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Depression, Anxiety and Pain Catastrophizing in Migraine Patients

Migren Hastalarında Depresyon, Anksiyete ve Ağrıyı Felaketleştirme

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ABSTRACT

Aim: In this study, we aimed to evaluate the relationship between anxiety, depression, and pain catastrophizing in individuals with and without migraine.

Method: Data of the study was collected using the socio-demographic data form, Beck Depression Scale (BDI), Beck Anxiety Scale (BAI), Pain Catastrophizing Scale (PCS), Migraine Disability Assessment Scale (MIDAS), and Visual Analogue Scale (VAS).

Results: Of the 183 patients, 80 were migraine patients and 103 were the control group. The BDI, BAI, and PCS scores were found to be higher in the migraine patients compared to the control group. The migraine patients were found to have "moderate" depression, "mild" anxiety, and "moderate" disability. There was a positive correlation between BDI, BAI, PCS, MIDAS, and VAS scores in the migraine patients. According to the total BDI and BAI scores of the migraine patients, the PCS total score and the PCS subscales "helplessness", " magnification", and "rumination" scores were higher in the patients with depression or anxiety.

Conclusions: It was found that the migraine patients had "moderate" depression and "mild" anxiety, and their pain catastrophizing level increased with increasing depression and anxiety severity.

Key Words: Migraine, Depression, Anxiety, Pain Catastrophizing.

ÖZET

Amaç: Bu çalışmada migreni olan ve olmayan bireylerde anksiyete, depresyon ve ağrıyı felaketleştirme arasındaki ilişkiyi değerlendirmeyi amaçladık.

Yöntem: Araştırmanın verileri sosyodemografik veri formu, Beck Depresyon Ölçeği (BDÖ), Beck Anksiyete Ölçeği (BAÖ), Ağrıyı Felaketleştirme Ölçeği (AFÖ), Migren Yetersizliği Değerlendirme Ölçeği (MIDAS) ve Görsel Analog Ölçeği (VAS).

Bulgular: 183 hastanın 80'i migren hastası ve 103'ü kontrol grubuydu. Migren hastalarında BDI, BAI ve AFÖ puanları kontrol grubuna göre daha yüksek bulundu. Migren hastalarının "orta" depresyon, "hafif" anksiyete ve "orta" yeti yitimine sahip oldukları bulundu. Migren hastalarında BDÖ, BAÖ, AFÖ, MIDAS ve VAS skorları arasında pozitif korelasyon vardı. Migren hastalarının toplam BDÖ ve BAÖ puanlarına göre, depresyon ya da anksiyetesi olan hastalarda AFÖ toplam puanı ve AFÖ alt ölçekleri "çaresizlik", "büyütme" ve "ruminasyon" puanları daha yüksekti.

Sonuç: Migren hastalarının "orta" depresyon ve "hafif" anksiyeteye sahip oldukları ve artan depresyon ve anksiyete şiddeti ile ağrıyı felaketleştirme düzeylerinin arttığı bulundu.

Anahtar Kelimeler: Migren, Depresyon, Anksiyete, Ağrıyı Felaketleştirme

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Introduction

Migraine, a chronic disease usually characterized by pulsatile headache attacks on one side of the cranium, can begin at any age, and its frequency tends to decrease in older ages [1]. It is one of the causes of headache affecting up to 11% of the adult population worldwide [2]. Migraine negatively affects the quality of life, social functionality, and working life. Its pathophysiology has not been fully elucidated yet [3]. Migraine diagnosis criteria were determined by the International Headache Society (IHS) [4]. It is basically divided into two groups: migraine with and without aura [5].

The degree of disability in migraine is important in determining the treatment [6]. Migraine may be associated with some psychiatric disorders. Depression is 2-4 times more common in migraine patients than in general population [7]. Concomitant depression and anxiety make the migraine treatment difficult [8]. Similar biological pathways and neurotransmitters play a role in the development of depression and pain [9]. These findings are supported by the previous studies investigating the analgesic effects of tricyclic antidepressants and serotonin-noradrenaline reuptake inhibitors [10]. Symptoms of depression, which are quite common in the course of chronic pain, make it difficult for the patient to comply with the treatment [11].

Catastrophizing is the tendency to evaluate one's situation or physical complaint with the fear that it will get worse each time [12]. Pain catastrophizing may increase with depression and anxiety in patients with migraine. This situation is evaluated by the pain catastrophizing scale (PCS) [13]. Catastrophizing pain has been associated with various diseases, chronic pain, deterioration of quality of life, increased degree of disability, and more healthcare use [14]. In individuals with migraine, pain catastrophizing has been associated with poor response to treatment and decreased health-related quality of life [15].

In this study, we aimed to compare the levels of anxiety, depression, and pain catastrophizing between individuals with and without migraine.

Materials And Methods

*Patients;*183 individuals, 80 migraine patients who were previously diagnosed with migraine according to IHS diagnostic criteria and 103 non-migraine individuals (control group), were included in the study. Migraine Disability Assessment (MIDAS), Visual Analogue Scale (VAS), Beck Depression Inventory (BDI), Beck Anxiety Inventory (BAI), and PCS were filled and evaluated with a questionnaire prepared previously by the researchers.

The socio-demographic data form includes the following information: age, gender, history of psychiatric and chronic disease, migraine type, and duration of the disease. *MIDAS* evaluates the disability associated with migraine and consists of 7 questions [16]. In VAS, pain severity is scored between 0 (no pain) and 10 points (worst pain imaginable) [17]. BDI is used to assess depression level. In BDI, the scores within the range of 0-9 refer to "no depression", 10-16 to "mild depression", 17-23 to "moderate depression", 24 or more to "severe depression" [18, 19]. BAI is a self-assessment scale developed to determine the frequency of anxiety symptoms experienced by individuals. In BAI, the scores within the range of 0-7 points refer to minimal anxiety symptoms, 8-15 points to mild, 16-25 points to moderate, and 26-63 points to severe [12].

PCS was developed to determine the catastrophic thoughts or feelings of patients regarding pain. The higher the total score, the higher the level of catastrophizing. PCS is used to assess the patient's feelings and thoughts about pain. The scores for each item are added to determine the subscale scores [20].

Inclusion and exclusion criteria; Migraine patients with cognitive functions sufficient to answer the questions and the control group were included in the study. Individuals with cognitive impairment preventing them from answering the questions, those who did not answer the questionnaire completely, and those with missing sociodemographic data were excluded from the study (Figure 1).

Ethical approval; was taken from the local ethics committee for this study (Approval No: 2020/295).

Statistical Analysis; IBM SPSS software package (v.22.0) was used. Based on the distribution of data in the comparison between groups, One-way ANOVA test was used for normally distributed values in non-categorical data, and Mann-Whitney U test for non-parametric data. Categorical data were compared using the Chi-square test. Pearson Correlation analysis was used to analyze the relationship between scale scores. The statistical significance was set at $p < 0.05$.

Results

Of the 183 patients participating in the study, 80 were the migraine patients and 103 were in the control group. The mean age of the migraine patients was 38.7 ± 13.5 years and 88.8% (n = 71) of them were women. The mean age of the control group was 39.0 ± 9.9 years and 86.4% (n = 89) of them were women, so the control group consisted of the individuals of similar age and gender to the migraine patients ($p > 0.05$, all). Majority of the migraine patients

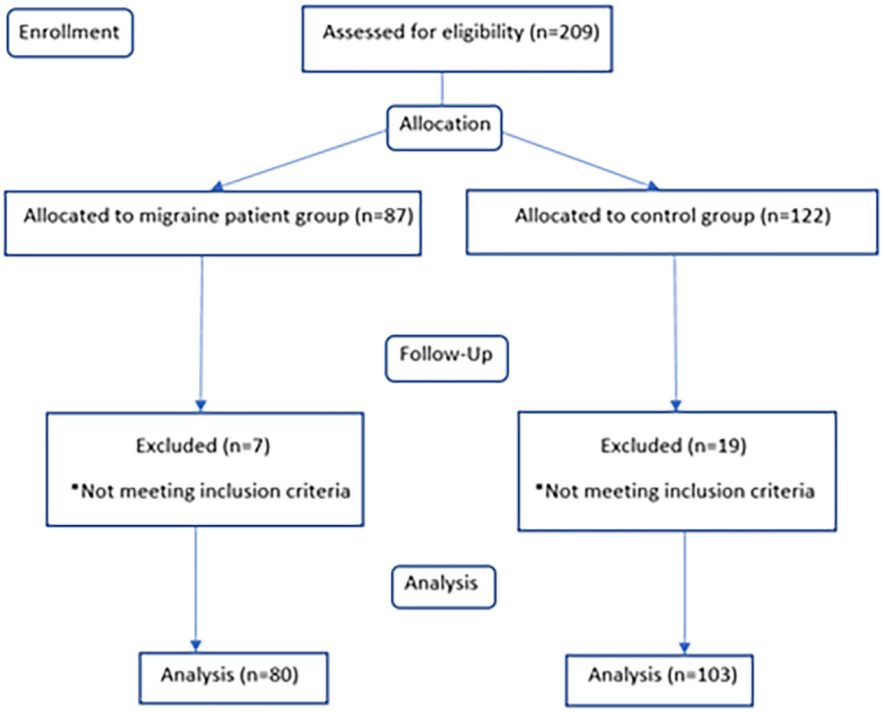

Figure 1. Flow diagram of the study The scale was applied to 209 people. 87 of these individuals were from the migraine group and 122 from the control group. 7 individuals from the migraine group and 19 individuals from the control group were excluded because they did not meet the inclusion criteria. As a result, the data of 80 migraine patients and 103 control groups were analyzed.

were diagnosed with non-aura migraine (72.5%). The mean disease duration of the migraine patients was 10.25 ± 8.15 years (Table 1).

When the BDI, BAI, and PCS scores of the migraine patients and the control group were compared, it was observed that the BDI, BAI, PCS scores were higher in the migraine patients compared to the control group ($p < 0.001$, all). The migraine patients were found to have "moderate" depression according to BDI score, "mild" anxiety according to BAI score, "moderate" disability according to MIDAS score (Table 2).

When the migraine patients were divided into the migraine subgroups, that is, those with and without aura; it was found that age, duration of illness, and test results were higher in the patients with migraine without aura compared to those with aura, but the difference was not statistically significant (Table 3).Correlation analysis was carried out between BDI, BAI, PCS, MIDAS, VAS scores and disease duration in migraine patients. There was a positive correlation between the scores for BAI and BDI, PCS and BDI, MIDAS and BDI, VAS and BDI, PCS and BAI, MIDAS and BAI, BAI and VAS, PCS and MIDAS, PCS and VAS, and MIDAS and VAS. There was no correlation between the disease duration and the scales ($p > 0.05$, all) (Table 4).

The PCS subscale scores of the patients with and without depression were evaluated in terms of their total BDI scores, and those of the patients with and without anxiety in terms of their BAI total scores. The PCS total score ($p = 0.003$) and the scores for the PCS subscales "helplessness" ($p = 0.001$), "magnification" ($p = 0.048$), and "rumination" ($p = 0.016$) were found to be significantly higher in the migraine patients with depression than in those without. Likewise, the PCS total score ($p < 0.001$) and the scores for the PCS subscales "helplessness" ($p < 0.001$), "magnification" ($p = 0.009$), and "rumination" ($p = 0.001$) scores were found to be higher in the migraine patients with anxiety than in those without. This shows that the level of pain catastrophizing increases with depression and anxiety (Table 5).

Discussion

Migraine is more common in women than men due to some genetic and hormonal reasons [21]. In our study, the majority of migraine patients (88.8%) were women. In the study by Atalar et al., it was shown that, in women, the migraine attacks was more frequent, their duration was longer, and the severity of pain was higher, and they were

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Table 1. Sociodemographic and clinical characteristics of migraine patients and control groups

Variables	All participiants (*n* = 183)	Migrain patients (*n* =80)	Control groups (*n* = 103)	***p***
Age (year), (mean ± sd)	38.91 ± 11.65	38.78 ± 13.57	39.01 ± 9.98	0.709
Gender, *n* (%)				0.635
Female	160 (87.4)	71 (88.8)	89 (86.4)	
Male	23 (12.6)	9 (11.2)	14 (13.6)	
Chronic disease history, *n* (%)				0.122
Yes	27 (14.8)	7 (8.7)	20 (19.4)	
No	156 (85.2)	73 (91.3)	83 (80.6)	
Psychiatric history, *n* (%)				0.068
Yes	8 (4.4)	6 (7.5)	2 (1.9)	
No	175 (95.6)	74 (92.5)	101 (98.1)	
Duration of migraine disease (year), (mean ± sd)	-	10.25 ± 8.15	-	-
Migraine Type, *n* (%)	-		-	-
Aura Migraine		22 (27.5)		
Non-Aura Migraine		58 (72.5)		

p, chi square test; *n*, number; sd, standard deviation.

Table 2. Comparison of BDI, BAI, PCS, MIDAS and VAS scores of migraine patients and control group

Scales	Migrain Patients (mean ± sd)	Control Groups (mean ± sd)	*p*
BDI	17.56 ± 9.69	5.26 ± 4.08	<0.001
BAI	15.38 ± 9.10	3.90 ± 1.78	<0.001
PCS	22.38 ± 12.30	10.70 ± 12.73	<0.001
MIDAS	12.14 ± 5.12	-	-
VAS	6.26 ± 1.68	-	-

p, independent sample T-test; sd, standard deviation; BDI, Beck Depression Inventory; BAI, Beck Anxiety Inventory; PCS, Pain Catastrophizing Scale; MIDAS, Migraine Disability Assesment Scale; VAS, Visual Analogue Scale.

Table 3. Comparison of migraine groups with and without aura in terms of age, disease duration and test results

Variables	Aura Migraine (mean ± sd)	Non-Aura Migraine (mean ± sd)	*p*
BDI	15.82 ± 7.99	18.22 ± 10.24	0.324
BAI	13.09 ± 8.76	16.24 ± 9.15	0.169
PCS	18.55 ± 11.78	23.83 ± 12.28	0.087
MIDAS	10.32 ± 1.28	12.34 ± 4.20	0.421
VAS	5.86 ± 1.46	6.10 ± 1.65	0.092
Age	37.50 ± 9.09	39.27 ± 14.96	0.605
Duration of illness	13.13 ± 8.54	9.15 ± 7.79	0.051

p, independent sample T-test; sd, standard deviation; BDI, Beck Depression Inventory; BAI, Beck Anxiety Inventory; PCS, Pain Catastrophizing Scale; MIDAS, Migraine Disability Assesment Scale; VAS, Visual Analogue Scale.

Table 4. Correlation analysis between BDI, BAI, PCS, MIDAS, VAS scores and duration of illness in migrain patients

Variables		BDI	BAI	PCS	MIDAS	VAS
BDI	*r*	-	0.750	0.347	0.315	0.276
	95% CI	-	0.584,0.870	0.126,0.569	0.065,0.522	0.046,0.477
	p	-	<0.001	0.002	0.004	0.013
BAI	*r*	0.750	-	0.453	0.540	0.556
	95% CI	0.584,0.870	-	0.264,0.630	0.329,0.721	0.360,0.713
	p	<0.001	-	<0.001	<0.001	<0.001
PCS	*r*	0.347	0.453	-	0.372	0.387
	95% CI	0.126,0.569	0.264,0.630	-	0.152,0.574	0.171,0.582
	p	0.002	<0.001	-	0.001	<0.001
MIDAS	*r*	0.315	0.540	0.372	-	0.726
	95% CI	0.065,0.522	0.329,0.721	0.152,0.574	-	0.606,0.828
	p	0.004	<0.001	0.001	-	<0.001
VAS	*r*	0.276	0.556	0.387	0.726	-
	95% CI	0.046,0.477	0.360,0.713	0.171,0.582	0.606,0.828	-
	p	0.013	<0.001	<0.001	<0.001	-
Duration of illness	*r*	-0.029	-0.049	-0.081	-0.117	-0.062
	95% CI	-0.227,0.181	-0.251,0.175	-0.029,0.797	-0.330,0.099	-0.314,0.168
	p	0.797	0.668	0.473	0.300	0.586

p value, Pearson Partial Correlation Test; *r*, Correlation Coefficient; CI, Confidence Interval; sd, standard deviation; BDI, Beck Depression Inventory; BAI, Beck Anxiety Inventory; PCS, Pain Catastrophizing Scale; MIDAS, Migraine Disability Assesment Scale; VAS, Visual Analogue Scale.

Table 5. PCS subscale scores according to the presence of depression or anxiety in migraine patients

PCS Subscales	No Depression (BDI) (mean ± sd)	Depression (BDI) (mean ± sd)	*p*
Helplessness	7.55 ± 6.41	12.60 ± 4.24	0.001
Magnification	5.35 ± 3.03	6.72 ± 2.31	0.048
Rumination	6.84 ± 3.99	9.04 ± 3.02	0.016
Total	19.65 ± 12.88	28.36 ± 8.41	0.003
	No Anxiety (BAI) (mean ± sd)	Anxiety (BAI) (mean ± sd)	*p*
Helplessness	7.45 ± 6.09	13.04 ± 4.86	<0.001
Magnification	5.23 ± 2.87	7.04 ± 2.54	0.009
Rumination	6.63 ± 3.62	9.63 ± 3.57	0.001
Total	19.23 ± 11.95	29.71 ± 9.92	<0.001

p, independent sample T-test; sd, standard deviation; BDI, Beck Depression Inventory; BAI, Beck Anxiety Inventory; PCS, Pain Catastrophizing Scale.

more susceptible to the environmental and hormonal factors [22].

Non-Aura Migraine accounts for approximately 80-90% of all migraine cases [4]. Also, in the present study, the patients with Non-Aura Migraine constituted the majority (72.5%). Although age, duration of illness, and test results were higher in the patients with migraine with aura compared to the patients diagnosed with Non-Aura Migraine, the difference was not statistically significant (Table 1). While some studies assert that there are no differences in the levels of anxiety and depression symptom between patients with migraine with and without aura [7], some other studies assert that the psychiatric disorders are more common in those with aura than in those without aura [23].

In our study, the BDI, BAI, PCS scores were found to be higher in the migraine patients compared to the control group. The levels of depression, anxiety, and pain catastro-

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phizing were higher in the migraine group than in the normal population. The migraine patients were found to have "moderate" depression, "mild" anxiety, and "moderate" disability according to MIDAS (Table 2). It can be thought that migraine patients are depressed due to having a chronic disease for a long time. In the study by Kutlu et al., it was asserted that as the level of depression increased, the quality of life decreased significantly in all areas [24]. The psychiatric disorders such as depression, anxiety disorder, bipolar disorder, and phobia thought are common in individuals with migraine. Juang et al. reported that 78% of the patients with migraine and 64% of the patients with tension headache had psychiatric disorders [25]. In the study by Breslau et al., it was found that major depression and migraine increased the frequency of each other, and this relationship was not found to exist in other headaches [26]. In the study by Selekler et al., major depression and dysthymic disorders were found to be more common in the patients with migraine and tension-type headache than those with secondary headache [27]. In the similar previous studies, the levels of depressive symptom and anxiety severity were found to be higher in the migraine group compared to the control group [28, 29].

No relationship was found between the duration of the disease and the levels of depressive symptoms in our study. Although there are some studies with similar results to ours [7], there are also some other studies reporting a relationship between disease duration and depressive symptom levels [30]. Since anxiety and depression can negatively affect the quality of life in patients with migraine, physical and psychosocial symptoms that may lead to anxiety and depression should be well recognized and evaluated, and appropriate treatment modalities should be developed for patients. According to the study by Gürsoy et al., the medication to be used in prophylactic treatment should be selected according to its efficacy and side effect profile, and the patient's comorbid diseases should also be considered [31]. Antidepressant use may be preferred if the patient with migraine has a mood disorder. According to the study by Tassorelli et al., major depression and anxiety are common in migraine patients, and psychiatric comorbidities and allodynia are the risk factors for progression to chronic migraine [4].

Pain catastrophizing is the tendency to feel increased pain, whether real or imaginary. This inability to distract the focus of attention from pain causes an increase in pain perception and sensitivity. In our study, PCS scores, which show the emotional and cognitive attitudes of individuals towards their pain, were found to be higher in the migraine patients compared to the control group (Table 2). In the study by Bond et al., it was observed that the duration of attack and pain sensitivity were higher in the patients with migraine. They asserted that when treating headache, it was necessary to address the pain catastrophizing and mood disorders [15]. Pires et al. reported that those with migraine exhibited different psychological characteristics than those without migraine, and the levels of anxiety and pain catastrophizing were higher in the migraineurs [32]. In our study, according to the total BDI scores of migraine patients, the PCS total score and the scores for PCS subscales were statistically significantly higher in the patients with depression and anxiety than those without ($p < 0.05$, all). Thus, in our study, it was found that the overall level of pain catastrophizing and the levels of PCS subscales were higher in the patients with depression or anxiety. The subscales "helplessness" (inability to cope with pain effectively), "magnification" (discontent created by focusing excessively on the negative consequences of pain), and "rumination" (inability to inhibit thoughts about pain) reflect the cognitive content of psychopathologies such as anxiety and depression accompanying headache and migraine (Table 5). It was shown in previous studies that the scores for the subscales of PCS were higher in those with migraine and tension-type headache than in the control group [8]. A positive correlation was observed between BDI, BAI, PCS, MIDAS, and VAS scores in migraine patients, in our study ($p < 0.05$, all) (Table 4). This indicates that pain catastrophizing increases with depression and anxiety. In our study, it was found that as the degree of pain and migraine disability increased, the levels of depression, anxiety, and pain catastrophizing also increased, and vice versa. In migraine patients, psychosocial approach also plays an important role in breaking this vicious circle in addition to medical treatment, and incorporation of psychosocial approach into treatment can increase its effectiveness. If these problems are not expressed by patients or questioned by clinicians, it can be difficult to treat migraine.

One of the limitations of our study is that it is single-centered. Future studies should be carried out in multiple centers with more participants. The strength of our study lies in that it is a prospective study and includes the comparison of the symptom levels of anxiety, depression, and pain catastrophizing between normal individuals and migraine patients, and between migraine patients with and without aura, and the evaluation of these levels together with MIDAS and disease duration.

Conclusion In this study, it was observed that the levels of depressive symptoms, anxiety, and pain catastrophizing were significantly higher in the migraine patients compared to the control group. It was found that the migraine patients generally had "moderate" depression and "mild" anxiety. It was found that as the severity of anxiety and depression increased in the migraine patients; their levels of pain catastrophizing, helplessness, magnification, and rumination also increased. In migraine patients, in addi-

tion to medical treatments, psychiatric approaches should be incorporated into the treatment for patients who are indicated after psychosocial evaluations.

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ORCID and Author contribution: **H.İ. (**0000-0003-2883-259X): *Concept and Design, Data collection, Statistical Analysis Interpretation, Literature search, Manuscript Writing, Critical Review. Final approval.* **F. İ. (**0000-0002-7590-7630**):** *Concept and Design, Data collection, Statistical Analysis Interpretation, İnterpretation of results, Literature search, Manuscript Writing, Critical Review. Final approval.*

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