Neurology Asia 2025; 30(4) : 1125 – 1133

Evaluation of quality of life, anxiety, depression, and sleep quality in female fibromyalgia patients with and without migraine

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Abstract

Objective: This study aims to assess the prevalence and severity of migraine among fibromyalgia patients as well as to assess its impact on quality of life, anxiety, depression, and sleep disturbances. *Methods:* A prospective cross-sectional study was conducted among 115 women (mean age 42.1 ± 5.44 years). Fibromyalgia was diagnosed in 48 participants using the 2016 revised American College of Rheumatology (ACR) criteria; 67 participants without fibromyalgia served as the control group. Participants were classified into four subgroups based on fibromyalgia and migraine status. The Headache Impact Test-6 (HIT-6), Visual Analog Scale (VAS), Beck Anxiety Inventory (BAI), Beck Depression Inventory (BDI), Pittsburgh Sleep Quality Index (PSQI), and a quality of life (QoL) scale were used for assessment. *Results:* The fibromyalgia group exhibited a significantly greater prevalence of migraine compared to the control group (43.75% vs. 13.43%, $p < 0.001$). Fibromyalgia patients reported greater severe headache intensity ($p < 0.001$), higher anxiety and depression scores ($p < 0.001$), poorer sleep quality ($p < 0.001$), and reduced QoL ($p < 0.001$). Subgroup analysis showed that the presence of migraine did not significantly affect disease activity, fatigue, or psychological symptoms in fibromyalgia patients, but was associated with worse sleep quality.
Conclusion: Patients with fibromyalgia exhibited increased migraine frequency, greater psychological distress, and more impairment of sleep and quality of life compared to controls. While comorbid migraine does not demonstrably worsen the overall symptomatic burden, it may increase sleep disturbances, underscoring the value of a multidisciplinary care model.

Keywords: Fibromyalgia, migraine, sleep quality, anxiety, depression

INTRODUCTION

Fibromyalgia presents as a chronic syndrome of uncertain origin, with pervasive musculoskeletal pain and accompanying symptoms of fatigue, sleep dysfunction, cognitive deficits, and affective disturbances including anxiety and depression. Its multifaceted nature requires a comprehensive approach to diagnosis.[1] Studies indicate that fibromyalgia prevalence ranges from 0.2% to 6.6% in males, 2.4% to 6.8% in females, 0.7% to 11.4% in urban populations, 0.1% to 5.2% in rural populations, and 0.6% to 15% in specific demographic groups. The general population prevalence is widely considered to be around 2%, although regional variations exist.[2,3] The diagnosis of fibromyalgia remains problematic, despite the evolution of diagnostic criteria, including the 2010 American College of Rheumatology (ACR) criteria and their 2016 revision, owing to the subjective nature of its characteristic symptoms and the lack of objective laboratory markers.[4,5]

Patients diagnosed with fibromyalgia frequently exhibit co-occurring conditions which substantially affect their quality of life. Of these, migraine attacks are noteworthy for their frequency and the potential for disability. Prior research indicates that as many as 50% of fibromyalgia patients experience migraine.[6] Migraine, a chronic disorder characterized by recurrent headache attacks, exhibits a strong correlation with various psychiatric and sleep disturbances, such as anxiety, depression, and sleep pattern disruption. The presence of fibromyalgia can exacerbate migraine symptoms,

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Date of Submission: 16 April 2025; Date of Acceptance: 12 September 2025

https://doi.org/10.54029/2025cmx

substantially impacting patients' overall health and daily activities.[7]

The presence of anxiety, depression, and sleep disorders is independently linked to adverse fibromyalgia outcomes and reduced quality of life. These factors not only exacerbate the patient's experience of pain but also create a negative feedback loop where pain causes poor sleep, which in turn amplifies psychological distress, leading to more severe migraine episodes.[8,9] While a growing body of evidence indicates common pathophysiological mechanisms such as central sensitization and neuroendocrine dysregulation in both fibromyalgia and migraine, the impact of the comorbidity of both conditions on mood and sleep has been understudied.

We hypothesized that individuals with both fibromyalgia and migraine would experience substantially higher levels of anxiety and depression, and significantly worse sleep, compared to those without these conditions. The evidence suggested a clear link between the combined conditions and these negative mental and physical health outcomes. The aim of this prospective cross-sectional study was to examine the interrelationships of fibromyalgia, migraine, anxiety, depression, and sleep quality.

METHOD

Study design and participants

A cross-sectional design was used in this prospective study comparing 48 women newly diagnosed with fibromyalgia to 67 age-matched women without fibromyalgia. This study was performed at a training and research hospital during the year 2022. Ethical approval for this study was granted by the institutional review board (Approval Number: 2022/06–04); all procedures were conducted in compliance with the Declaration of Helsinki (1975, revised 2008). Prior to study enrollment, written informed consent was secured from all participants within the context of their routine clinical management.

The study included individuals newly diagnosed with fibromyalgia who had presented to the outpatient physical medicine and rehabilitation (PMR) clinic with widespread pain. The control group comprised age-matched female patients from PMR or neurology clinics who did not meet the diagnostic criteria for fibromyalgia during the study period.

The fibromyalgia group enrolled women between 30 and 60 years of age who satisfied the 2016 revised American College of Rheumatology (ACR) criteria for fibromyalgia. Where applicable, migraine diagnoses were confirmed according to the International Classification of Headache Disorders' diagnostic criteria.[10] Complete clinical evaluations and all clinical and questionnaire data were prerequisites for study participation. Participants with comorbid chronic pain conditions (such as active rheumatoid arthritis or advanced osteoarthritis) or severe psychiatric disorders potentially affecting the reliability of self-reported data were excluded from the study. Additionally, the study excluded male participants, those with cognitive deficits, illiteracy, a history of traumatic brain injury, or those employed in night-shift roles.

Study variables

Demographic (age, marital, employment status) and anthropometric (BMI) data were collected from patient charts and clinical data were verified using self-reported questionnaires during initial visits. Data were collected using the Fibromyalgia Impact Questionnaire (FIQ), Visual Analog Scale (VAS) for pain, Fatigue Severity Scale (FSS), Beck Anxiety Inventory (BAI), Beck Depression Inventory (BDI), Pittsburgh Sleep Quality Index (PSQI), Headache Impact Test-6 (HIT-6), and a suitable quality-of-life scale (QOLS or a similar measure).

The HIT-6 scale was utilized to assess migraine-related disability and its functional impact; higher total scores indicate a more pronounced negative effect on quality of life. Migraine attack frequency was categorized into near-daily, bi- to tri-weekly, weekly, monthly, or less than monthly. Migraine diagnosis was confirmed based on established diagnostic criteria.

Physical function, employment status, and symptom presentation (pain, stiffness, fatigue) were assessed using the FIQ; pain severity was measured on a 10-centimeter visual analog scale (VAS). Severity of anxiety and depression were independently evaluated via the 21-item BAI and BDI self-report scales. Sleep quality was measured across multiple domains using the PSQI for the preceding month. A total score greater than five suggests inadequate sleep quality. A 0-1 scale was used to assess overall life satisfaction as a measure of quality of life; higher scores indicated greater well-being.

Statistical analysis

All analyses were performed in R (version 4.4.2).

The distribution of continuous variables was assessed using the Shapiro-Wilk test. Depending on the results, normally distributed data were analyzed using parametric tests (independent samples t-test or one-way ANOVA), while non-normally distributed data were evaluated using non-parametric alternatives (Wilcoxon rank-sum test or Kruskal-Wallis test). For post hoc comparisons following Kruskal-Wallis tests, the Dunn–Bonferroni method was applied to control for multiple testing. Categorical variables were compared using Pearson's chi-square test or Fisher's exact test (including the Freeman–Halton extension where applicable). Statistical significance was set at a two-sided p-value of <0.05. All procedures conformed to institutional guidelines, and participant privacy was safeguarded throughout the study using de-identified data.

RESULTS

A total of 115 women (mean age 42.1 ± 5.44 years) participated in the analysis, with 67 assigned to the control group and 48 to the fibromyalgia group. No statistically significant differences were observed in age, weight, or BMI between the groups. Analysis revealed a statistically significant differences in marital status between groups ($p = 0.003$), with a significantly higher percentage of married individuals in the fibromyalgia group (81.25%) compared to the control group (52.24%). Housewives made up a considerably larger portion (64.58%) of the fibromyalgia group than the control group (40.30%, $p = 0.017$).

Migraine was diagnosed in 26.09% (30 individuals) of study participants while 73.91% (85 individuals) reported no migraine history. Those with fibromyalgia had a significantly higher migraine prevalence (43.75%) than control (13.43%, $p < 0.001$). Among participants diagnosed with migraine, attack frequency and pain intensity tended to be higher in those with fibromyalgia compared to migraine-diagnosed controls; however, these differences did not reach statistical significance ($p = 0.174$ and $p = 0.813$, respectively).

No statistically significant differences were detected between groups regarding median migraine duration or the presence of comorbidities such as hypertension and rheumatological diseases. In contrast, diabetes mellitus demonstrated a marginally significant association ($p = 0.050$) with fibromyalgia, with prevalence rates of 16.67% and 4.48% in the fibromyalgia and control cohorts, respectively.

Among participants diagnosed with migraine, pain intensity scores (VAS) were similar between the fibromyalgia and control groups (median 7 in both), with slightly broader variability observed in the fibromyalgia group (IQR 6–9 vs. 7–8); this difference was not statistically significant ($p = 0.813$). HIT-6 scores, reflecting migraine-related disability, were slightly higher in the fibromyalgia group but did not differ significantly between groups ($p = 0.463$).

Individuals in the fibromyalgia group exhibited higher scores on the FIQ with a median of 58.8 (IQR 22.8–88.1) compared to 26.7 (IQR 9.8–53.5) in the control group ($p < 0.001$). Participants reported significantly higher pain levels (median VAS 6 vs 2, $p<0.001$) and greater fatigue (FSS total median 54 vs 34, average median 6 vs 3.8, $p<0.001$) in the fibromyalgia group compared to the control group. Analysis of BAI and BDI scores revealed significantly elevated anxiety and depression levels in the fibromyalgia group compared to the control group.

Fibromyalgia patients exhibited a median BAI score of 23.5 (IQR 6–47), significantly higher than the control group's median score of 9 (IQR 0–40) ($p < 0.001$). Similarly, the median BDI score was 20 (IQR 4–41) in the fibromyalgia group and 6 (IQR 0–35) in controls ($p < 0.001$). Analysis revealed a substantial disparity in quality-of-life scores (median 0.48 vs 0.9, $p < 0.001$) and self-reported health (median 52.5 vs 80, $p < 0.001$) between fibromyalgia patients and controls.

PSQI-assessed sleep parameters revealed a substantial exacerbation of fibromyalgia symptoms. The fibromyalgia cohort demonstrated a substantially greater median PSQI score (7, IQR 3–13) than the control group (4, IQR 1–11) ($p < 0.001$). Fibromyalgia patients exhibited significantly poorer sleep quality (85.42%) than controls (38.81%; $p < 0.001$). PSQI subscale analysis demonstrated a significantly higher incidence of subjective sleep disturbances, increased sleep onset latency, shorter sleep duration, and lower sleep efficiency within the fibromyalgia participant group. The fibromyalgia group exhibited a significantly greater incidence of daytime dysfunction attributed to sleep disturbances (25% reported moderate dysfunction versus 1.49% in the control group; $p < 0.001$). These findings were consistent with significantly increased fatigue and impaired daily activities reported by fibromyalgia participants, confirming a substantially larger clinical burden than in controls.

Analysis of subgroups with respect to both

Table 1: Comparison of demographic, anthropometric, and clinical characteristics in fibromyalgia patients and control group

	All Patients (n = 115)	Controls (n = 67)	Fibromyalgia (n = 48)	P
Age (years)	42.1 ± 5.44	41.27 ± 5.23	43.25 ± 5.57	0.058
Height (cm)	162.64 ± 4.8	163.7 ± 4.18	161.17 ± 5.24	0.006
Weight (kg)	65.84 ± 8.63	66.31 ± 8.02	65.19 ± 9.46	0.493
BMI (kg/m²)	24.88 ± 2.98	24.75 ± 2.88	25.06 ± 3.13	0.590
Marital Status				0.003
Married	74 (64.35%)	35 (52.24%)	39 (81.25%)	
Single	41 (35.65%)	32 (47.76%)	9 (18.75%)	
Employment Status				0.017
Housewife	58 (50.43%)	27 (40.30%)	31 (64.58%)	
Employed	57 (49.57%)	40 (59.70%)	17 (35.42%)	
Presence of Migraine	30 (26.09%)	9 (13.43%)	21 (43.75%)	<0.001
Migraine (years)	5 (1 - 30)	4.5 (1 - 10)	7 (2 - 30)	0.367
Attack Frequency*				0.174
Almost Every Day	3 (10.00%)	1 (11.11%)	2 (9.52%)	
2-3 Per Week	14 (46.67%)	2 (22.22%)	12 (57.14%)	
Once Per Week	13 (43.33%)	6 (66.67%)	7 (33.33%)	
VAS Score*	7 (6 - 9)	7 (7 - 8)	7 (6 - 9)	0.813
HIT-6 Score*	62 (54 - 68)	62 (54 - 65)	62 (54 - 68)	0.463
Comorbidities				
Hypertension	8 (6.96%)	4 (5.97%)	4 (8.33%)	0.718
Diabetes Mellitus	11 (9.57%)	3 (4.48%)	8 (16.67%)	0.050
Hypothyroidism	6 (5.22%)	1 (1.49%)	5 (10.42%)	0.081
Rheumatologic Disease	6 (5.22%)	2 (2.99%)	4 (8.33%)	0.234
Hyperlipidemia	1 (0.87%)	0 (0.00%)	1 (2.08%)	0.417

Means ± standard deviations describe normally distributed continuous variables; otherwise, medians (minimum–maximum) are reported. Categorical variables are displayed as frequencies (percentages). P-values< 0.05 denote statistical significance. BMI = Body Mass Index, VAS = Visual Analog Scale, HIT-6 = Headache Impact Test-6. Medical records confirmed patient-reported comorbidities.

*Migraine attack frequency and VAS score were analyzed exclusively among participants diagnosed with migraine.

fibromyalgia and migraine indicated that the presence of migraine was associated with nuanced yet clinically significant distinctions within the fibromyalgia patient population. Although fibromyalgia patients showed significantly higher scores for disease activity, fatigue, anxiety, and depression than non-fibromyalgia participants ($p < 0.001$), the presence or migraine did not result in significant differences in these measures. However, perceived health and sleep quality was affected by the presence of migraine. Self-reported health scores (median 62.5 vs. 50.0) and quality of life scores (median 0.5 vs. 0.3) were higher among FM+/M+ participants compared to FM+/M– participants; however, these differences did not reach statistical significance.

By contrast, the sleep disturbances were markedly more evident within the FM+/M+ group. Compared to other subgroups, this group reported the highest median PSQI scores (8.0, IQR 6.0–9.2), the lowest percentage reporting normal sleep quality (5.0%), and the highest percentage reporting impaired sleep quality (95.0%). This indicates a possible additive or synergistic impact of migraine on sleep disturbance in individuals with fibromyalgia. The FM–/M+ subgroup, however, displayed sleep and psychological characteristics similar to the FM–/M– group, thus indicating that migraine without fibromyalgia likely has a negligible effect on overall functioning or sleep quality.

Table 2: Comparison of quality of life, fatigue, anxiety and depression scores in fibromyalgia patients and control group

	All Patients (n = 115)	Controls (n = 67)	Fibromyalgia (n = 48)	P
FIQ Score	46.1 (9.8 - 88.1)	26.7 (9.8 - 53.5)	58.8 (22.8 - 88.1)	<0.001
Fibromyalgia VAS Score	4 (0 - 9)	2 (0 - 5)	6 (3 - 9)	<0.001
FSS Total Score	47 (9 - 63)	34 (9 - 63)	54 (27 - 63)	<0.001
FSS Average	5.2 (1 - 7)	3.8 (1 - 7)	6 (3 - 7)	<0.001
Beck Anxiety Score	15 (0 - 47)	9 (0 - 40)	23.5 (6 - 47)	<0.001
Beck Depression Score	11 (0 - 41)	6 (0 - 35)	20 (4 - 41)	<0.001
Today's Health Status	70 (20 - 100)	80 (40 - 100)	52.5 (20 - 100)	<0.001
Quality of Life Scale Score	0.78 (0.07 - 1)	0.9 (0.12 - 1)	0.48 (0.07 - 0.91)	<0.001

Medians (minimum–maximum) are reported for non-normally distributed continuous variables. P-values< 0.05 denote statistical significance. FIQ = Fibromyalgia Impact Questionnaire span from 0 to 100, with higher values indicating more severe functional impairment and symptom burden. VAS = Visual Analog Scale, indicating a 10-point scale where 0 represents "no pain" and 10 represents "worst imaginable pain. Fatigue Severity Scale (FSS) total score ranges from 9 to 63, while the FSS average is the mean score per item. Beck Anxiety Score and Beck Depression Score each derive from 21-item instruments; higher values reflect greater symptom severity. Today's Health Status represents patients' self-reported perception of their health on a 0–100 scale. Quality of Life Scale Score ranges from 0 to 1, with higher scores signifying better overall well-being.

DISCUSSION

Fibromyalgia syndrome is a clinical condition characterized by widespread musculoskeletal pain. While fibromyalgia syndrome primarily manifests as pain, patients often report additional symptoms, including sleep disturbances, mood disorders, weakness, fatigue, muscle spasms, and paresthesia. In particular, migraine is frequently observed as a comorbid condition in patients with fibromyalgia.

Studies have indicated the multifaceted nature of chronic pain disorders like fibromyalgia, affecting various life domains and emphasizing the roles of both psychosocial and physiological elements in pain experience.[3,6,8] Our findings corroborate with this perspective, as we observed that individuals with fibromyalgia exhibit significantly higher levels of anxiety and depression, poorer sleep quality, and diminished quality of life compared to controls.[9,11,12]

A higher prevalence of married individuals and housewives in the fibromyalgia group suggests a possible link between sociocultural roles and the intensity of symptoms. Existing literature suggests a correlation between traditional caregiving roles, reduced physical activity levels, and social isolation.[13,14]

The influence of these factors may extend beyond sociocultural explanations, reflecting the more encompassing biopsychosocial mechanisms of fibromyalgia. These factors could be associated with increased stress levels and heightened pain perception in affected fibromyalgia population. Disease severity and functional limitations in affected patients should be interpreted while considering these contextual factors.

Chronic pain necessitates a thorough health evaluation. Biopsychosocial variables influence the perception of pain; chronic pain diminishes quality of life, an effect also documented for FMS. Pain varies from person to person and affects the quality of life at different rates. Martinez *et al*.[9] and Sas *et al*.[11] both documented a significant negative correlation between fibromyalgia and quality of life, aligning with the impact observed in other chronic illnesses. Our study determined a statistically significant difference in quality of life between patients with and without fibromyalgia.

Research demonstrates a substantial correlation between fibromyalgia and a high incidence of persistent psychiatric disorders, including cases where psychiatric illness precedes fibromyalgia onset, supporting its categorization as a mood disorder. Pre-existing depression has been observed in a significant proportion of fibromyalgia patients, exceeding rates seen in the general population. In various studies, the frequency of depressive disorders in fibromyalgia has been reported to vary between 28.6% and 70%.[12] Offenbauer *et al*.[15] found that 27% of fibromyalgia patients had a BDI score above 21. In studies conducted in our country, Güven *et al*.[16]

Table 3: Comparison of Pittsburgh Sleep Quality Index (PSQI) components in fibromyalgia patients and control group

	All Patients (n = 115)	Controls (n = 67)	Fibromyalgia (n = 48)	P
Total PSQI Score	5 (1 - 13)	4 (1 - 11)	7 (3 - 13)	<0.001
Sleep Quality Category				<0.001
Normal	48 (41.74%)	41 (61.19%)	7 (14.58%)	
Impaired Sleep Quality	67 (58.26%)	26 (38.81%)	41 (85.42%)	
PSQI 1 - Subjective Sleep Quality				<0.001
Normal	3 (2.61%)	3 (4.48%)	0 (0.00%)	
Mild Problem	70 (60.87%)	52 (77.61%)	18 (37.50%)	
Moderate Problem	42 (36.52%)	12 (17.91%)	30 (62.50%)	
PSQI 2 - Sleep Latency				<0.001
Normal	30 (26.09%)	28 (41.79%)	2 (4.17%)	
Mild Problem	74 (64.35%)	39 (58.21%)	35 (72.92%)	
Moderate Problem	11 (9.57%)	0 (0.00%)	11 (22.92%)	
PSQI 3 - Sleep Duration				0.018
Normal	74 (64.35%)	47 (70.15%)	27 (56.25%)	
Mild Problem	30 (26.09%)	18 (26.87%)	12 (25.00%)	
Moderate Problem	11 (9.57%)	2 (2.99%)	9 (18.75%)	
PSQI 4 - Habitual Sleep Efficiency				0.014
Normal	75 (65.22%)	50 (74.63%)	25 (52.08%)	
Mild Problem	25 (21.74%)	13 (19.40%)	12 (25.00%)	
Moderate Problem	15 (13.04%)	4 (5.97%)	11 (22.92%)	
PSQI 5 - sleep disorders				<0.001
Normal	10 (8.70%)	3 (4.48%)	7 (14.58%)	
Mild Problem	75 (65.22%)	55 (82.09%)	20 (41.67%)	
Moderate Problem	30 (26.09%)	9 (13.43%)	21 (43.75%)	
PSQI 6 - Use of Sleeping Pills				0.024
Normal	49 (42.61%)	35 (52.24%)	14 (29.17%)	
Mild Problem	45 (39.13%)	24 (35.82%)	21 (43.75%)	
Moderate Problem	21 (18.26%)	8 (11.94%)	13 (27.08%)	
PSQI 7 - Daytime Dysfunction				<0.001
Normal	50 (43.48%)	45 (67.16%)	5 (10.42%)	
Mild Problem	52 (45.22%)	21 (31.34%)	31 (64.58%)	
Moderate Problem	13 (11.30%)	1 (1.49%)	12 (25.00%)	

Medians (minimum–maximum) are reported for non-normally distributed continuous variables. Categorical variables are displayed as frequencies (percentages). P-values< 0.05 denote statistical significance. PSQI = Pittsburgh Sleep Quality Index, comprising seven subscales: subjective sleep quality, sleep latency, sleep duration, habitual sleep efficiency, sleep disturbances, use of sleeping pills, and daytime dysfunction. Normal, mild, or moderate problem categories are based on cutoffs established for each PSQI subcomponent. "Impaired Sleep Quality" corresponds to a total PSQI score of >5 or adverse subscale findings in multiple domains. The daytime dysfunction subscale captures self-reported difficulties in maintaining alertness and performing daily activities because of poor sleep.

evaluated fibromyalgia patients with BDI and found that 50% had mild depression, 38% had moderate depression, and 2% had severe depression. Çeliker *et al*.[17] reported that 30.8% of fibromyalgia patients had moderate depression and 5.1% had severe depression, again using BDI. In another study, the rate of depression in fibromyalgia patients was found to be 32%.[18]

Altunören *et al*.[19] reported that 76.5% of the patients with fibromyalgia and 51 controls had a psychiatric diagnosis according to DSM-IV-TR criteria in their study. One-third

Table 4: Comparison of disease activity, psychological parameters, quality of life, and sleep characteristics across groups defined by fibromyalgia and migraine status

	FM–, M– n = 58	FM–, M+ n = 9	FM+, M– n = 26	FM+, M+ n = 20
FIQ Score	27.1 (19.9–46.2) [a]	15.4 (13.5–38.2) [a]	58.8 (54.0–74.4)[b]	63.3 (48.9–80.5) [b]
FSS Total Score	35.0 (28.0–49.8) [a]	21.0 (17.0–42.0) [a]	54.5 (48.2–56.8) [b]	53.5 (48.0–58.5) [b]
FSS Average	3.9 (3.1–5.5) [a]	2.3 (1.9–4.7) [a]	6.0 (5.3–6.3) [b]	6.0 (5.3–6.5) [b]
Beck Anxiety Score	9.0 (3.2–16.8) [a]	12.0 (6.0–16.0) [a]	24.0 (14.5–31.8) [b]	23.5 (15.2–35.0) [b]
Beck Depression Score	6.0 (2.0–10.8) [a]	8.0 (3.0–9.0) [a]	20.5 (13.5–29.0) [b]	20.0 (14.5–25.0) [b]
Today's Health Status	80.0 (70.0–80.0) [a]	70.0 (60.0–70.0) [a]	50.0 (40.0–67.5) [b]	62.5 (50.0–70.0) [a]
Quality of Life Score	0.9 (0.8–1.0) [a]	1.0 (0.8–1.0) [a]	0.3 (0.2–0.8) [b]	0.5 (0.2–0.6) [b]
Total PSQI Score	4.0 (3.0–5.0) [a]	4.0 (3.0–6.0) [a]	7.0 (5.0–9.8) [b]	8.0 (6.0–9.2) [b]
Sleep Quality Category*				
Normal	36 (62.1%) [a]	5 (55.6%) [a]	6 (23.1%) [b]	1 (5.0%) [b]
Impaired Sleep Quality	22 (37.9%) [a]	4 (44.4%) [a]	20 (76.9%) [b]	19 (95.0%) [b]

Medians (minimum–maximum) are reported for non-normally distributed continuous variables. Categorical variables are displayed as frequencies (percentages). Superscript letters (e.g., a, b) indicate results of post hoc pairwise comparisons; groups not sharing the same letter are significantly different ($p < 0.05$, Bonferroni-adjusted). PSQI = Pittsburgh Sleep Quality Index; FIQ = Fibromyalgia Impact Questionnaire; FSS = Fatigue Severity Scale.
*Sleep Quality Category was compared using Fisher's Exact Test (Freeman–Halton extension); $p < 0.001$.

had major depression, and the frequency was listed as dysthymic disorder, anxiety disorder, somatization, and obsessive-compulsive disorder. In the same study, high harm avoidance, low self-directedness, and low perseverance scores were found in the fibromyalgia group. Atagün *et al*.[20] reported that alexithymia (especially difficulty in recognizing, understanding and expressing their emotions) was the major determinant of disease severity in fibromyalgia patients. They emphasized that depression and anxiety were more burdensome psychiatric problems for fibromyalgia. Hauser *et al*.[21] compared 395 fibromyalgia patients, and 395 healthy controls matched for age and gender. Post-traumatic stress disorder (PTSD) was found in 45.3% (n=179) in the fibromyalgia group and 3.0% (n=12) in the control group, and probable depressive disorder was found in 65.6% (n=259) and 4.8% (n=19), respectively. Our results confirmed the previous literature. Fibromyalgia presence showed a significant relationship between anxiety and depression according to the Beck-D and Beck-A scales.

Acar *et al*.[22] included 80 fibromyalgia patients and 46 healthy women. In both groups, pain was assessed via VAS, quality of life was assessed using the Fibromyalgia Impact Questionnaire (FIQ), and depression was assessed using the Beck Depression Inventory (BDI). Sleep disturbance was assessed using the 10 cm VAS, and hypersomnolence was evaluated using the Epworth Sleepiness Scale (ESS). The mean age, VAS-sleep, and EUS in the patient and control groups were 40.12±9.27 years, 7.27±2.22, 5.33±44.19 and 41.69±10.32 years, 0.71±1.31, 2.52±2.52, respectively. The mean BDI and FES scores were 21.77±11.9, 57.45±15.23 and 5.08±3.09, 15.77±11.40 with a statistically significant difference. Akaltun *et al*.[23] investigated 76 patients diagnosed with FMS. Patients were evaluated with the Fibromyalgia Impact Questionnaire (FIQ), Hamilton Depression Rating Scale (HAM-D), Pittsburgh Sleep Quality Index, Douleur Neuropathique 4 (DN4), and Leeds Assessment of Neuropathic Symptoms and Signs (LANSS) scales. According to the Pittsburg Sleep Quality Scale, 90.8% of patients had poor sleep quality. According to HAM-D, 82.9% of patients had depression. The mean FES values of the patients were calculated as 63.16±10.73. In our study, the Fibromyalgia Impact Questionnaire Score, Fibromyalgia VAS Score, Fatigue Severity Scale Total Score, and Fatigue Severity Scale were significantly different.

Our study confirmed the strong relationship between fibromyalgia and sleep disorders, a characteristic feature of the disease. Participants with fibromyalgia had drastically higher PSQI scores, reflecting significantly poorer sleep quality; a stark 85.42% reported troubled sleep, compared to just 38.81% in the control group.

Further analysis of PSQI subscales indicated substantial impairment affecting subjective sleep quality, sleep latency, sleep duration, sleep efficiency, and daytime functionality. These findings align with previous research suggesting a bidirectional relationship between pain, fatigue, cognitive difficulties, and non-restorative sleep.[23-25] Prior research utilizing subjective measures or polysomnography has investigated these observations. Our results, however, support the use of self-reported sleep scales, including the PSQI, for the practical assessment of clinically meaningful sleep impairment in this population. The significant relationship between poor sleep, heightened anxiety/depression, and impaired function highlights the importance of incorporating sleep-focused approaches into fibromyalgia care.

Prior research indicates a high prevalence of sleep disturbances in patients with fibromyalgia, frequently exacerbated by coexisting migraine. Although our data generally support align with this trend, specifically the elevated PSQI scores among the FM+/M+ subgroup, no statistically significant difference was found in self-reported health status or quality of life between FM+/M– and FM+/M+ patients. This observation contradicts previous literature suggesting a potential exacerbation of fibromyalgia symptoms by migraine, possibly via sensory hypersensitivity and impaired sleep regulation.[26-28]

The lack of significant differences across several domains may be attributed to the small sample sizes in the migraine subgroups. Limited statistical power, especially in post hoc analyses, can obscure moderate but clinically relevant effects. Given these constraints, our findings should be interpreted with caution. Future studies with larger samples are needed to explore the potential additive or synergistic impact of migraine on fibromyalgia-related outcomes, including sleep architecture, functional capacity, and central sensitization.

In conclusion, compared to a control group, patients with fibromyalgia demonstrated substantially more physical limitations, emotional distress, and reduced functional capacity. The sleep quality of fibromyalgia patients was significantly compromised, further characterized by increased anxiety and depression and reduced overall quality of life. Although migraine was more common among participants with fibromyalgia, its presence did not significantly worsen disease activity, psychological distress, or functional capacity. However, patients with both fibromyalgia and migraine reported the worst sleep quality, suggesting a potential synergistic effect in this domain. These findings highlight the importance of a multidisciplinary therapeutic strategy including pharmacologic analgesia, psychological support, and targeted treatments for sleep and mood disturbances. The association between sleep quality and disease progression warrants further investigation.

DISCLOSURE

Ethics: Ethical approval for the study was obtained from the Ethics Committee of Tepecik Training and Research Hospital (Approval Number: 2022/06–04).

Data availability: The data supporting this study's findings are available on request from the corresponding author. The data are not publicly available due to privacy or ethical restrictions.

Financial support: None

Conflict of interest: None

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