered eating behavior in migraine patients, similar to studies in the literature.

Our study found that migraine patients had significantly higher BAI and BDI scores compared to the control group and positive correlation with EAT scores. Migraine patients who had disordered eating attitudes also had significantly higher BAI and BDI scores compared to those who did not. One study reported major depressive disorder in 42% of female patients with disordered eating attitudes and a strong relationship between major depressive disorder and migraine[22]. Another study found a significant positive correlation between EAT scores and depression and anxiety levels in migraine patients[22].

Our study found a negative correlation between SF-36 and EAT scores and that all SF-36 subscale scores were significantly lower in migraine patients compared to the control group. In addition, migraine patients who had disordered eating attitudes had significantly higher SF-36 scores than those who did not. Many studies have found that migraine patients had poorer quality of life compared to healthy individuals[23,24]. Moreover, quality of life significantly decreased in migraine patients, especially during headache episodes. Therefore, a significant relationship between quality of life and migraine is strongly suggested[25]. It has been reported that people with

Table 4. Age, gender, body mass index, and Migraine Disability Assessment Scale, Headache Impact Test, Beck Anxiety Inventory, Beck Depression Inventory, Neuroticism subscale, and 36-Item Short Form Health Survey questionnaire scores of migraine patients with Eating Attitude Test score of ≥30 and <30.

	Migraine (EAT<30) (n=70)	Migraine (EAT≥30) (n=21)	p-value
Age, median (min–max)	32 (18–55)	40 (19–59)	p=0.053 U=530
Gender, n (%)			
Female	20 (28.6%)	16 (23.8%)	p=0.785
Male	50 (71.4%)	5 (76.2%)	χ^2=0.184
BMI, median (min–max)	24.91 (17.19–36.73)	32.79 (23.26–40.57)	**p=<0.001** U=262.5
MIDAS, median (min–max)	16.5 (6–69)	22 (10–50)	**p=0.016** U=480.5
HIT, median (min–max)	59 (42–68)	63 (54–72)	**p=0.001** U=388.5
BAI, median (min–max)	10.50 (2–50)	33 (8–44)	**p<0.001** U=362.5
BDI, median (min–max)	10 (3–37)	23 (4–35)	**p=0.001** U=385.5
Neuroticism subscale, median (min–max)	3 (0–6)	4 (0–6)	**p=0.021** U=494
Quality of life subdimensions, median (min–max)			
Physical functioning	60 (20–100)	40 (10–90)	p=0.124 U=572.5
Role physical	62.5 (0–100)	25 (0–100)	**p=0.004** U=435
Role emotional	66.67 (0–100)	33.3 (0–100)	**p=0.002** U=420
Vitality	55 (10–100)	20 (25–100)	**p<0.001** U=314
Mental Health	66 (16–100)	32 (16–88)	**p<0.001** U=260.50
Social functioning	62.5 (12.5–100)	37.5 (37.5–100)	**p<0.001** U=260
Bodily pain	50 (12.50–100)	32.5 (35–100)	**p<0.001** U=302
General health	55 (15–100)	35 (35–100)	**p<0.001** U=348

EAT: Eating Attitude Test; BAI: Beck Anxiety Inventory; BDI: Beck Depression Inventory; BMI: body mass index; MIDAS: Migraine Disability Assessment Scale; HIT: Headache Impact Test; U: Mann-Whitney U test; χ^2: chi-square test. Bold values represent significant findings at p<0.05.

Table 5. Correlation of Eating Attitude Test scores with age, body mass index, duration of education, and Headache Impact Test, Migraine Disability Assessment Scale, Beck Anxiety Inventory, Beck Depression Inventory, 36-Item Short Form Health Survey questionnaire, and neuroticism subscale scores in migraine patients (n=91).

	EAT	
	R	p-value
Age	0.210	**0.046**
BMI	0.421	**<0.001**
Duration of education	-0.349	**0.001**
HIT	0.353	**0.001**
MIDAS	0.260	**0.013**
BAI	0.408	**<0.001**
BDI	0.414	**<0.001**
Neuroticism	0.307	**0.003**
Quality of life subdimensions		
Physical functioning	-0.240	**0.022**
Role limitations due to physical health	-0.456	**0.001**
Role limitations due to emotional problems	-0.470	**<0.001**
Vitality	-0.531	**<0.001**
Mental health	-0.531	**<0.001**
Social functioning	-0.447	**<0.001**
Bodily pain	-0.338	**0.001**
General health perceptions	-0.465	**<0.001**

EAT: Eating Attitude Test; BMI: body mass index; HIT: Headache Impact Test; MIDAS: Migraine Disability Assessment Scale; BAI: Beck Anxiety Inventory; BDI: Beck Depression Inventory; Bold values represent significant findings at p<0.05. All parameters were determined as significant (Spearman's correlation analysis). R: correlation coefficients.

disordered eating attitudes also have poor quality of life[26]. So far, no study in the literature has collectively investigated quality of life, migraine, and disordered eating attitudes. According to the results of our study and data in the literature, it can be concluded that patients with both migraine and disordered eating attitudes have an even lower quality of life and that migraine patients should be treated in consideration to comorbid conditions. Furthermore, migraine patients with low quality of life may have a higher prevalence of disordered eating attitudes. All these considerations suggest that the treatment of underlying pathological conditions is crucial in order to break this vicious circle.

In our study, there was no significant difference between the BMI of migraine patients and those in the control group, whereas there was a positive correlation between BMI and EAT scores. In addition, migraine patients with disordered eating attitudes had significantly higher BMI compared to migraine patients without disordered eating attitudes. A meta-analysis of approximately 300,000 participants reported a 27% increased risk of migraine in obese adults[6]. Another study reported increased frequency and severity of migraine headache in overweight individuals[27]. Obesity and episodic migraines are associated with inflammatory processes through the release of pro-inflammatory cytokines and neuropeptides[28]. Severe inflammatory response increases the risk of migraine progression by increasing the sensitivity of central neurons to harmful and non-harmful stimuli[4]. In obesity, adipocytes produce and secrete a large number of proteins, which may play a role in the potential relationship between obesity and migraine[5,29]. The association between obesity and migraine may be attributed to calcitonin gene-related peptide (CGRP). CGRP is a neurotransmitter produced in peripheral sensory neurons and in numerous regions of the central nervous system, secondary to increased vasodilatation during acute migraine episodes, and is capable of supporting immune and inflammatory responses[30,31]. In addition, evidence of increased CGRP levels in obese subjects suggests that this relationship may be attributed to CGRP[5,32]. Despite the studies on all of these molecules, the cause of the increased prevalence of migraine in underweight individuals has not yet been clarified. It was interesting to find a correlation between EAT scores and BMI in our study since EAT is also an index of anorexia nervosa symptoms. According to the literature, one study showed a correlation between EAT and BMI[33]. In light of the data from the literature and our study, it is evident that further research is needed to clarify this topic.

Our study found that neuroticism subscale scores were significantly higher in migraine patients compared to the control group. There was a positive correlation between neuroticism and EAT scores. In addition, neuroticism scores of migraine patients with disordered eating attitudes were significantly higher than those of migraine patients without disordered eating attitudes. Personality traits may have an impact on the individual's ability to cope with various diseases. Since neuroticism can alter the perception of pain, people with high levels of neuroticism have a lower pain threshold compared to people with low levels of neuroticism[34]. Migraine patients have been found to have higher levels of neuroticism[9,34]. Patients with disordered eating attitudes have been shown to have a high likelihood of developing comorbid personality disorders[7]. Likewise, patients with personality disorders are more likely to have eating pathologies[7]. It has been shown that there is a relationship between neuroticism and eating disorders[7]. The results of this study may be considered valuable as they indicate a high prevalence of eating disorder in the coexistence of migraine and neuroticism.

Migraine patients with disordered eating attitudes according to the EAT had significantly higher MIDAS and HIT scores compared to those without disordered eating attitudes. To the best of our knowledge, there is no data in the literature on this subject. The hypothalamus, limbic system, and amygdala are thought to play an important role in the pathogenesis of eating disorders[35,36]. It has been reported that hypothalamic or limbic dysfunction may lead to prodromal symptoms such as nausea, depressive mood, irritability, and hypersomnia prior to migraine episodes[37,38]. These results support existing hypotheses in the literature. The data from the literature and our study are indicative that a disordered eating attitude may be associated with the frequency and severity of migraine episodes in migraine patients.

The limitations of our study include its single-center study design and the use of non-diagnostic self-report scales.

In conclusion, our study demonstrated that there may be a relationship between migraine and disordered eating attitudes. We also showed that the association of migraine and disordered eating attitudes was related to depression, anxiety, higher BMI, poor quality of life, and personality traits, and may be a clinical sign of more severe migraine. This study suggests that the presence of eating disorders or disordered eating behavior is significant in the follow-up and treatment of migraine patients and that early detection and treatment of disorders in eating behavior will benefit migraine patients. Finally, it is known that behavioral therapy can be very effective in the treatment of disordered eating attitudes and migraine[39,40]. The data from the literature and our study implies that there is a need for studies that apply behavioral therapy to this association between disordered eating attitudes and migraine.

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