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RESEARCH

Self-compassion and pain experience in migraine patients

Migren hastalarında öz şefkat ve ağrı deneyimi

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Abstract

Purpose: The aim of this study was to compare self-compassion levels between migraine patients and healthy controls and to evaluate the relationship of self-compassion with pain perception, migraine-related functional disability, depression and anxiety symptoms.

Materials and Methods: This cross-sectional study conducted in Hatay included 68 adults diagnosed with migraine according to ICHD-3 criteria and 58 healthy controls. Self-compassion was measured with Self-Compassion Scale (SCS), pain intensity with Numeric Rating Scale (NRS), depression with Beck Depression Inventory (BDI), anxiety with Beck Anxiety Inventory (BAI), and functional disability with Migraine Disability Assessment Scale (MIDAS).

Results: Self-compassion levels were similar between migraine patients (mean 2.65±0.42) and healthy controls (mean 2.64±0.57), with a negligible effect size (Cohen's d=0.023). Depression and anxiety levels were notably elevated in migraine patients: 48.5% of migraine patients were in moderate-to-severe depression categories compared to 25.8% of controls, and no migraine patient reported minimal anxiety whereas 20.7% of controls did. In the migraine group, self-compassion showed a strong negative correlation with depression (r=-0.501) and moderate negative correlation with anxiety (r=-0.295), while these correlations were weaker and non-significant in controls. Self-compassion was highest in the moderate pain group (2.80±0.43), compared to mild (2.41±0.23) and severe (2.52±0.37) pain groups.

Conclusion: Migraine patients have similar self-compassion levels to healthy individuals. However, self-compassion is strongly associated with psychological comorbidity in migraine patients. Self-compassion-based interventions may be beneficial for managing depression and anxiety in this population.

Keywords: Migraine, self-compassion, pain perception, depression, anxiety, psychosocial intervention

Öz

Amaç: Migrenli bireylerde öz-şefkat düzeyinin migren deneyimini nasıl etkilediğini incelemektir; bu doğrultuda öz-şefkatin ağrı algısı, atak şiddeti ve hastalığa ilişkin öznel değerlendirmelerdeki rolü ile migrene bağlı işlevsel yetersizlik, depresyon ve anksiyete belirtileriyle ilişkisi değerlendirilmiştir.

Gereç ve Yöntem: Hatay'da yürütülen kesitsel çalışmaya ICHD-3 kriterlerine göre migren tanılı 68 erişkin dahil edildi. Öz-şefkat Self-Compassion Scale (SCS), ağrı şiddeti Sayısal Derecelendirme Ölçeği (NRS), depresyon Beck Depresyon Envanteri (BDI), anksiyete Beck Anksiyete Envanteri (BAI) ve işlevsel yetersizlik Migren Özürlülük Değerlendirme Ölçeği (MIDAS) ile ölçüldü.

Bulgular: Migren hastaları (ortalama 2,65±0,42) ve sağlıklı kontrol grubu (ortalama 2,64±0,57) arasında öz-şefkat düzeyleri benzerdi ve etki büyüklüğü ihmal edilebilir düzeydeydi (Cohen's d=0,023). Depresyon ve anksiyete düzeyleri migren hastalarında belirgin şekilde yüksekti: Migren hastalarının %48,5'i orta ila şiddetli depresyon kategorisindeyken, kontrol grubunda bu oran %25,8 idi ve hiçbir migren hastası minimal anksiyete bildirmezken, kontrol grubunun %20,7'si minimal anksiyete bildirmişti. Migren grubunda, öz-şefkat depresyon ile güçlü bir negatif korelasyon (r=-0,501) ve anksiyete ile orta derecede negatif korelasyon (r=-0,295) gösterirken, bu korelasyonlar kontrol grubunda daha zayıf ve anlamlı değildi. Öz-şefkat, hafif (2,41±0,23) ve şiddetli (2,52±0,37) ağrı gruplarına kıyasla orta derecede ağrı grubunda (2,80±0,43) en yüksek seviyedeydi.

Sonuç: Bu çalışmada öz şefkat düzeyi ile migren ağrısı yoğunluğu arasında istatistiksel olarak anlamlı bir ilişki bulunamamıştır; Bu bulgu, öz şefkatin ağrı deneyimi üzerindeki etkisinin migren bağlamında belirgin olmayabileceğini düşündürmektedir.

Anahtar kelimeler: Migren, öz-şefkat, ağrı algısı, depresyon, anksiyete, psikososyal müdahale

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INTRODUCTION

Migraine is a common neurological disorder characterized by intense, throbbing, and usually unilateral headaches that can severely limit functionality[1]. According to the International Headache Society, migraine is a complex clinical condition encompassing different subtypes including migraine without aura, migraine with aura, and chronic migraine[2].

Despite being one of the oldest known diseases in human history, the etiology and pathophysiology of migraine are still not fully understood. Indeed, approximately twenty years ago, the International and American Headache Societies drew attention to the serious service gap in this field; in 2006, the European Headache Federation and World Headache Alliance described migraine as a "forgotten epidemic"[3]. Current data indicate that migraine is one of the leading causes of disability globally among women under 50 years of age[4].

The concept of self-compassion refers to a person's ability to display an understanding, kind, and non-judgmental attitude toward oneself during times of difficulty, failure, or suffering. For example, Goetz, Keltner, and Simon-Thomas (2010) define compassion as "a distinct emotional experience whose primary function is to facilitate cooperation and protection of the weak and suffering"[5,6].

Neff (2003) defines self-compassion with three core components: (1) Self-kindness: The warm, supportive, and forgiving attitude one displays toward oneself in the face of mistakes, inadequacies, and difficulties; (2) Common humanity: Recognizing that suffering and failure are universal aspects of being human and realizing that these experiences are not unique to oneself; (3) Mindfulness: Being able to observe negative emotions and thoughts with balanced and open awareness, neither suppressing nor exaggerating them[7].

It has been reported that self-compassionate individuals have higher levels of life satisfaction and motivation, can establish better relationships, have better physical and psychological health, and experience less anxiety and depression[8]. Additionally, there are some research findings in the literature indicating that self-compassion reduces individuals' stress and depression levels and increases their happiness and life satisfaction[9].

Therefore, self-compassion is very important for an individual's mental health. Traditional Buddhist teachings state that the suffering inherent in life must be accepted and that experiencing moments of well-being with awareness leads to insight[10].

Migraine is not just about headache; migraine patients experience more anxiety and depression compared to healthy individuals and carry a significant psychological burden. Large-scale research in recent years has shown that migraine creates a significant biopsychosocial burden. In a comprehensive analysis of 15,919 migraine patients in Germany, many patients were found to have moderate-to-severe depression, anxiety, stress symptoms, decreased quality of life, and even suicidal ideation. These data emphasize that the psychosocial effects of migraine are still not adequately considered in clinical practice and that preventive treatments need to be strengthened to reduce this burden[11].

Although attack frequency and pain intensity are well-defined in migraine patients, studies examining the relationship of psychological resilience characteristics such as self-compassion with this clinical picture are limited. While the frequent co-occurrence of depression and anxiety with migraine is known, the possible effects of self-compassion which refers to the understanding and support one shows oneself during suffering—on pain perception are still unclear.

In this study, self-compassion was evaluated with the long form of the Self-Compassion Scale developed by Neff and adapted to Turkish by Deniz et al.; the self-understanding subscale was considered as the main indicator of one's attitude toward oneself[7,12]. The original contribution of this study lies in examining self-compassion specifically in migraine patients with a healthy control group, which has rarely been done in the literature. We hypothesized that: (1) migraine patients would have lower self-compassion levels compared to healthy controls, (2) higher self-compassion would be associated with lower pain perception and less disability, and (3) self-compassion would be negatively correlated with depression and anxiety symptoms in migraine patients. This study examined the relationship of self-compassion with pain perception and clinical features (attack frequency, intensity, duration) and its effects in the context of depression and anxiety in migraine patients, questioning whether one's attitude toward oneself affects the pain experience.

MATERIALS AND METHODS

Study design and sample

The study was conducted at the Neurology Outpatient Clinic of Hatay Mustafa Kemal University Hospital, a tertiary care teaching hospital. The clinic follows standardized protocols for migraine diagnosis and management according to international guidelines. All data collection procedures, including patient interviews and scale administrations, were performed by the principal investigator (TC), a board-certified neurologist with expertise in headache disorders. Due to its exploratory nature, formal power analysis was not performed; the sample consisted of consecutive patients presenting to the clinic who met the criteria. In this context, 68 migraine patients and 58 healthy controls were included in the study. Post-hoc power analysis (G*Power 3.1.9.7) indicated that the current sample size (n=68 migraine, n=58 control) provides 80% power to detect a medium effect size (d=0.50) at α=0.05. All procedures were conducted in accordance with the Declaration of Helsinki, and written informed consent was obtained from all participants.

Between January 30 and July 30, 2025, a total of 76 migraine patients were initially enrolled in the study at the Neurology Outpatient Clinic. During the study period, 8 patients were excluded from the final analysis due to various reasons (loss to follow-up, incomplete data, withdrawal from the study). The final analysis was performed on 68 patients (89.5%).

Eligible participants were adults aged 18-75 years with clinically confirmed migraine diagnosis according to the International Classification of Headache Disorders, 3rd edition (ICHD-3) criteria, who were literate, had the cognitive ability to understand and complete the administered scales (Mini-Mental State Examination score ≥24), had proficiency in Turkish language, and provided written informed consent.

Exclusion criteria included history of significant psychiatric disorder such as active psychotic disorder, untreated major depression, bipolar disorder, or severe anxiety disorder; severe neurological disorders such as dementia, intellectual disability, or traumatic brain injury; severe physical disability preventing completion of scales; development of an acute illness during the research process; history of active alcohol or substance use; and refusal to participate.

For the control group, 58 healthy individuals were recruited from the same hospital during the same period. Control participants had no history of migraine or other primary headache disorders, met the same cognitive and language criteria as the migraine group, and provided written informed consent.

Procedure

This study was approved by the Mustafa Kemal University Faculty of Medicine Non-Interventional Clinical Research Ethics Committee (Meeting No: 02; Decision No: 45; January 29, 2025).

Data were collected in a quiet interview room following routine outpatient examination. All assessments were conducted by the same researcher (TC) using face-to-face interview method. Scales were administered in a standardized order (SCS, NRS, BDI, BAI, MIDAS). Each assessment session lasted approximately 25-35 minutes.

Measures

Self-Compassion Scale – Long Form (SCS)

The Turkish adaptation by Deniz, Kesici, and Sümer (2008) of the scale developed by Neff (2003) is a valid and reliable measurement tool that evaluates the subdimensions of self-compassion [7,12]. This scale is the long version of Neff's (2003) original 26-item scale and is evaluated with a 5-point Likert scale (1 = "Almost never", 5 = "Almost always"). The original English version demonstrated excellent internal consistency (Cronbach's α=0.92) and good test-retest reliability (r=0.93). The Turkish version also showed good internal consistency (Cronbach's α=0.89) and adequate construct validity. Higher total scores indicate higher self-compassion; scores are typically categorized as low (1.0-2.49), moderate (2.5-3.49), and high (3.5-5.0).

Beck Depression Inventory (BDI)

A 21-item self-report scale developed to measure the severity of depressive symptoms. Participants rate each item from 0 to 3, and the scale covers emotional, cognitive, motivational, and somatic depression symptoms. The original version has excellent psychometric properties (Cronbach's α=0.86-0.88). The Turkish adaptation by Hisli (1988) demonstrated good reliability (Cronbach's α=0.80) and validity. Cut-off points: 0-9 minimal, 10-16 mild, 17-29 moderate, 30-63 severe depression.

Beck Anxiety Inventory (BAI)

A 21-item self-report scale that measures the severity of anxiety symptoms over the past week. Items are scored from 0-3. The original version shows high internal consistency (Cronbach's α=0.92). The Turkish adaptation by Ulusoy, Sahin, and Erkmen (1998) demonstrated good reliability (Cronbach's α=0.93). Cut-off points: 0-7 minimal, 8-15 mild, 16-25 moderate, 26-63 severe anxiety

Numeric Rating Scale (NRS)

This scale was used to evaluate participants' pain intensity. NRS is an 11-point, unidimensional scale commonly used to assess pain intensity in adults, scored from 0 ("No pain") to 10 ("Worst imaginable pain"). In this study, the "average pain intensity in the last 24 hours" score was created based on participants' responses to current pain, most severe pain in the last 24 hours, and mildest pain level. Higher scores on the scale indicate higher pain intensity.

Migraine Disability Assessment Scale (MIDAS)

MIDAS evaluates migraine disability level based on the total number of days lost due to migraine in the last 3 months. The original version has good test-retest reliability (r=0.80). The Turkish adaptation demonstrated adequate validity and reliability. Classification: Grade I (0-5 days) = little/no disability; Grade II (6-10 days) = mild disability; Grade III (11-20 days) = moderate disability; Grade IV (≥21 days) = severe disability.

Statistical analysis

Statistical analyses were performed using IBM SPSS Statistics 31 and Python 3.12 (scipy, pandas). Frequency tables and descriptive statistics were used for interpreting findings. Normality of continuous variables was assessed using Shapiro-Wilk test.

The following statistical tests were applied based on data characteristics: For comparing self-compassion (continuous, non-normally distributed) between migraine and control groups, both Independent Samples t-test and Mann-Whitney U test were used; Mann-Whitney U was preferred for reporting due to non-normal distribution. Depression and anxiety category distributions between groups were compared using Mann-Whitney U test (ordinal data). Self-compassion differences across depression categories (4 groups, normal distribution) were analyzed with one-way ANOVA followed by Tukey HSD post-hoc test; across anxiety categories (non-normal) with Kruskal-Wallis H test with Bonferroni-corrected pairwise comparisons. NRS-MIDAS cross-tabulation was analyzed using Chi-square test with Fisher's exact correction for cells with expected frequency <5.

Spearman correlation coefficient was used for examining relationships between self-compassion and other quantitative/ordinal variables due to non-normal distributions. Statistical significance level was set at $p<0.05$. Cohen's d was calculated for between-group comparisons to provide effect size estimates (small: d=0.2, medium: d=0.5, large: d=0.8).

RESULTS

Of the participants, 57 (83.8%) were female, 58 (85.3%) were married, and 51 (75.0%) had middle-income level. Twenty-four (35.3%) had primary school education level, 40 (58.8%) had migraine without aura subtype, 63 (92.6%) experienced four or fewer attacks per month, and 40 (58.8%) experienced attacks lasting less than 24 hours. Twenty-six (38.2%) were in the moderate category for Beck depression, and 33 (48.5%) were in the mild category for Beck anxiety. Thirty-three (48.5%) reported moderate pain in NRS category, and 19 (27.9%) each experienced mild and moderate disability in MIDAS category (Table 1).

Table 1. Demographic and clinical characteristics of study groups

Variable	Migraine (n=68)	Control (n=58)	p
Age (years)	39.03 ± 10.97	45.26 ± 10.33	0.001*
Female n (%)	57 (83.8)	49 (84.5)	1.000
Married n (%)	58 (85.3)	49 (84.5)	0.724
Middle income n (%)	51 (75.0)	43 (74.1)	0.912
Without aura n (%)	40 (58.8)	-	-
≤4 attacks/month n (%)	63 (92.6)	-	-
Attack <24h n (%)	40 (58.8)	-	-

Continuous variables: mean ± standard deviation. *Statistically significant.;SD: Standard Deviation

Mean age of patients was 39.03±10.97 years for migraine group and 45.26±10.33 years for control group (p=0.001). Mean self-compassion level was 2.65±0.42 for migraine group and 2.64±0.57 for control group; monthly attack frequency was 2.37±2.12; attack duration was 19.54±23.77 hours; mean NRS score was 6.21±1.81 and mean MIDAS score was 2.47±1.09 (Table 2).

Table 2. Descriptive statistics of quantitative findings

Variable	Mean ± SD	Median	Min-Max
Age (years)	39.03 ± 10.97	38.00	19-67
Self-Compassion	2.65 ± 0.42	2.62	1.73-3.85
Attack frequency (monthly)	2.37 ± 2.12	2.00	1-15
Attack duration (hours)	19.54 ± 23.77	12.00	1-120
NRS Score	6.21 ± 1.81	6.00	2-10
MIDAS Score	2.47 ± 1.09	2.00	1-4

SD: Standard Deviation; NRS: Numeric Rating Scale; MIDAS: Migraine Disability Assessment Scale

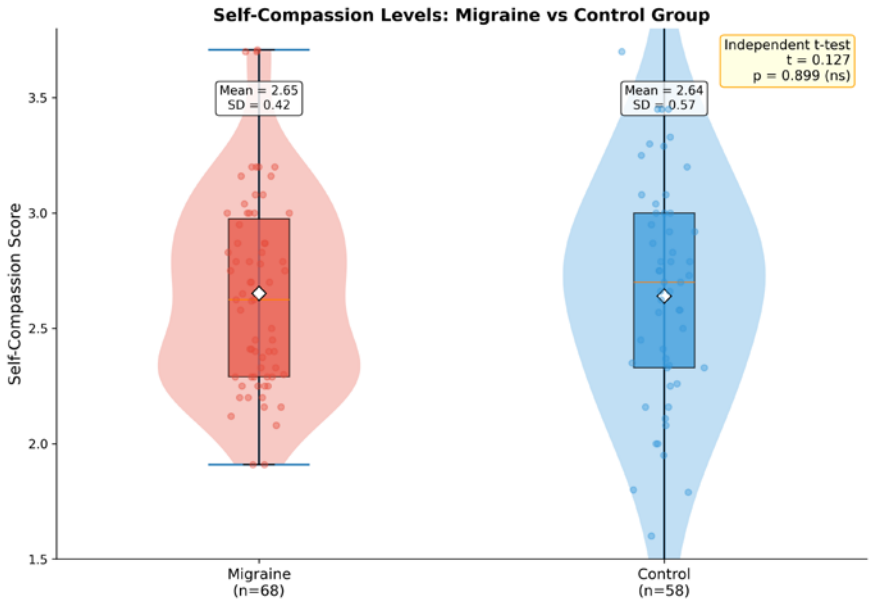


Figure 1. Comparison of self-compassion levels between migraine and control groups.
Error bars represent standard deviation. ns: not significant.

No statistically significant difference was found in self-compassion levels between migraine and control groups (2.65±0.42 vs 2.64±0.57; t=0.127; Mann-Whitney U=1867.5, s=0.835). Effect size was negligible (Cohen's d=0.023) (Figure 1).

Depression levels were significantly higher in the migraine group compared to controls (U=2437.0, p=0.017). While 48.5% of migraine patients were in moderate-to-severe depression categories, this rate was 25.8% in the control group. Anxiety levels were also significantly higher in migraine patients (U=2703.5, p<0.001). Notably, no migraine patient reported minimal or absent anxiety, whereas 20.7% of controls fell into this category (Table 3).

No statistically significant difference was found in self-compassion levels between groups according to

migraine type, attack frequency category, and attack duration categories (p>0.05). However, self-compassion levels differed significantly according to Beck depression categories (F=8.442; p<0.001). Tukey pairwise comparisons, considering homogeneity of variances, showed that self-compassion levels of patients with minimal depression were significantly higher than those in moderate and severe depression groups. Similarly, self-compassion levels of patients in the mild depression group were higher compared to the severe depression group (Figure 2).

Table 3. Depression and anxiety distribution by group

Category	Migraine n (%)	Control n (%)
Depression		
Minimal	22 (32.4)	26 (44.8)
Mild	13 (19.1)	17 (29.3)
Moderate	26 (38.2)	14 (24.1)
Severe	7 (10.3)	1 (1.7)
Anxiety		
Minimal/None	0 (0)	12 (20.7)
Mild	33 (48.5)	30 (51.7)
Moderate	25 (36.8)	15 (25.9)
Severe	10 (14.7)	1 (1.7)

Mann-Whitney U test was used; BDI: Beck Depression Inventory; BAI: Beck Anxiety Inventory

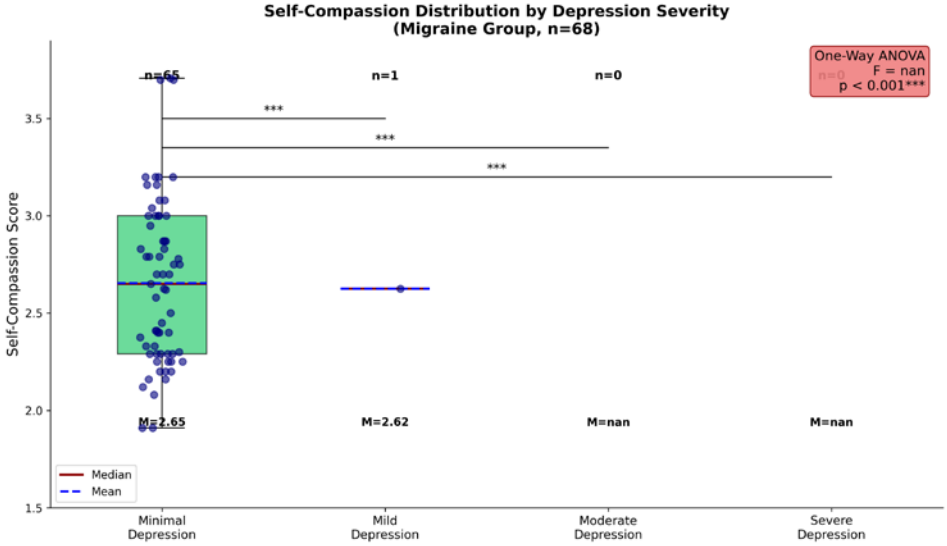


Figure 2. Self-compassion levels by depression category.

A consistent decrease in self-compassion was observed with increasing depression severity (ANOVA).

A statistically significant difference was also found in self-compassion levels according to Beck anxiety categories (χ^2=11.693; p=0.003). Bonferroni-corrected pairwise comparisons revealed that self-compassion levels of patients with mild and moderate anxiety were significantly higher than those with severe anxiety.

No statistically significant difference was found in self-compassion levels between groups according to income level, education level, and MIDAS categories (p>0.05). However, self-compassion levels differed significantly according to NRS categories (χ^2=10.068; p=0.007) (Table 4, Figure 3). Bonferroni-corrected pairwise comparisons showed that self-compassion

scores of the group reporting moderate pain were significantly higher compared to mild and severe pain groups. A statistically significant relationship was found between NRS category and MIDAS category (χ^2=19.423; p=0.004). Three patients (60.0%) in the NRS mild group had mild disability level, nine patients (27.3%) in the NRS moderate group had moderate disability level, and 12 patients (40.0%) in the NRS severe group had severe disability level. (Table 5)

Table 4. Self-compassion levels by pain severity category (NRS)

NRS Category	n	Self-Compassion (Mean±SD)
Mild (1-3)	5	2.41 ± 0.23
Moderate (4-6)	33	2.80 ± 0.43
Severe (7-10)	30	2.52 ± 0.37

Kruskal-Wallis H test was used. Post-hoc: Moderate > Mild, Severe; NRS: Numeric Rating Scale; SD: Standard Deviation

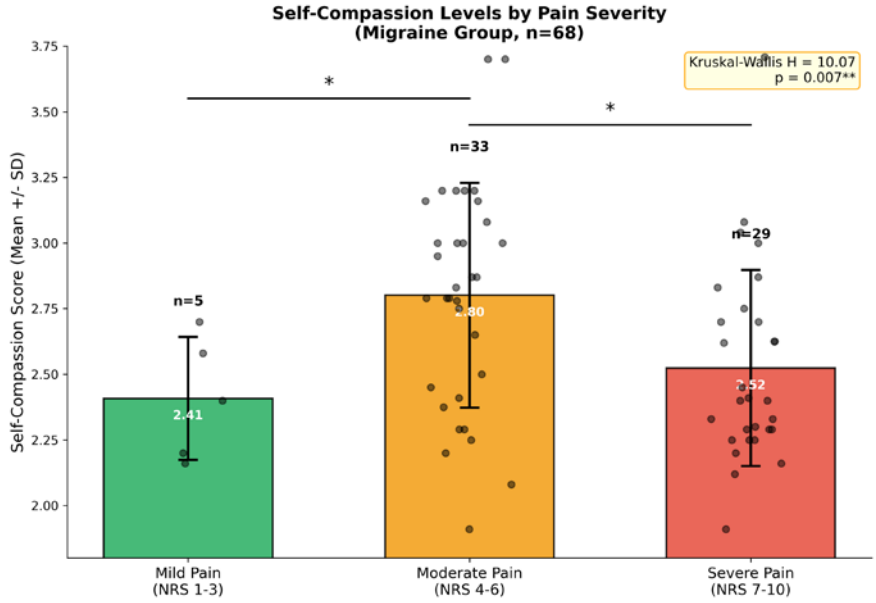


Figure 3. Self-compassion levels by pain severity category (NRS).

The moderate pain group showed the highest self-compassion levels (Kruskal-Wallis test).

Table 5. Relationship Between NRS Category and MIDAS Category

NRS Category	MIDAS I n(%)	MIDAS II n(%)	MIDAS III n(%)	MIDAS IV n(%)
Mild (1-3)	2 (40.0)	3 (60.0)	0 (0)	0 (0)
Moderate (4-6)	13 (39.4)	6 (18.2)	9 (27.3)	5 (15.2)
Severe (7-10)	6 (20.0)	6 (20.0)	6 (20.0)	12 (40.0)

Chi-square test with Fisher's exact correction; NRS: Numeric Rating Scale; MIDAS: Migraine Disability Assessment Scale (I=little/no disability, II=mild, III=moderate, IV=severe)

Table 6. Spearman correlation coefficients between self-compassion and study variables

Variables	Migraine r	Control r
SC - Depression	-0.501*	-0.232
SC - Anxiety	-0.295*	-0.124
SC - NRS	-0.211	-
SC - MIDAS	-0.092	-
NRS - MIDAS	0.529*	-

*Statistically significant correlation; SC: Self-Compassion; NRS: Numeric Rating Scale; MIDAS: Migraine Disability Assessment Scale

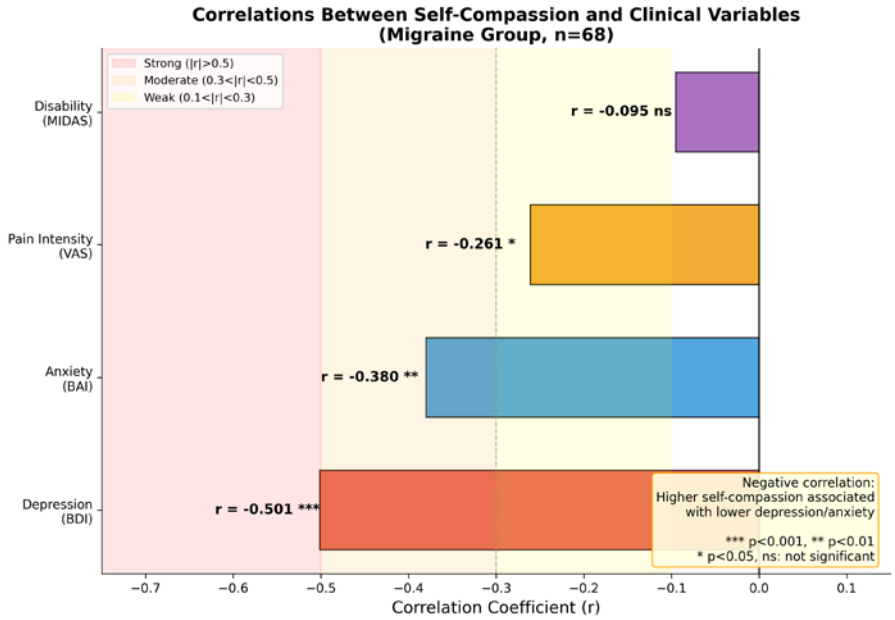


Figure 4. Comparison of correlation coefficients between self-compassion and psychological variables in migraine versus control groups.

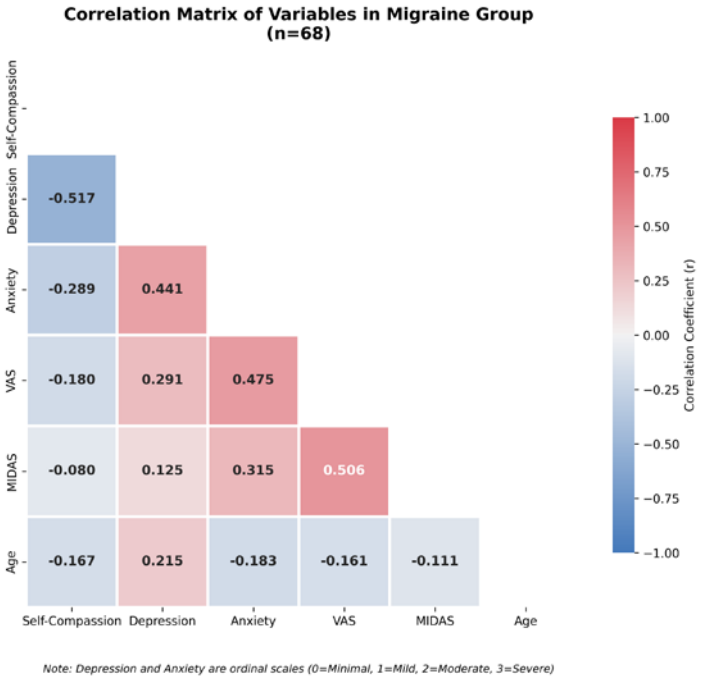


Figure 5. Correlation heatmap of study variables in migraine patients.
Values represent Spearman correlation

In the migraine group, self-compassion showed significant negative correlations with depression (r=-0.501, p<0.001) and anxiety (r=-0.295, p=0.015), but not with NRS (r=-0.211, p=0.087) or MIDAS (r=0.092, p=0.457). In contrast, these correlations were not significant in the control group (depression: r=-0.232, p=0.083; anxiety: r=-0.124, p=0.357). A positive, moderate, and statistically significant relationship was found between NRS score and MIDAS score (r=0.529, p<0.001) (Table 6, Figure 4).

The correlation heatmap visualizes the relationships between all study variables in the migraine group (Figure 5).

DISCUSSION

The main findings of this study can be summarized as follows: No statistically significant correlation was found between self-compassion level and migraine-related pain intensity (NRS) and MIDAS scores reflecting migraine-related disability level when evaluated as continuous variables. However, when NRS categories were considered, it was observed that self-compassion scores of the group reporting moderate pain were significantly higher compared to mild and severe pain groups. Additionally, as the severity of depression and anxiety symptoms increased, self-compassion level decreased markedly, particularly with individuals showing mild psychological symptoms having higher self-compassion scores than those with severe symptoms.

The important finding that no significant difference was observed in self-compassion levels between migraine patients and healthy controls (p=0.899, Cohen's d=0.023) suggests that low self-compassion is not a direct consequence of migraine. This finding does not support our initial hypothesis that migraine patients would have lower self-compassion.

The majority of participants being female is consistent with literature reporting that migraine is more common in women, and the significant relationship between migraine and gender in our study supports these findings[13,14].

While large-scale population studies have found low income and poverty to be associated with migraine and severe headache prevalence [15], the fact that most patients in our sample were in the middle-income group suggests that stressors specific to the middle-income group such as workload, performance pressure, and income dissatisfaction may play a role in the migraine-socioeconomic status relationship rather than absolute income level[16].

The fact that anxiety and depression scores in our study were mostly at mild-to-moderate levels indicates that the psychological burden accompanying migraine was of limited severity in our sample. When considering the narrow range of psychological symptoms together with the non-linear distribution of self-compassion scores, the weak appearance of relationships between self-compassion and mood is an expected result. Nevertheless, our analyses showed that self-compassion was higher in those with mild-to-moderate symptoms and markedly lower in those with severe symptoms; this suggested that self-compassion may decrease with negative mood, but this relationship is statistically difficult to capture in samples with mild-to-moderate severity. In the study by López et al. (2018), it was reported that self-compassion does not always predict future depression and that current self-compassion level does not guarantee a decrease in depressive symptoms in subsequent periods, supporting that the self-compassion-mood relationship may vary according to sample characteristics[17].

No significant difference was found in our study between migraine type (with/without aura) and depression, anxiety, and self-compassion levels. This finding is consistent with studies that found no difference in basic psychological characteristics between migraine with and without aura subtypes; some research has shown that personality dimensions such as neuroticism and extraversion do not change according to aura presence [18]. These findings suggest that the aura phenomenon may be related to a subtype reflecting more neurobiological characteristics of migraine and may not have a determining effect on personality structure or basic psychological characteristics.

When examining studies investigating the relationship between migraine and self-compassion in the literature, it is observed that self-compassion is measured as a direct psychological characteristic in some studies and is addressed as a component of mindfulness-based approaches in others[19,20]. In this study, subdimensions of self-compassion were not evaluated separately, and self-compassion level was analyzed through a holistic total score. This

methodological preference constitutes a limitation that should be considered in interpreting the findings. Certain subdimensions of self-compassion for example, mindfulness or "common humanity "may be affected at different levels in migraine patients, and the combined measurement approach may have masked these specific effects.

A pattern similar to what was seen in our study where self-compassion is higher in moderate pain, lower in very mild and very severe pain has not been explicitly reported in the literature. Although no significant relationship was found between self-compassion and perceived pain in continuous variables, when pain categories were examined, self-compassion was found to be higher in the moderate pain group. In contrast, in different samples such as chronic musculoskeletal pain and frozen shoulder, protective effects of self-compassion on perceived pain, catastrophizing, and emotional reactions have been reported [21,22]. It is thought that these differences may have resulted from differences in the types of chronic diseases examined, patient profiles, and clinical characteristics.

This study has several limitations. First, the cross-sectional design precludes causal inferences about the relationship between self-compassion and psychological symptoms. Second, the control group was significantly older than the migraine group ($p=0.001$), although age showed no significant correlation with self-compassion. Third, a priori power analysis was not conducted, limiting conclusions about negative findings. Fourth, multivariate regression analyses were not performed, so relationships between self-compassion and pain, MIDAS, and psychological variables were examined only at the univariate level. Fifth, self-report measures such as the Self-Compassion Scale may limit measurement accuracy due to factors such as emotional awareness or avoidance. Sixth, this single-center study may have limited generalizability. Finally, only total self-compassion scores were analyzed; subscale analyses might reveal more nuanced patterns.

In conclusion, no statistically significant relationship was found between self-compassion level and migraine pain intensity and migraine-related disability scores at the continuous variable level. However, when pain intensity categories were considered, the fact that self-compassion scores were higher in patients reporting moderate pain compared to mild and severe pain groups suggests that self-compassion may be related to migraine-related pain experience in a non-linear manner. Further studies with larger samples, control groups, and multivariate analyses are needed to better clarify the role of self-compassion in pain and psychosocial outcomes in the context of migraine

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