Original Article

HEALTH SCIENCES
MEDICINE

DOI: 10.32322/jhsm.1589687

J Health Sci Med. 2025;8(2):174-179

Evaluation of the physical and emotional effects of the earthquake in fibromyalgia patients

Hatice Zehra Ferhatlar[1], Mustafa Tuna[2], Esma Demirhan[3]

[1]Department of Physical Medicine and Rehabilitation, Viranşehir State Hospital, Şanlıurfa, Turkiye
[2]Department of Physical Medicine and Rehabilitation, Şanlıurfa Training and Research Hospital, Şanlıurfa, Turkiye
[3]Department of Physical Medicine and Rehabilitation, İstanbul Prof. Dr. Cemil Taşcıoğlu City Hospital, İstanbul, Turkiye

Cite this article as: Ferhatlar HZ, Tuna M, Demirhan E. Evaluation of the physical and emotional effects of the earthquake in fibromyalgia patients. *J Health Sci Med.* 2025;8(2):174-179.

Received: 22.11.2024 ◆ **Accepted**: 24.01.2025 ◆ **Published**: 21.03.2025

ABSTRACT

Aims: Fibromyalgia (FMS) is a soft tissue disease characterized by widespread pain and tenderness. Poor living conditions and stress can cause the symptoms of the disease to aggravate. Natural disasters such as earthquakes can also increase the severity of symptoms such as pain and sleep disturbance in fibromyalgia patients by creating physical and psychological stress. In this study, we aimed to show the physical and psychological effects of the earthquake on fibromyalgia patients.

Methods: Our study is of prospective type and was conducted between 01.09.2023 and 01.11.2023. 59 earthquake victims and 50 non-earthquake victims FMS patients diagnosed with FMS according to the ACR2016 diagnostic criteria were included. All patients filled out four forms: Perceived Stress Scale (PSS) showing psychological states, Fibromyalgia Impact Questionnaire (FIQ) showing physical states, EuroQol Group (EQ5D3L) general quality of life scale showing quality of life, EQ5D3L-VAS scale showing pain conditions and Pittsburgh Sleep Quality Index showing sleep quality.

Results: ASD, FIQ, EQ5D3L, EQ5D3L-VAS and Pittsburg scores of fibromyalgia patients who were earthquake victims were statistically significantly higher than FMS patients who were non earthquake victims (respectively $p=0.008$, $p<0.001$, $p=0.008$, $p=0.008$, $p=0.008$).

Conclusion: It is known that the risk of developing chronic pain syndromes and psychological distress increases after unexpected natural disasters such as earthquakes. In this study, we showed that the earthquake negatively affected pain, fatigue, sleep and quality of life in fibromyalgia patients. Thus, we tried to draw attention to the importance of appropriate screening, management, emotional support and mental health services for post-earthquake fibromyalgia patients.

Keywords: Fibromyalgia, pain, natural disaster, earthquake

INTRODUCTION

Natural disasters such as earthquakes negatively affect people physically and psychologically. In addition, it causes economic and social difficulties. Two major earthquakes of magnitude 7.7 and 7.6, with the epicenter in Kahramanmaraş, occurring in Turkiye on February 6, 2023, and approximately 17,000 aftershocks that occurred subsequently, caused serious losses to a large part of the society. According to the latest reports of the World Health Organization (WHO), more than 50 thousand deaths occurred in the earthquake, which affected approximately 15 million people in 10 provinces, and more than 3 million people had to change their place of residence.[1] In addition, individuals suffered serious social and economic damage due to the destruction of historical places, destruction of business centers that provide employment, damage to schools, hospitals becoming unusable and lack of resources that will arise in the future

Fibromyalgia (FMS) is a soft tissue disease that is characterized by widespread pain and tenderness and occurs through central sensitization.[3] In addition to symptoms such as widespread pain, sleep disturbance, fatigue, and cognitive dysfunction, anxiety and depression are also frequently observed in these patients.[4] There is evidence of a relationship between traumatic experiences and the prevalence of fibromyalgia.[5] Poor living conditions and stress can cause the symptoms of the disease to aggravate. Natural disasters such as earthquakes, floods and fires can increase the severity of symptoms in fibromyalgia patients because they are stress factors.[6] Evaluation of these patients is very important in terms of patient management and possible worsening of the disease course. Considering the deteriorations in the climate, various geological factors and the damage caused to nature by humans, the expected increase in natural disasters in the future shows the importance of

Corresponding Author: Hatice Zehra Ferhatlar, haticezehraferhatlar@gmail.com

this issue. In this study, we aimed to show the effect of the earthquake on the physical and mental states of fibromyalgia patients.

METHODS

Study Design

Our prospective study was approved by the Harran University Clinical Researches Ethics Committee (Date: 21.08.2023, Decision No: HRÜ/23.15.30). The study protocol was prepared in accordance with the Declaration of Helsinki. Informed written consent was obtained from the participants in the study.

Participants

A total of 109 patients, 59 patients from Şanlıurfa, the earthquake region, and 50 patients from Istanbul, the region not affected by the earthquake, over the age of 18 years diagnosed with fibromyalgia according to American College of Rheumatology 2016 diagnostic criteria was included in the study. Patients with major depression, history of chronic disease, heart disease, diabetes mellitus, rheumatic disease and malignancy were not included.

Collection of Data

59 patients with fibromyalgia who applied to the Physical Medicine and Rehabilitation outpatient clinic of Şanlıurfa Training and Research Hospital between 01.09.2023 and 01.11.2023, and 50 patients with fibromyalgia who applied to the Physical Medicine and Rehabilitation outpatient clinic of İstanbul Prof. Dr. Cemil Taşcıoğlu City Hospital on the same dates, were included in the study.

Demographic characteristics of the patients, including age, gender, marital status, educational status and body-mass index (BMI), were recorded. A total of four forms were filled out: the Perceived Stress Scale (PSS), which shows their psychological state, the Fibromyalgia Impact Questionnaire (FIQ), which shows their physical condition, the EuroQol5D3L General Quality of Life Scale, which shows their quality of life, and the Pittsburgh Sleep Quality Index, which shows their sleep quality.

Perceived Stress Scale (PSS): The PSS developed by Cohen et al.[7] is a self-reported measure of perceived stress, feelings, and thoughts in the past month. The PSS consists of 14 items scored on a 5-point Likert-Type Scale ("1=never" to "5=very Often"). The total score ranges from 14 to 70, with higher scores indicating higher stress levels. The PSS was adapted to Turkish by Eskin et al.[8]

Fibromyalgia Impact Questionnaire (FIQ): The FIQ developed by Burchardt et al.[9] is used to assess the health status and physical functionality of individuals diagnosed with fibromyalgia. It is a 10-item scale that evaluates work status, productivity level, depression, anxiety, sleep, pain, stiffness, fatigue, and overall well-being. Patients are asked to indicate the most appropriate level for themselves over the past week. The total score achievable on the test is 100, with higher scores indicating lower levels of functionality. The Turkish validity of the questionnaire was established by Ediz et al.[10]

EuroQol5D3L: The EuroQol 5-dimension 3-level (EQ-5D-3L) instrument is a standardized, generic measure developed by the EuroQol Group to assess health-related quality of life. It encompasses five dimensions: mobility, self-care, usual activities, pain/discomfort, and anxiety/depression. Each dimension has three levels of severity: no problems, some problems, and extreme problems. Additionally, the EQ-5D-3L includes a Visual Analogue Scale (EQ VAS) ranging from 0 to 100, allowing individuals to rate their overall health status. The instrument is widely utilized in clinical and economic evaluations due to its simplicity, reliability, and validity.[11]

Pittsburgh Sleep Quality Index (PSQI): It is developed by Buysse et al.[12] in 1989, is a 24-item instrument used to evaluate sleep quality over the past month. Of these, 19 questions are self-assessment items, while the remaining 5 are answered by the individual's roommate or partner, if applicable. The calculation of the total PSQI score and component scores is based solely on the responses provided by the participant. These questions provide information on seven components: subjective sleep quality (component 1), sleep latency (component 2), sleep duration (component 3), habitual sleep efficiency (component 4), sleep disturbances (component 5), use of sleep medication (component 6), and daytime dysfunction (component 7). Each component is scored on a scale of 0 to 3. The sum of the seven component scores constitutes the total PSQI score, which ranges from 0 to 21. Individuals with a total score of 5 or less are considered to have "good" sleep quality, whereas those with a score above 5 are categorized as having "poor" sleep quality.[12] The validity and reliability of the PSQI in Turkiye were established by Ağargün et al.[13]

Statistical Analysis

The data analyses were performed with SPSS version 25.0 program. The suitability of the data for normal distribution was examined using the Shapiro Wilk test and histogram graphics. According to the normality test results, continuous variables were presented as median (minimum: maximum) values and categorical variables as number (n) and percentage (%). Categorical variables between the two groups were compared with the Pearson chi-square test. Mann Whitney U test was used for variables that were not normally distributed, and Spearman correlation analysis was used for correlation analysis. A value of $p<0.05$ was considered statistically significant.

RESULTS

There was no statistically significant difference in the comparisons made between fibromyalgia patients who were earthquake victims and patients who did not experience an earthquake in terms of gender, age, BMI, education level and marital status (**Table 1**).

The median PSS score of fibromyalgia patients who were earthquake victims was 31, and it was statistically significantly higher than the median ASD score of non-earthquake FMS patients ($p=0.008$) (**Table 2**).

The median FIQ score of fibromyalgia patients who were earthquake victims is 74, which is statistically significantly higher than the median FIQ score of non-earthquake FMS patients ($p<0.001$).

Table 1. Demographic data

	Earthquake victim FMS (n=59)	Non-earthquake victim FMS (n=50)	p
Gender[a]			
Woman	46 (78%)	30 (60%)	0.068[2]
Male	13(22%)	20 (40%)	
Age[b]	39.8±10.1	43.2±8.8	0.100[1]
BMI[b]	26.9±4.8	26.1±3.8	0.061[1]
Education[a]			
Primary school	43 (72.9%)	31 (62%)	0.121[2]
Middle school	12 (20.3%)	9 (18%)	
High school/university	4 (6.8%)	10 (20%)	
Marital status[a]			
Married	56 (94%)	42 (84%)	0.117[2]
Single/divorced	3 (5%)	6 (5.1%)	

FMS: Fibromyalgia, a: n (%) b: mean±standart deviation 1: Mann-Whitney U, 2: Pearson chi-square

Table 2. Clinical data

	Earthquake victim FMS (n=59)	Non-earthquake victim FMS	p
PSS[a]	31 (16-49)	28 (11-40)	0.008[1]
FIQ[a]	74 (16-90)	57.6 (11.3-88.5)	<0.001[1]
EQ5D3L[a]	0.56 (0.1-1)	0.35 (0.08-1)	0.008[1]
EQ5D3L-VAS[a]	40 (0-100)	60 (10-80)	<0.001[1]
Pittsburg[a]	12 (4-21)	9 (3-16)	<0.001[1]

FMS: Fibromyalgia, PSS: Perceived Stress Scale, FIQ: Fibromyalgia Impact Questionnaire, EQ5D3L: EuroQol5D3L, [a]: median (min-max), [1]: Mann Whitney U

The median EQ5D3L score of fibromyalgia patients who were earthquake victims is 0.56, which is statistically significantly higher than the median EQ5D3L score of non-earthquake FMS patients (p=0.008) (Table 2).

The median EQ5D3L-VAS score of fibromyalgia patients who were earthquake victims is 40, which is statistically significantly higher than the median EQ5D3L-VAS score of non-earthquake FMS patients (p=0.008) (Table 2).

The median Pittsburg score of fibromyalgia patients who were earthquake victims is 12, which is statistically significantly higher than the median Pittsburg score of non-earthquake FMS patients (p=0.008) (Table 2).

There is a moderate positive correlation between PSS and FIQ (rho=0.495 p<0.01) (Figure).

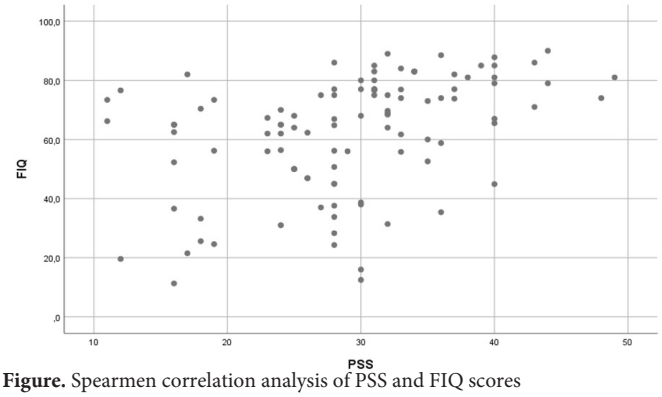

Figure. Spearmen correlation analysis of PSS and FIQ scores

PSS: Perceived Stress Scale, FIQ: Fibromyalgia Impact Questionnaire

In our study, 59.3% of earthquake victim fibromyalgia patients reported that their general health status was affected by the earthquake. 21.7% of patients rated their general health as worse and 37.3% of patients rated their general health as much worse after the earthquake. Additionally, 64.4% of the patients reported that their pain levels were affected by the earthquake. 15.3% of patients rated their pain levels as worse and 49.1% of patients rated their pain levels as much worse after the earthquake (Table 3).

Table 3. Earthquake-related pain and general health condition

Did the earthquake affect your general health?	n	%
Yes	35	59.3
No	24	40.7
How did the earthquake affect your general health?		
Much worse	22	37.3
Worse	13	21.7
Matter	0	
Much matter	0	
Did the earthquake affect your pain level?		
Yes	38	64.4
No	21	35.6
How did the earthquake affect your pain level?		
Much worse	29	49.1
Worse	9	15.3
Matter	0	
Much matter	0	

DISCUSSION

In our study, we showed that earthquake, one of the natural disasters, negatively affects pain, fatigue, sleep and quality of life in fibromyalgia patients. Destruction of living spaces after an earthquake, death of close friends and relatives, uncertainty about the future and many other earthquake-related factors lead to acute and chronic stress. Acute and chronic stress are known to trigger fibromyalgia symptoms.[14]

It has been shown in many studies that people's physical and mental health conditions are worse after the earthquake.[15-18] In addition to the devastating consequences of the initial impact of the earthquake, the difficult living conditions experienced in the post-earthquake period negatively affect people's general health status and pain levels. Cammack et al.[19] reported that two Christchurch earthquake survivors developed allodynia, chronic pain, and mood disorders requiring antidepressants and opioid analgesics after their general health stabilized. Similarly, Angeletti and colleagues examined the triage documents of nearly 1000 patients who applied to the emergency department with complaints of pain after the earthquake and found that 34.6% of the patients reported pain for various reasons. 58.8% of patients were affected by severe pain and 3% had widespread joint/muscle pain.[20] In our study, 59.3% of earthquake victims evaluated their general health condition as much worse after the earthquake. Additionally, 64.4% of patients rated their pain levels as much worse after the earthquake.

Natural disasters such as earthquakes are significant sources of stress for various reasons. It is well-established that stress is closely associated with sleep disturbances.[21] Several studies have demonstrated that sleep disorders are highly prevalent following earthquakes.[22,23] In a study conducted after the Great East Japan earthquake, the prevalence of insomnia was recorded at 9.7% in November 2009 (prior to the earthquake, with 1,224 participants), whereas in July 2011 (four months after the earthquake, with 1,259 participants), this rate had increased to 25.7%, which is 2.7 times higher than before the disaster.[22] In another study conducted in Athens, it was found that while sleep problems were reported in approximately 20-30% of adults in the general population, this rate increased to 60% in individuals from the disaster-stricken areas several months after the earthquake.[24] Moreover, the study identified difficulties in adapting to new living conditions as a predictor of sleep disturbances. In a study by Akbaş et al.,[25] thirty patients affected by the February 6, 2023 earthquake in Turkiye, were evaluated along with a control group of individuals not exposed to the earthquake. The results revealed a significant deterioration in sleep quality among the earthquake survivors compared to those not affected by the disaster. Similarly, in our own study, sleep disorders were found to be significantly more prevalent among earthquake survivors with fibromyalgia syndrome (FMS) compared to those who had not experienced the earthquake.

Numerous studies have been conducted on the health issues faced by disaster victims, with mental health problems such as depression and anxiety being the most commonly reported following disasters.[26] In a study by Guimaro and colleagues, psychological stress following the 7.0 magnitude earthquake in Haiti in 2010 was assessed. Survivors were monitored for two months, and it was found that 55% of the individuals exhibited symptoms of depression, and 40% displayed symptoms of anxiety.[27] In a study conducted in Turkiye with 100 elementary school teachers directly exposed to the February 6, 2023 earthquake, high levels of anxiety were reported post-disaster, and it was recommended that support interventions for disaster survivors be systematic.[28] Similarly, another study conducted after the same disaster identified that the traumatic responses exhibited by the disaster victims included emotions such as pain, fear, anger, guilt, tension, meaninglessness, uncertainty, withdrawal, and hopelessness.[29] Likewise, after the 7.4 magnitude Marmara earthquake in Turkiye in 1999, high levels of depression, post-traumatic stress, and anxiety were reported.[30] In a study conducted by Marthoenis et al.,[31] the predictors of depression and anxiety following an earthquake were investigated. Injury to a first-degree family member, hospitalization, and experiencing post-earthquake stress were identified as predictors of depression, while personal injury, the destruction of one's home, and fear of staying in buildings were found to be predictors of anxiety. A systematic review identified the primary risk factors for the development of mental health disorders following earthquakes as sociodemographic characteristics such as gender, age, and education, the level of exposure to the earthquake, peritraumatic distress, low social support, a history of personal or family mental health disorders, and exposure to other forms of trauma.[32]

There is a well-established relationship between stress and fibromyalgia. A study by Gupta and colleagues demonstrated that the activity of certain endocrine pathways and neurotransmitters changes in parallel in both fibromyalgia and stress. Furthermore, it was concluded that chronic stress induces changes in various hormones and neurotransmitters, which may contribute to the pain and fatigue symptoms observed in fibromyalgia.[33] Similarly, Malt et al.[34] found an exaggerated response to stressors in 42 women diagnosed with fibromyalgia. Another study by Salaffi at al.[35] found that, in fibromyalgia patients, perceived stress levels were significantly higher after the earthquake, along with increased levels of pain and fatigue. In our own study, a correlation was found between perceived stress and fibromyalgia activity in fibromyalgia patients.

After the Great East Japan disaster, Usui et al.[6] evaluated sensitivity to traumatic stress in fibromyalgia patients and showed that fibromyalgia patients were more sensitive to chronic rather than acute stress. In a study conducted in Italy with a 6-month follow-up after the earthquake, 55 fibromyalgia patients and 49 control groups were included, and although there was no significant difference in total FIQ, FAS score and SAPS (Self-Assessment Pain Scale) between the groups at the beginning, a significant difference was found in these scores at the end of 6 months. Higher results were obtained in fibromyalgia patients who experienced an earthquake compared to those who did not experience an earthquake.[35] Our study was conducted 6 months after the earthquake with a similar number of patients, and the FIQ, PSS and EQ5D3L scores of fibromyalgia patients who were earthquake victims were found to be higher than those who were not earthquake victims. These results show that although the disease activities of fibromyalgia patients may not change after acute stress, they may worsen with chronic stress, and therefore it is important to follow up these patients.

Cognitive and behavioral coping strategies in stress management; It plays an important role in preventing psychological trauma and mental disorders.[36] It has been found that people with higher levels of optimism are more resilient to stress and have better coping methods. It is also thought that education level and social support protect mental health and help mitigate stressful situations.[37] Tang et al.[38] They examined 349 earthquake victims after the 6.5 magnitude Ludian earthquake and found that physical and mental status varied by education and age. Earthquake victims with higher education levels had better methods of coping with stress. Similarly, Khachadourian et al.[39] In a cohort study they conducted after the Spitak earthquake, they measured the quality of life of 725 earthquake victims 23 years after the earthquake using the EQ5D5L Quality of Life Scale. This study showed that people who experienced the loss of close relatives and friends and received less socioeconomic support had worse quality of life. The authors also showed that the female gender has a poorer ability to cope with stress.[28,38] In a study conducted by Oztekin et al.[40] following the February 6th earthquake in Turkiye, 418 volunteers were assessed to examine the effects of demographic characteristics on post-earthquake stress, anxiety, and depression. The findings

revealed that women experienced significantly higher levels of stress and depression compared to men following the earthquake. Considering that fibromyalgia is more common in female gender, we can say that these patients will be worse affected by traumatic events such as earthquakes.

Limitations

The limitations of our study are that PTSD was not evaluated, the number of patients was small, and other accompanying stress factors such as loss of loved ones were not questioned. Studies with improved methodology and longer follow-up periods are needed on this subject.

CONCLUSION

Although many studies investigating the effects of unexpected natural disasters such as earthquakes on the daily lives of survivors have shown an increased risk of developing chronic pain syndromes and psychological distress after natural disasters, published data on fibromyalgia patients is quite limited. In this study, we showed that the earthquake negatively affected pain, fatigue, sleep and quality of life in fibromyalgia patients. Thus, we tried to draw attention to the importance of appropriate screening, management, emotional support and mental health services for post-earthquake fibromyalgia patients.

ETHICAL DECLARATIONS

Ethics Committee Approval

The study was conducted with the permission of the Harran University Clinical Researches Ethics Committee (Date: 21.08.2023, Decision No: HRÜ/23.15.30).

Informed Consent

All patients signed and free and informed consent form.

Referee Evaluation Process

Externally peer-reviewed.

Conflict of Interest Statement

The authors have no conflicts of interest to declare.

Financial Disclosure

The authors declared that this study has received no financial support.

Author Contributions

All of the authors declare that they have all participated in the design, execution, and analysis of the paper, and that they have approved the final version.

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