



# The Frequency of Fibromyalgia in Migraine Patients

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## Abstract

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**BACKGROUND:** Fibromyalgia (FM) is a prevailing debilitating ailment that has been described in patients with migraines in several investigations.

**AIM:** The study aimed to investigate the frequency of FM in migraine patients and to study the characteristics of migraine patients with comorbid FM.

**METHODS:** This case–control study was piloted in the Neurology Unit, Department of Medicine in Ibn Sina Teaching Hospital in Mosul, Iraq, between March and November 2020. One hundred consecutive patients with migraine and 100 healthy controls were included in this study. The sociodemographic and headache characteristics of the patients were recorded.

**RESULTS:** The frequency of FM was statistically higher among participants with migraines (27%) when compared to the controls (5%). Migraine patients with FM had a substantially older mean age and a higher ratio of female gender than migraine patients without FM. FM was found to be more common in patients without versus with aura. Patients with comorbid FM had greater headache frequency ( $p = 0.0002$ ), headache intensity ( $p = 0.007$ ), and higher scores on the “Headache Impact Test (HIT-6)” ( $p = 0.0001$ ).

**CONCLUSIONS:** There is a high frequency of FM in patients with migraines. Patients with coexistent “FM” and “migraine” tended to have more depressive symptoms, greater headache intensity, headache frequency, and when compared to healthy people, they are more likely to have a significant headache-related disability.

## Introduction

Fibromyalgia (FM) is a prevalent disorder marked by chronic diffuse pain, often accompanied by tenderness, fatigue, mood changes, sleep disturbances, and other somatic problems [1], [2]. Comorbid FM has been reported in patients with migraines in several studies [3], [4], [5], [6]. The strike of FM pain was demonstrated to be triggered by environmental factors, including stress and infections. Similarly, migraines are triggered by environmental factors (e.g., stress, strong light, or noise); therefore, their association and coexistence are potentially possible [2]. “Central sensitization” may be involved in both FM and migraine [7]. Pain amplification at a central level and its persistence despite the termination of the primary cause may explain the comorbidity of both conditions. One possible explanation is that pain modulating pathways are faulty in these disorders. Decreased adaptation to painful stimuli may lead to an increase in noxious input in the cortex, promoting central sensitization. This phenomenon has been found in migraine and FM patients [8]. FM is a devastating illness that, when combined with migraine, can rise morbidity [3], [4]. Comorbidity is relevant in migraine from various points of view: Comorbid disorders can make diagnosis more difficult; one disease can alert physicians of other diseases, and one treatment can be taken to treat both conditions. The etiology of migraine

can be elucidated by looking at the comorbidity of disorders [9]. Physicians dealing with migraine patients should be aware of the connection between migraine and FM. This study aimed to estimate the frequency of FM in migraine patients and to evaluate the characteristics of migraine patients with comorbid FM.

## Patients and Methods

### Study setting and design

This case–control study was enrolled 100 consecutive patients with migraine in the Neurology Unit, Department of Medicine in Ibn Sina Teaching Hospital, between March and November 2020. For comparative purposes, a total of 100 healthy control individuals matched for age and sex were selected. They had no migraine or any type of headache.

### Ethics approval and patients informed consents

The study was done in conformity with the Declaration of Helsinki’s principles, and all participants supplied written informed consent before

the study's start. The study protocol was approved by the Department of Medicine, College of Medicine, University of Mosul (approval date: September 17, 2020, no: MDESC9-2).

### Eligibility

The diagnosis of migraine was confirmed based on the International Classification of Headache Disorders, 3<sup>rd</sup> edition (ICHD-3) by a neurologist [10]. Patients with other types of headaches, neurological illnesses, or other recognized purposes of widespread pain, such as endocrine, rheumatic, or systemic problems, were omitted from the present study.

### Data collection

Sociodemographic features (age, gender, body mass index, marital status, employment position, and education) and headache characteristics (headache intensity, frequency, migraine type, and duration) were recorded. The diagnosis of FM was done according to the 2011 modification of the "2010 American College of Rheumatology preliminary diagnostic criteria for FM" by one rheumatologist [11].

### Assessment and evaluation

The "Headache Impact Test-6 (HIT-6)" is an endorsed questionnaire used to quantify the disruption in the daily life of the patient caused by migraine (range: 36–78). This questionnaire includes six domains that assess how often recent headaches resulted in severe pain, how often they limit the ability to perform regular daily activities, and how often they led to the need to lay down, headache-related tiredness, irritability, or difficulty concentrating [12].

The "Migraine Disability Assessment Scale (MIDAS)" is a quick and accurate headache-specific measure for calculating headache-related disability. In five questions, the impact of headaches on everyday activities over the previous 3 months is studied. Items 1 and 2 look into the number of days absent from work comeuppance to a headache, as well as the number of days when the mass productiveness is cut in half or more. The identical questions about domestic work are asked in Items 3 and 4. Item 5 inquires about days spent participating in recreational, social, and family events that were missed. A higher score suggests that the disability is more severe [13].

The Patient Health Questionnaire-9 "(PHQ-9)" is an endorsed depression screening tool. It includes nine assertions of depressive symptoms that are assessed on a scale of 0–3 (never, a few days, more than half the days, and virtually every day) over the preceding 2 weeks [14].

Headache intensity was evaluated on a numerical rating scale of 0–10, with 0 denoting "no pain" and 10 denoting "the worst pain imaginable."

### Statistical analysis

"Statistical Package for the Social Sciences" version 23 was used for statistical analysis. The mean and standard deviation of continuous variables were calculated. For the comparison of qualitative data, the Chi-square test was utilized. The differences between the two means were calculated using the "Student's t-test." Statistical significance was defined as  $p < 0.05$ .

## Results

One hundred participants with migraine, 28 males (28%) and 72 females (72%), their mean age  $30.76 \pm 9.9$  years, and 100 healthy control group, 30 males (30%) and 70 females (70%), their mean age was  $32.4 \pm 7.30$  years, were included in this study. Gender distribution among patients and control groups was shown in Figure 1. The age and sex of the studied groups were matched, with no significant statistical difference between them ( $p > 0.05$ ).

The frequency of "FM" in 100 participants with migraine was 27% compared to 5% in 100 healthy individuals ( $p = 0.00002$ ) intimating a statistically significant variation between the studied groups, as shown in Table 1.

**Table 1: Comparison of FM between patients with migraine and control groups**

Fibromyalgia status	Cases (migraine) n=100	Controls (no migraine) n=100	p-value
Fibromyalgia, n (%)	27 (27)	5 (5)	0.00002
No fibromyalgia, n (%)	73 (73)	95 (95)	

FM: Fibromyalgia

Table 2 displays the sociodemographic features of "migraine" patients with and without "FM." Participants with coexisting "migraine" and FM had a substantially greater mean age and percentage of female than migraine patients without FM ( $39.96 \pm 7.67$  vs.  $27.36 \pm 8.39$ ,  $p = 0.0001$ ; 88.9% vs. 65.75%,  $p = 0.022$ ). Other sociodemographic features, such as body mass index, marital status, educational status, and employment position, did not show a substantial difference between the studied groups ( $p > 0.05$  for all).

**Table 2: Sociodemographic features of "migraine" patients with and without "FM"**

Variable	Migraine patients with FM n=27	Migraine patients without FM n=73	p-value
Mean age, years	$39.96 \pm 7.67$	$27.36 \pm 8.39$	0.0001
Gender (F/M), n (%)	24/3 (88.9/11.1)	48/25 (65.75/34.25)	0.022
Body mass index (kg/m <sup>2</sup> )	$27.3 \pm 5.4$	$25.9 \pm 4.2$	0.175
Married, n (%)	20 (74.1)	54 (74)	0.99
Employed, n (%)	8 (29.6)	24 (32.9)	0.76
Education, years	$8 \pm 3.6$	$9.4 \pm 4.2$	0.128

FM: Fibromyalgia

Headache characteristics among “migraine” participants with and without FM are demonstrated in Table 3. FM was found to be more common in patients without aura ( $p = 0.017$ ), whereas there was no difference between them concerning disease duration and the presence of menstrual migraine. Patients with comorbid FM had greater headache frequency ( $p = 0.000$ ), headache intensity ( $p = 0.007$ ), and higher scores on the HIT-6 ( $p = 0.0001$ ), MIDAS ( $p = 0.0167$ ), and PHQ-9 ( $p = 0.001$ ).

**Table 3: Headache characteristics among migraine patients with and without FM**

Variable	Migraine patients with FM n=27	Migraine patients without FM n=73	p-value
Duration of migraine, years	7.3 ± 6.4	6.5 ± 5.3	0.53
Migraine frequency (per month)	9.8 ± 6.6	5.6 ± 4.1	0.0002
Headache intensity	8 ± 1.5	7.2 ± 1.2	0.007
Migraine with aura, n (%)	3 (11.1)	26 (35.6)	0.017
Menstrual migraine	7 (33.3)	12 (23.5)	0.391
HIT-6	64.7 ± 5.1	57.4 ± 7.3	0.0001
MIDAS	29.5 ± 12.6	21.8 ± 14.5	0.0167
PHQ-9	15.4 ± 5.6	10.8 ± 6.4	0.001

FM: Fibromyalgia, HIT-6: Headache Impact Test-6, MIDAS: Migraine Disability Assessment Scale, PHQ-9: Patient Health Questionnaire-9

## Discussion

The outcome of the present study revealed that FM was detected in 27% of migraine patients in comparison to 5% of healthy individuals which indicate a statistical relation between the two conditions ( $p = 0.00002$ ). This finding agreed with the previous studies which showed a high frequency of FM in migraine patients, ranging between 10 and 35.6% [3], [4], [5], [6], [15]. The apparent variation in FM frequency between studies could be attributable to the use of different FM classification criteria or inconsistencies in their application. The “FM classification criteria” are not without limitations, and the “ACR” has established clinical criteria that do not include examination for tender spots, but it gives a metric for assessing the intensity of symptoms that are common in FM. These new criteria would be easier to use and would make diagnosing FM distress much easier.

Because the study was conducted in a hospital-based neurology unit, the high frequency of FM among migraine patients may not be reflective of migraine distribution in the general population. As evidenced by high headache intensity, “MIDAS,” and “HIT-6” scores, the sample under investigation had more severe symptoms of migraines than other groups of patients. Community-based researches are needed to determine the link between these illnesses in the general population.

This frequent association of migraine with FM could be possibly attributed to a common pathophysiologic basis. As a common mechanism for both FM and migraine, hypothalamic neuroendocrine dysfunction has been suggested [16]. The central pain transmission circuits signaling through pain neurons

also have been anticipated as a pathway shared by both conditions [17]. Low levels of magnesium can worsen FM symptoms and are also implicated in migraines [18].

The instant study demonstrated that patients with migraine and comorbid FM had the tendency to be older, and most were female. Our findings were in agreement with the previous studies [4], [8], [9]. It is known that the frequency of “FM” rises with age and that both migraine and FM predominate in females. However, gender variations in these diseases are not entirely understood, but they are most likely the consequence of a complex interplay between gonadal hormones, brain processes, and pain processing [19], [20], [21].

Regarding the relationship between FM and the presence of aura, FM was found to be more common among patients without aura. This inspection is supported by few other studies [3], [15]. In a paper published by Ifergan *et al.*, FM was identified in approximately all aura-free migraine patients [3]. FM comorbidity was not observed in patients who presented with aura strikes, according to de Tommaso *et al.* [8]. However, this contradicts with Beyazal *et al.* who have stated that aura is more prevalent when migraine coexists with FM than those with FM-free migraine patients [9]. A possible explanation may be that in the studies with a significant association between aura and FM, other factors such as frequency of migraine headache might have influenced the analyzes.

In our study, the frequency of migraine episodes was statistically greater in individual with FM compared to those without “FM.” In a study done by “de Tommaso *et al.*,” the rate of headache was stated as one of the major discrimination variables for FM distress [22]. In a subsequent study, FM was more prevalent between migraine patients who testified more prevailing migraine attacks [5]. Increased migraine frequency increases pain intensity in somatic areas beyond the cranium, and patients may be predisposed to FM [23]. In our study, patients with comorbid FM had significantly greater headache intensity, and higher grades on the HIT-6, and MIDAS. This study backs up prior findings that people with FM and migraine had more severe headaches and headache-related impairment than those who simply have migraines [4], [6].

Scores on PHQ-9 were significantly greater in patients with concomitant FM. Our finding was in agreement with the previous studies which show increased depression in participants with coexisting FM and migraine in comparison to those with migraine only [3], [5]. It is inconclusive if depression is triggered by FM or migraine, or if it is an independent provoking element for either if any. It has been shown that interconnections between anxiety, depression, and migraine may be linked to serotonin levels [24]. A subnormal concentration of serotonin may be involved in the dysregulation of “descending antinociceptive systems,” contributing to FM and migraine [24], [25].

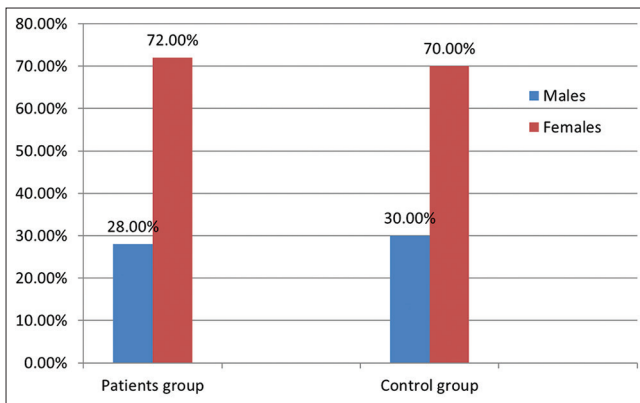


Figure 1: Gender distribution among patients and control groups

The primary drawback in the present study was the limited participants' number. We also did not look at the variations in FM frequency between chronic and episodic migraine patients. According to the findings of our study, it would be equitable to suggest screening for coexisting FM in the assessment and management of migraine patients.

## Conclusions

Patients with migraines have a high percentage of FM. Migraine patients with concomitant FM had the tendency to be older, and most were female. FM was significantly more common in patients without aura. In comparison to patients without FM, individuals with FM and migraine experienced altered mood symptoms, had more intense and frequent headaches, and were more prone to have a critical headache-related impairment.

## Authors' Contributions

The authors contributed equally to this study.

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