Research Article / Araştırma Makalesi

Inflammatory Markers, Impulsivity and Aggression in Fibromyalgia Patients

Fibromiyalji Hastalarında İnflamatuvar Belirteçler, Dürtüsellik ve Saldırganlık

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Abstract

Background: Fibromyalgia syndrome (FMS) is a chronic pain disorder associated with psychological symptoms, especially impulsivity and aggression. Although inflammation has recently been suggested to play a role in the etiopathogenesis of FMS, the relationship between this mechanism and psychological factors is unclear. The aim of this study was to examine the relationship between inflammatory markers and impulsivity and aggression in FMS patients.
Materials and Methods: This study included 73 FMS patients and 73 healthy controls matched for age, gender and body mass index (BMI). Impulsivity was assessed with the Barratt Impulsivity Scale-11 Short Form (BIS-11-SF) and aggression was assessed with the Buss-Perry Aggression Questionnaire (BPAQ). The BIS-11-SF measures motor, cognitive and planning impulsivity, while the BPAQ assesses physical aggression, verbal aggression, anger and hostile attitudes. Neutrophil-to-lymphocyte ratio (NLR), platelet-to-lymphocyte ratio (PLR), monocyte-to-lymphocyte ratio (MLR), systemic inflammatory response index (SIRI), systemic immune-inflammation index (SII) and aggregate systemic inflammation index (AISI) were analyzed and the relationship between inflammatory markers and psychological parameters was examined with Pearson correlation test.
Results: BIS-11-SF (58.6 ± 16.8 vs. 48 ± 15.4, $p < 0.001$) and BPAQ (71.9 ± 18.4 vs. 55.9 ± 16.8, $p < 0.001$) scores of FMS patients were significantly higher than the control group. However, no significant difference was found between the groups in terms of NLR, PLR, MLR, SII, SIRI and AISI levels ($p > 0.05$). In addition, no significant correlation was found between inflammatory markers and impulsivity and aggression scores.
Conclusions: The high levels of impulsivity and aggression in FMS patients suggest that these psychological factors may play an important role in the symptomatology of the disease. However, the fact that inflammatory markers are not associated with these psychological parameters suggests that hematologic indices may be insufficient to predict impulsivity and aggression. Further studies with larger patient groups may contribute to a more detailed evaluation of these relationships.

Keywords: Fibromyalgia, Inflammatory markers, Impulsivity, Aggression

Öz

Amaç: Fibromiyalji sendromu (FMS), psikolojik semptomlar, özellikle dürtüsellik ve agresyon ile ilişkili kronik bir ağrı bozukluğudur. Son yıllarda inflamasyonun FMS'nin etiyopatogenezinde rol oynayabileceği öne sürülse de, bu mekanizmanın psikolojik faktörlerle ilişkisi belirsizdir. Bu çalışmanın amacı, FMS hastalarında inflamatuar belirteçler ile dürtüsellik ve agresyon arasındaki ilişkiyi incelemektir.
Materyal ve Metod: Bu çalışmaya 73 FMS hastası ve yaş, cinsiyet ve vücut kitle indeksi (VKİ) açısından eşleştirilmiş 73 sağlıklı kontrol dahil edilmiştir. Dürtüsellik düzeyi Barratt Dürtüsellik Ölçeği-11 Kısa Formu (BIS-11-SF) ile; agresyon düzeyi ise Buss-Perry Agresyon Anketi (BPAQ) ile değerlendirilmiştir. BIS-11-SF, motor, bilişsel ve planlama dürtüselliğini ölçerken; BPAQ, fiziksel agresyon, sözel agresyon, öfke ve düşmanca tutumları değerlendirmektedir. Nötrofil-lenfosit oranı (NLR), trombosit-lenfosit oranı (PLR), monosit-lenfosit oranı (MLR), sistemik inflamatuar yanıt indeksi (SIRI), sistemik immün-inflamasyon indeksi (SII) ve agregat sistemik inflamasyon indeksi (AISI) analiz edilmiş ve inflamatuar belirteçler ile psikolojik parametreler arasındaki ilişki Pearson korelasyon testi ile incelenmiştir.
Bulgular: FMS hastalarının BIS-11-SF (58,6 ± 16,8 vs. 48 ± 15,4, $p < 0,001$) ve BPAQ (71,9 ± 18,4 vs. 55,9 ± 16,8, $p < 0,001$) skorları kontrol grubuna göre anlamlı derecede yüksek bulunmuştur. Ancak, NLR, PLR, MLR, SII, SIRI ve AISI düzeyleri açısından gruplar arasında anlamlı bir fark saptanmamıştır ($p > 0,05$). Ayrıca, inflamatuar belirteçler ile dürtüsellik ve agresyon skorları arasında anlamlı bir korelasyon bulunmamıştır.
Sonuç: FMS hastalarında dürtüsellik ve agresyon düzeylerinin yüksek bulunması, bu psikolojik faktörlerin hastalığın semptomatolojisinde önemli bir rol oynayabileceğini göstermektedir. Ancak, inflamatuar belirteçlerin bu psikolojik parametrelerle ilişkili olmaması, hematolojik indekslerin dürtüsellik ve agresyonu öngörmede yetersiz kalabileceğini düşünürmektedir. Daha genis hasta grupları ile yapılacak ileri çalışmalar, bu ilişkilerin daha ayrıntılı bir şekilde değerlendirilmesine katkı sağlayabilir.

Anahtar Kelimeler: Fibromiyalji, İnflamatuvar belirteçler, Dürtüsellik, Saldırganlık

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Introduction

Fibromyalgia Syndrome (FMS) is a chronic, widespread pain condition characterized by diverse clinical symptoms, including diffuse musculoskeletal pain of unknown origin, fatigue, cognitive impairments, psychiatric symptoms, and sleep disturbances (1). Classified as one of the central sensitization syndromes, FMS lacks clear evidence of tissue damage or inflammation, yet findings of altered nociception are consistently reported (2). It is the third most common musculoskeletal disorder, following lumbar pain and osteoarthritis, predominantly affecting women, with a peak prevalence of 2–4% in the 50–60 age group (3).

FMS represents a significant public health concern. It has a significant impact on patients' quality of life and daily functioning (1). The etiology of FMS is multifactorial. It involves complex interactions of epigenetic, genetic, and environmental factors. Although abnormalities in the peripheral and central nervous systems and neuroendocrine dysfunctions have been linked to fibromyalgia symptoms, the underlying mechanisms remain incompletely understood (4). Research suggests that inflammation and neuroinflammation play roles in the etiopathogenesis of FMS (5,6), with studies showing elevated inflammatory marker levels in FMS patients compared to control groups (7).

Inflammatory markers, increasingly utilized in clinical practice, are derived from ratios and indices calculated based on complete blood count parameters. An elevated inflammatory response is characterized by increased neutrophil production and lymphocyte apoptosis, resulting in a higher neutrophil count and a reduced lymphocyte count. Consequently, the neutrophil-to-lymphocyte ratio (NLR) is considered an indicator of inflammation severity (8). Similarly, the platelet-to-lymphocyte ratio (PLR) and the monocyte-to-lymphocyte ratio (MLR), calculated using platelet, monocyte, and lymphocyte counts, have been reported as markers of inflammation severity (9). Additionally, composite indices such as the systemic inflammatory response index (SIRI), which incorporates neutrophils, monocytes, lymphocytes, and platelets; the systemic immune-inflammation index (SII); and aggregate index of systemic inflammation (AISI) are also recognized as valuable markers of systemic inflammation (10,11). Samanci R. et al., one of the studies examining the relationship between inflammation and FMS in the literature, found no difference in NLR between FMS patients and healthy controls (12). Akturk S. et al. found that NLR was significantly higher in FM patients (13). Al-Nimer MSM. et al. also reported increased NLR, PLR and FIQ scores in FM patients (14). Sariyildiz A. et al. found high SII, SIRI and AISI values in patients with FM compared to the control group (7).

Psychological and psychosomatic mechanisms are known to play a significant role in the development of FMS (3,15). Patients with FMS often experience various psychological challenges, such as maladaptive thought patterns and ineffective coping strategies, which are thought to contribute to an increased perception of pain (16).

The prevalence of psychiatric comorbidities in FMS patients is higher than in the general population and is commonly associated with conditions such as depression, anxiety, and posttraumatic stress disorder (17,18). Studies have also identified elevated levels of impulsivity and aggression in individuals with FMS (19). Impulsivity is defined as the inability to inhibit a voluntary response to a stimulus (20) and is characterized by behavioral tendencies such as attention deficits, superficial thinking, and a shortened response threshold. Impairments in working memory and deficits in executive functions have been implicated in its etiology (21). Aggression, defined as behavior intended to cause physical or psychological harm, has been linked to decreased serotonergic activity and increased dopaminergic activity (22). Despite these findings, there is a limited number of studies exploring the relationship between impulsivity, aggression, and fibromyalgia. A study conducted by Montoro et al (23) found that the neuroticism-psychoticism dimension was higher in the FMS group. Shelley-Tremblay et al (24) observed that FMS patients exhibited higher levels of depression, anger, and aggression compared to healthy participants. Baykara et al (25) found a correlation between disease severity and impulsivity in their study examining the relationship between FMS severity and impulsivity. It is known that inflammation in fibromyalgia is associated with psychological states (26). This raises the question of whether these psychogenic factors influence hematological and inflammatory parameters in FMS patients. Thus, this study aims to investigate the relationship between impulsivity and aggression levels, disease severity, and inflammatory markers in FMS.

Materials and Methods

This study was approved by the Fırat University Faculty of Medicine Ethics Committee (date: March 21, 2024; no: 2024/05-43) and carried out in compliance with the Declaration of Helsinki's principles. All participants signed an informed consent form prior to participation in the study. The study initially included 80 female patients aged 18–60 years, with no known comorbidities, who were diagnosed with FMS based on the 2016 diagnostic criteria of the American College of Rheumatology (27). These patients were recruited from the Internal Medicine and Physical Medicine and Rehabilitation outpatient clinics at Elazığ Fethi Sekin City Hospital. Additionally, 75 healthy female volunteers with no known comorbidities, who visited the hospital for routine check-ups and were confirmed to have no pathologies based on the tests performed, served as the control group. However, 7 patients from the FMS group and 2 participants from the control group voluntarily withdrew from the study, leaving a total of 73 participants in the patient and control groups.

The severity of FMS was assessed using the Fibromyalgia Impact Questionnaire (FIQ) (28). Impulsivity levels were evaluated with the Barratt Impulsivity Scale (BIS-11) (29), while

aggression levels were measured using the Buss-Perry Aggression Questionnaire (BPAQ) (30).

Scales used in the study:

1) Sociodemographic and Clinical Data Form: This form, prepared by us, includes data such as demographic characteristics of individuals, disease duration, and blood values.

2) Fibromyalgia Impact Questionnaire (FIQ): It was developed by Burckhardt et al. (28). It is a 10-item scale that evaluates FM patients. Item 1 consists of 10 questions, each question is scored between 0-3. In items 2 and 3, the respondent is asked to mark a day for the determination of "being affected by disease" and "not being able to go to work". In the remaining 7 questions, the appropriate place on the Visual Equivalence Scale is marked. The score range is 0-100. The validity study was conducted by Sarmer et al.(31). Higher scores mean more impairment. The mean value is 50. Scores of 70 and above are considered as "severely affected patients".

3) Barratt Impulsivity Scale Short Form (BIS-11-SF): It consists of 30 items. It is divided into 3 subscales: attention, motor impulsivity and lack of planning. When it is evaluated; four different sub-scores are obtained as total score, non-planning, attention and motor impulsivity. Turkish validity study was conducted by Güleç et al. (32).

4) Buss-Perry Aggression Questionnaire (BPAQ): It is a 5-point scale and has a scoring between "Strongly Disagree" (1) and "Strongly Agree" (5). It consists of 29 items aiming to measure 4 different dimensions of aggression: physical aggression, verbal aggression, anger and hostility. There are 5 questions related to verbal aggression subscale, 9 questions related to physical aggression subscale, 8 questions related to hostility subscale and 7 questions related to anger subscale. Buss and Perry determined internal consistency coefficients for the subscales in their original study (33).

Blood Sampling and Inflammatory Marker Analysis: After at least eight hours of fasting, blood samples were taken from each participant between 8:00 and 9:00 AM. Hemograms were obtained from both the patient and control groups. 3 cc of EDTA-anticoagulated whole blood (Beckman Coulter DXH 800 automated hematology analyzer) were used for standard hemogram assays. The following parameters were recorded for all participants: hemoglobin (Hgb), white blood cell (WBC) count, neutrophil, lymphocyte, monocyte, and platelet values.

Additionally, the neutrophil-to-lymphocyte ratio (NLR), platelet-to-lymphocyte ratio (PLR), monocyte-to-lymphocyte ratio (MLR), systemic immune-inflammation index (SII), systemic inflammatory response index (SIRI), and aggregate index of systemic inflammation (AISI) were calculated. Neutrophils were divided by the number of lymphocytes to determine NLR, platelets by the number of lymphocytes to determine PLR, and monocytes by the number of lymphocytes to determine MLR. The formulas for SII, SIRI, and AISI were as follows:

SII = [(platelet × neutrophil) / lymphocyte]
SIRI = [(neutrophil × monocyte) / lymphocyte]
AISI = [(neutrophil × platelet × monocyte) / lymphocyte] (10,34).

Statistical Analysis

Statistical analyses were performed using the Statistical Package for Social Sciences (SPSS, version 22.0). The normal distribution of data was assessed using the Shapiro-Wilk test, kurtosis-skewness values, and histogram plots. Age, hemogram values, inflammation indices, and scale scores were compared using the Student's t-test. The hemogram values, inflammation indices, and scale scores of participants taking different medications were analyzed using the Kruskal-Wallis test. Scale scores of FMS patients on different medications and controls were evaluated by Kruskal-Wallis test. Bonferroni correction test was used as a post-hoc test. Pearson's correlation test was employed to examine relationships between variables. A p-value of less than 0.05 was considered statistically significant.

Results

The study included 73 female participants in case group and 73 female participants in the control group. The mean age of the case group was 42.4 ± 9.9 years, while the mean age of the control group was 44.8 ± 10.2 years ($p > 0.05$). There were no significant differences between groups in terms of body mass index (BMI), WBC, hemoglobin, platelet, lymphocyte, neutrophil, or monocyte counts ($p > 0.05$). Additionally, the groups were similar in terms of NLR, PLR, and MLR ratios ($p > 0.05$). There was no significant difference in SII, SIRI and AISI index.

The BIS-11-SF scale score for the case group was 58.6 ± 16.8, while the score for the control group was 48± 15.4 ($p < 0.001$). Similarly, the BPAQ score for the case group was 71.9±18.4, compared to 55.9 ± 16.8 in the control group ($p < 0.001$). The FIQ scale score, administered only to the case group, was 59.2 ± 13.4. A comparison of blood parameters, inflammation indices, and scale scores between the groups is presented in Table 1.

In the case group, 26 participants (35.6%) were drug-free, 26 (35.6%) were taking duloxetine, 12 (16.4%) were on gabapentin, and 9 (12.3%) were on pregabalin. When the blood values, inflammation indices, and scale scores of participants using different medications in the case group were compared, no significant differences were found ($p > 0.05$). While the BPAQ scores of the control group were significantly lower than all other FMS subgroups, no difference was observed in pairwise comparisons of FMS subgroups. The BIS-11-SF scale score of the control group was found to be significantly lower than that of the patients who did not use medication and who used duloxetine and gabapentin, while it was similar to that of the patients who used pregabalin. No difference was found between the BIS-11-SF scores of patients using medication. Test values for the comparisons are summarized in Table 2.

Table 1. Comparison of blood parameters, inflammation indices and scale scores of the groups

	Case group (n=73) Meas±Sd	Control group (n=73) Meas±Sd	*p** value
Age (years)	42.44±9.99	44.85±10.21	0.161
BMI (kg/m2)	24.66±2.63	24.76±2.45	0.821
WBC (10^9/L)	6.96±1.31	6.98±1.80	0.943
Hemoglobin (g/dL)	13.44±1.14	13.70±1.12	0.175
Platelets (10^9/L)	270.55±59.42	275.97±62.17	0.599
Lymphocyte (10^9/L)	2.37±0.59	2.50±0.91	0.342
Neutrophil (10^9/L)	3.90±0.99	3.70±1.14	0.286
Monocyte (10^9/L)	0.67±0.16	0.71±0.23	0.247
SII	455.81±143.29	431.84±165.14	0.362
SIRI	1.14±0.37	1.12±0.47	0.810
AISI	307.16±109.24	311.52±146.29	0.843
Neutrophil/Lymphocyte ratio	1.71±0.51	1.59±0.59	0.220
Platelet / Lymphocyte ratio	117.98±28.25	118.09±34.25	0.983
Monocyte / Lymphocyte ratio	0.295±0.074	0.299±0.076	0.699
BIS-11-SF	58.67±16.83	48.07±15.43	**<0.001**
BPAQ	71.95±18.45	55.91±16.86	**<0.001**

**Student t-testi*

Sd: Standard deviation, BMI: Body mass index, WBC: White Blood Cell, SII: Systemic immune inflammation index, SIRI: Systemic inflammatory response index, AISI: aggregate index of systemic inflammation, BIS-11: Barrat impulsivity scale short form, Buss-Perry Aggression Questionnaire (BPAQ)

Table 2. Comparison of scale scores according to participants' medication use

		Median (Min – Max values)	p value
BPAQ	Control – medication-free FMS	62 (29 – 100) – 72.50 (35 – 100)	**0.001**
	Control - Duloxetine	62 (29 – 100) – 73 (36 – 24)	**0.001**
	Control - Gabapentin	62 (29 – 100) – 81.50 (42 – 112)	**<0.001**
	Control - Pregabalin	62 (29 – 100) – 74 (35 – 125)	**0.019**
BIS-11-SF	Control – medication-free FMS	50 (30 – 100) – 55.50 (30 – 102)	**0.043**
	Control - Duloxetine	50 (30 – 100) – 60 (30 – 100)	**0.006**
	Control - Gabapentin	50 (30 – 100) – 65 (40 – 105)	**0.001**
	Control - Pregabalin	50 (30 – 100) – 54 (30 – 100)	0.443

Kruskal-Wallis test

BIS-11-SF: Barrat impulsivity scale short form; BPAQ: Buss-Perry Aggression Questionnaire

The relationship between hemogram values, inflammation indices, and scale scores was assessed using Pearson's correlation test for all participants. A significant negative correlation was observed between BMI and SII (r = -0.246, *p* = 0.003), SIRI (r = -0.176, *p* = 0.038) and NLR (r = -0.276, *p* = 0.001). No significant correlation was found between age, BIS-11, BPAQ, and the indices. The correlations between the variables are presented in Table 3.

In the case group, the relationship between hemogram values, inflammation indices, and scale scores was evaluated using Pearson's correlation test. No significant correlations were found between the variables. The data related to these test values are presented in Table 4.

Table 3. Correlation between variables

		SII	SIRI	AISI	NLR	PLR	MLR
Age	r	-0.095	-0.011	0.000	-0.106	0.001	0.121
	p	0.262	0.893	1.000	0.213	0.994	0.153
BMI	r	-0.246	-0.176	-0.144	-0.276	-0.147	-0.086
	p	0.003	0.038	0.090	0.001	0.083	0.314
BIS-11-SF	r	0.033	0.049	0.040	0.034	0.015	0.044
	p	0.701	0.569	0.639	0.693	0.860	0.608
BPAQ	r	0.045	0.076	0.016	0.094	-0.015	0.016
	p	0.595	0.373	0.855	0.267	0.857	0.848

Pearson correlation test

BMI: Body mass index, BIS-11-SF: Barrat impulsivity scale short form, BPAQ: Buss-Perry Aggression Questionnaire

Table 4. Correlations between the parameters of the case group

		SII	SIRI	AISI	NLR	PLR	MLR
Age	r	-0.125	-0.168	-0.148	-0.155	0.130	0.045
	p	0.293	0.155	0.213	0.190	0.274	0.708
BMI	r	-0.200	-0.111	-0.187	-0.043	0.053	0.045
	p	0.090	0.351	0.113	0.718	0.657	0.702
BIS-11 SF	r	-0.073	0.016	-0.076	-0.024	-0.176	-0.042
	p	0.538	0.891	0.522	0.841	0.137	0.725
BPAQ	r	-0.063	0.078	0.002	-0.056	-0.122	0.042
	p	0.597	0.513	0.988	0.638	0.302	0.722
FIQ	r	0.094	-0.053	0.090	-0.078	0.084	-0.038
	p	0.430	0.654	0.449	0.514	0.481	0.748

Pearson correlation test

BMI: Body mass index, BIS-11-SF: Barrat impulsivity scale short form, BPAQ: Buss-Perry Aggression Questionnaire, FIQ: Fibromyalgia Impact Questionnaire

Discussion

In this study, in which we evaluated impulsivity, aggression levels, and inflammatory parameters in women with fibromyalgia syndrome, inflammatory markers were found to be similar between fibromyalgia patients and the control group. However, impulsivity and aggression levels were significantly higher in fibromyalgia patients compared to healthy controls. When analyzing the degree to which inflammatory marker levels predicted impulsivity and aggression levels, no statistically significant relationship was found. To the best of our knowledge, this is the first study to investigate the relationship between inflammatory markers and impulsivity and aggression in FMS.

The role of increased inflammation in the etiopathogenesis of fibromyalgia is frequently discussed. Inflammatory substances are thought to contribute to pain formation by disrupting nociceptive transmission (35). Several studies have investigated the role of interleukins (ILs), important regulators of the inflammatory response, in FMS, yielding conflicting results. It has been suggested that proinflammatory ILs contribute to central and peripheral sensitization and cause pain from normally painless stimuli through N-methyl-D-aspartate (NMDA) receptor activation. In contrast, ILs with anti-inflammatory properties, such as IL-10, have been suggested to be decreased in FM patients (36-37). However, other studies have found no significant difference in IL levels between FM patients and healthy controls, and some have observed higher levels of IL-1β, an anti-inflammatory cytokine (38). In a study investigating C-reactive protein (CRP), IL-6, and IL-8, erythrocyte sedimentation rate (ESR) levels in FM patients, CRP levels were found to be higher than in healthy controls, whereas IL-6, IL-8 and ESR levels were similar (39). Ratios and indices derived from complete blood count parameters, which have recently been examined for their diagnostic and prognostic value in various systemic diseases, have been studied to a limited extent in FMS. In a study by Samancı et al. (12), NLR levels were found to be similar between FM patients and healthy controls. Additionally, other studies have reported higher NLR and PLR levels in FM patients compared to controls (14). In our study, however, SII, SIRI, AISI, NLR, PLR and MLR levels were similar between the patient and control groups. This finding supports the hypothesis that the role of inflammation in FM may be limited.

It has been determined that neurotic personality traits are common in patients diagnosed with FMS and are also associated with disease severity (40). Bucourt et al. (41) demonstrated in their study that increases in neuroticism and impulsivity were associated with higher levels of chronic pain. Margari F. et al. (41) found that impulsivity and neuroticism were linked to pain catastrophizing in FMS patients. In our study, FM patients exhibited significantly higher levels of impulsivity and aggression compared to the control group. These findings are consistent with the literature (18). This suggests that psychiatric symptoms such as impulsivity and aggression may play a significant role in the clinical presentation and symptomatology of FM. The increased impulsivity and aggression observed in FM patients may be related to altered neurotransmitter systems and limbic system dysfunction, which are implicated in the pathogenesis of FM. In particular, it has been reported that impulsivity, aggression, and pain may be linked through serotonergic and adrenergic systems in patients with chronic pain (42).

When analyzing the correlation between the severity of FIQ and impulsivity and aggression levels in our study, no correlation was found, which is contrary to previous findings (41). This result may be related to the smaller size of our sample group. Furthermore, no relationship was observed between impulsivity and aggression levels and the NLR, PLR, MLR, SII, SIRI, and AISI levels in our patients. Yıldız et al. (43) found no relationship between impulsivity levels and NLR and PLR in patients with gambling disorder. The present results suggest that hematological parameters are inadequate in predicting impulsivity and aggression. To our knowledge, no other studies have investigated the relationship between impulsivity, aggression, and these parameters in FMS.

Conclusion

Impulsivity and aggression are higher in FM patients compared to the general population and may be related to the

etiopathogenesis and clinical course of the disease. Therefore, in addition to traditional diagnostic and therapeutic approaches, it is important to evaluate patients for impulsivity and aggression, and to consider appropriate therapeutic interventions. Inflammatory markers, which can be obtained through inexpensive and feasible complete blood count parameters, appear to be insufficient in predicting impulsivity and aggression. Future studies with larger patient populations are needed to clarify this issue. Understanding this relationship could enhance the foundation for both medical and psychiatric treatments for FMS patients, ultimately improving their quality of life.

Limitations

The limitations of the study include the cross-sectional design and the small sample size, which limited the participants to the female gender.

Ethical Approval: *This study was approved by the Fırat University Faculty of Medicine Ethics Committee (date: March 21, 2024; no: 2024/05-43) and carried out in compliance with the Declaration of Helsinki's principles.*

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