


Modulating factors of fibromyalgia in women during the COVID-19 pandemic

A protocol for systematic review

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Abstract

Background: Fibromyalgia is a disease that affects mostly women and is related to stressors. The aim of this study was to assess how the Coronavirus disease 2019 pandemic has affected women with fibromyalgia.

Methods: A systematic review was conducted in the PubMed, ScienceDirect, and Springer Link databases, following the recommendations of the preferred reporting items for systematic reviews and meta-analyses statement. The methodological quality was assessed using the Joanna Briggs Institute critical appraisal tools for non-randomized studies.

Results: A total of 6 studies were included. Most results indicated a worsening in the mental health of women with fibromyalgia during the pandemic, and this in turn impacted on physical health.

Conclusion: The mental health of women with fibromyalgia was more affected during the Coronavirus disease 2019 pandemic period than that of non-fibromyalgia sufferers. This was also reflected in the worsening of symptoms and weakness in performing daily activities.

Abbreviations: COVID-19 = Coronavirus disease 2019.

Keywords: COVID-19, fibromyalgia, psychological factors, self-perceived health, woman

1. Introduction

Fibromyalgia is a complex systemic disorder which is mainly characterized by generalized musculoskeletal pain, and a number of manifestations such as poor sleep quality, increased sensitivity to pain, or fatigue, seriously affecting quality of life.^[1,2] Anxiety and depression are also commonly present in people suffering from this disease, but also in other chronic pain diseases. Thus, these mental health issues are not considered the cause of fibromyalgia, but they are related to the increase in symptoms and the discomfort.^[3,4]

In order to diagnose fibromyalgia, a diagnosis of exclusion is made, even relating it to other rheumatological or psychiatric disorders, which is a complicated task for the diagnostician. However, recent medical practice is based more on an integral approach.^[5] Studies have shown that a multidisciplinary approach is a very valid option for treating patients with fibromyalgia while improving their quality of life and psychological adaptation.^[6] In addition, 3 key aspects could be considered to classify the best way to treat these patients:

hyperalgesia, depression/anxiety, and catastrophism.^[7] In addition, fibromyalgia is a disease that affects women to a greater extent than men, with the proportion between men and women being over 90% and similar in all countries, suggesting a relationship with the genetic components linked to the female chromosome.^[4]

Due to these factors, fibromyalgia is considered a chronic fatigue syndrome, but its etiology remains unknown in its entirety.^[8] One of the most plausible origins is an alteration in the processing of pain signals in the central nervous system, which would be related to its different forms of manifestation.^[9,10] This causes an amplification of afferent pain signals and, in turn, a dysfunction of the inhibitory pathways due to an alteration in the balance between excitatory and inhibitory neurotransmitters.^[11] The presence of neuropathic pain conditions is common in about half of patients with fibromyalgia,^[12] probably conceiving a neuropathic origin of this disease, and classifying it in a subgroup of them.^[13]

Recent research has mentioned many modulating factors, such as climate change, degree of physical activity, and high

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All data generated or analyzed during this study are included in this published article [and its supplementary information files].

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stress levels, which can alter the intensity of fibromyalgia symptoms.^[14] Such factors were similar to those experienced throughout the year 2020 with the fight against the global pandemic of Coronavirus disease 2019 (COVID-19), especially regarding to the confinement stage, when an increase in anxious and depressive episodes, adjustment disorders, and post-traumatic stress^[15] occurred as a consequence of reduced social contact and leisure activities, financial concerns, and apprehensions about the health of friends and family members.^[14] Therefore, it has been proven that changes in the autonomic nervous system, along with the psychological burden effects after COVID-19, may have triggered the emergence of symptoms related to fibromyalgia in the latest years.^[10,16] In addition, women are more affected by the pay gap and by discrimination and could have, therefore, been more affected by the COVID-19 state of alarm,^[17] as well as by the higher prevalence of certain emotional symptoms such as stress, depression, and anxiety in this period.^[18] It should be noted that confinement was a stage in which gender-based violence against women by their partners, both physical and psychological, increased.^[19]

This gap in literature is of particular importance since distress is a key factor in the worsening of fibromyalgia.^[20] The increased base rate of psychological distress during the COVID-19 period could have affected the symptoms of fibromyalgia sufferers, either from a physical or mental point of view, as a response to the change in life produced by confinement and social isolation measures. The aim of this review was to evaluate how the confinement derived from the COVID-19 pandemic had affected women suffering from fibromyalgia, covering 2 areas: how their physical symptoms had evolved and how this stage had affected their psychosocial factors.

2. Methods

A systematic review was conducted following the recommendations of the preferred reporting items for systematic reviews and meta-analyses statement^[21] between March 2022 and May 2022. Keywords were obtained from the population, intervention, comparison, outcome format (Table 1), based on the research question “How has the COVID-19 pandemic affected women with fibromyalgia?.” The medical subject headings descriptors were utilized. This systematic review has been registered in PROSPERO, with code CRD42022370740. No humans nor animals were involved in this investigation, therefore, ethical approval was waived.

Finally, the keywords “fibromyalgia,” “COVID-19,” “Severe acute respiratory syndrome coronavirus-2” “pandemic,” “female,” “woman,” and “women” were selected. The search strategy was developed using the Boolean operators “AND” and “OR.”

2.1. Search strategy

The search was conducted in May 2022 in PubMed, Science Direct, and Springer Link, taking as results the publications from 2020 to 2022, both included.

Table 1

Research question and keywords. PICO format.

Population	Women suffering from fibromyalgia before the pandemic.
Intervention	State of alarm and confinement during the COVID-19 pandemic.
Comparator	Pre-pandemic health status.
Outcomes	Physical and psychological symptoms of fibromyalgia.
Research question: <i>How has the COVID-19 pandemic affected women with fibromyalgia?</i>	

COVID-19 = Coronavirus disease 2019, PICO = population, intervention, comparison, outcome.

The search strategy used in Pubmed was: (fibromyalgia [Title/Abstract]) AND (COVID-19 [Title/Abstract] OR Severe acute respiratory syndrome coronavirus-2 [Title/Abstract] OR pandemic [Title/Abstract]) AND (female [Title/Abstract] OR woman [Title/Abstract] OR women [Title/Abstract])

2.2. Selection criteria

1.2.2. Inclusion criteria.

- The study population was based on patients suffering from fibromyalgia symptoms before the onset of quarantine.
- The study population had a significant percentage of people with fibromyalgia symptoms, provided data on their condition, or showed their results differentiated from the rest.
- The study population was predominantly female or data by sex were provided.
- Focus was placed on how quarantine, state of alarm, or confinement had affected them and their fibromyalgia, regarding their physical status (pain, sensitivity to pain, poor sleep quality) or psychosocial factors (stress, anxiety, depression...).
- It was published from 2020 to 2022 inclusive.
- The studies were written in Spanish or English.
- They were cohort or cross-sectional studies.

2.2.2. Exclusion criteria.

- The study population was mainly focused on people affected by COVID-19.
- The study population included people who had first experienced symptoms of the disease after confinement.

2.3. Study selection process

One author compiled the studies during the selection process. In accordance with the inclusion and exclusion criteria, studies were pre-selected by reading the title/abstract, after removal of duplicate studies.

Of the resulting articles, several were eliminated after reading them in depth for not dealing with fibromyalgia or excluding sufferers. Studies with emphasis on people with COVID-19, and focusing on what would happen to their study population if they got infected with COVID-19 were also excluded.

2.4. Quality assessment of the studies

The methodological quality of the selected studies was double-checked by a single person using the critical appraisal tools for non-randomized studies of the Joanna Briggs institute of the University of Adelaide (Australia).^[22] These tools were used to assess the methodological quality of the studies and to determine the extent to which a study had minimized the possibility of bias in its design.

For this purpose, the 8-item cohort and 11-item cross-sectional versions were used with a cutoff point of 6 to be accepted for inclusion in the review.^[23]

3. Results

A total of 6 studies were included in the systematic review. The search for studies yielded 14 results in PubMed, 28 in ScienceDirect, and 239 in Springer Link. The studies were selected using the inclusion and exclusion criteria (Fig. 1).

Bearing in mind that these studies were conducted during the pandemic, they were mostly conducted online, with questionnaires, scales, and data collection being the main method.

Table 2 shows a synthesis of the results obtained in the different studies included in the review.^[24-29] The selected studies show assessments on how people affected with fibromyalgia evolved during the COVID-19 pandemic from a perspective focused on mental health and the evolution of symptoms, some of them also covering sleep patterns, anxiety, or fear. These studies had mostly women as study population, and those that did not meet this requirement provided data by sex. Most of the studies turned out to be cross-sectional. Due to the scarcity of studies that matched the objective, all of the selected studies were in English with a study population from different parts of the world.

Most of them seem to indicate that there is a worsening of the health in women with fibromyalgia^[24-27,29] and place greater emphasis on mental health and self-perception of health. However, the study by Koppert et al^[28] shows that their health has even improved during confinement.

In the study by Rivera et al,^[24] regular assessments of the quality of life of fibromyalgia patients were carried out with the help of 2 questionnaires: the “ICAF” (Index of Severity of Fibromyalgia), which focuses on the ability to perform daily-life activities, the level of anxiety, and that of depression, and the patient global impression of change, which gives information

about a general change after a therapeutic intervention. Data from before and after confinement were analyzed, and patients affected by COVID-19 were excluded. After the first questionnaires, the population was divided into 2 groups, 1 group that had worsened and 1 group consisting of patients who had perceived an improvement or no change in their health status. Finally, no significant changes were observed in both groups with respect to the “ICAF” questionnaire carried out before and after the pandemic, on the basis that the fact that they had worsened was more related to how they coped with their disease than to a real clinical impact.

Hruschak et al^[25] conducted a cross-sectional study that focused on examining pain severity and psychosocial factors among individuals with chronic pain during the early stages of social distancing. Numerous questionnaires were used to collect demographic, psychosocial, pain severity, and social distancing data. The results showed a significant increase in the severity of pain and on how it interfered with the performance of other activities. Among these results, fibromyalgia patients and women had higher pain severity. Among women, there was also an increase in pain interference with other activities. All these findings were related to an increase in catastrophic thinking.

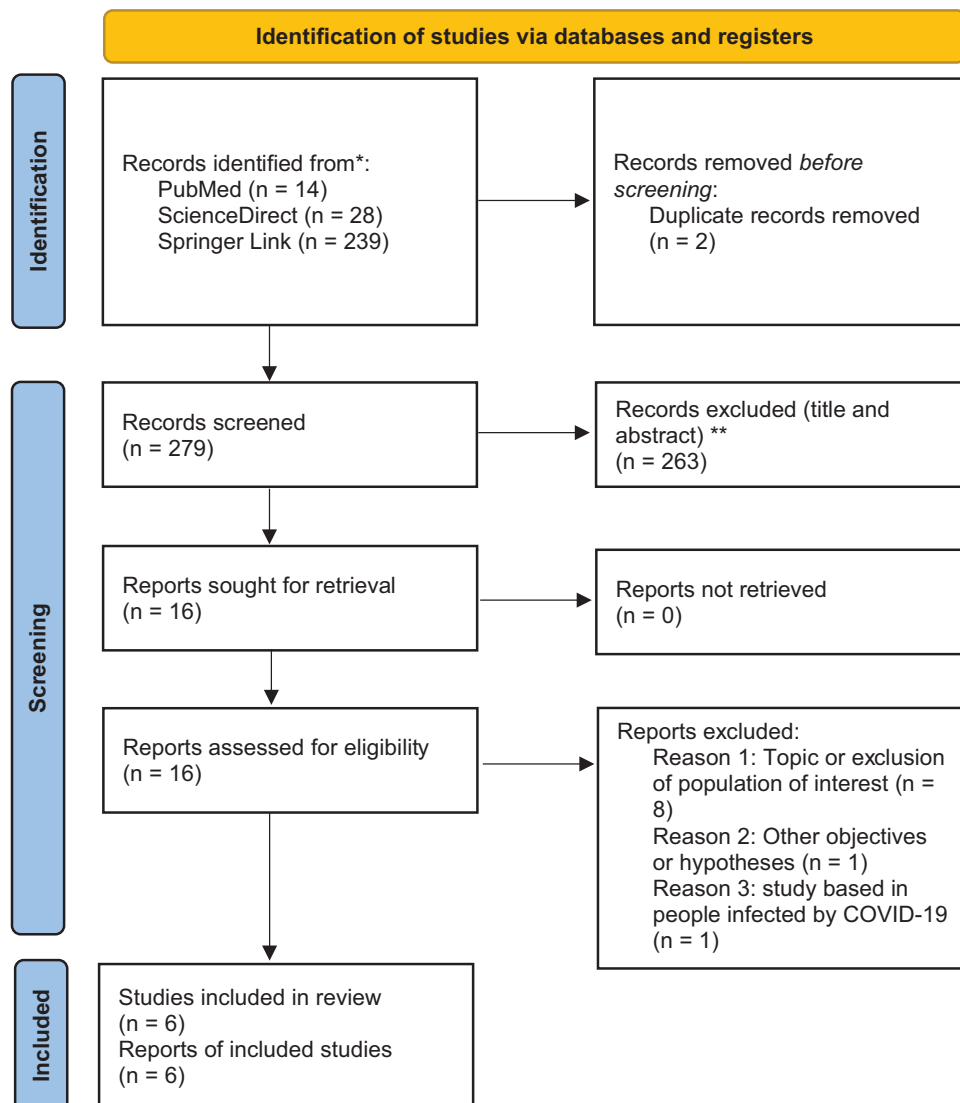


Figure 1. PRISMA flow diagram for systematic reviews which included searches of databases and registers only. PRISMA = preferred reporting items for systematic reviews and meta-analyses.

Table 2
Characteristics of the studies included in the systematic review.

Study	Type of study	Objective	Population	Method	Main findings	JBI
Rivera et al (2021) ^[24]	Cohort study.	To determine whether the severity of FM is increased by confinement measures to fight the COVID-19 pandemic.	89 patients with FM (95.5% female) residing in Spain. Only 51 patients responded.	Completion of two questionnaires: "ICAF" and "PGIC." Two groups were made, "group-worse" and "group-stable," to be compared.	Patients with FM have a worsening of perceived health and also a non-significant worsening of symptoms.	9/11
Hruschak et al (2021) ^[25]	Cross-sectional study.	To examine the severity of pain and interference among individuals with chronic pain during an early phase of social distancing and to determine the characteristics of the most impacted individuals.	150 patients with FM, post-surgical pain, and chronic back pain. Mostly Anglo-American women. Data from a medical academy in Massachusetts.	Demographic, psychosocial, social distancing, and pain questionnaires.	In patients with FM, it is found that they develop greater severity in terms of pain. In women, it is found that they develop greater severity with regard to pain and its interference with their activities. This is related with an increase in catastrophic thinking.	7/8
Ingegnoli et al (2021) ^[26]	Cross-sectional study.	To assess the psychological impact of the COVID-19 pandemic in patients with RD.	507 patients with RD from Italy, mostly women (31 had FM).	Online survey including "PSS" and "IES-R."	The results showed that patients with FM had higher values on all scales than the rest of the patients with other RD.	7/8
Macfarlane et al (2021) ^[27]	Cohort study.	To quantify the change in quality of life, disease-specific indicators, health, and lifestyle due to the COVID-19 pandemic in people with diagnoses or symptoms of musculoskeletal diseases.	1054 UK patients, including 596 with axSpA, 162 with PsA, and 296 with regional pain.	Questionnaire with validated questions, including questions for quality of life, sleep, and quantitative measurement of fibromyalgia.	Regarding fibromyalgia, a slight increase in symptoms was found, but also a slight improvement in sleep quality was detected. These results were found in both men and women.	8/11
Koppert et al (2022) ^[28]	Cross-sectional study.	To determine the mental and physical health of women with FM before and during the pandemic.	More than 500 participants in 3 phases, all Dutch women with FM.	Online questionnaire covering 8 dimensions of health. It was conducted in 3 stages and the results were compared. Normal values in women without FM were also compared.	Values were worse than normal values in women without FM, but pain and physical role improved in the second stage, and pain and physical functioning in the third stage. These improvements were low.	7/8
Cankurtaran et al (2021) ^[29]	Pilot study with cross-sectional study model.	To assess fear and anxiety produced by COVID-19 and examine its effect on disease severity, sleep quality, and mood in people with FM.	Two groups: FM group: 31 (28 women and 3 men). Control group: 31 (26 women and 5 men).	Both groups were assessed for anxiety and fear of COVID-19, sleep quality, symptom severity, and mood.	The FM group obtained significantly higher values than the control group. In the FM group, fear and anxiety produced by COVID-19 were associated with symptoms of severity, sleep quality, and anxiety levels.	7/8

axSpA = axial spondyloarthritis, COVID-19 = Coronavirus disease 2019, FM = fibromyalgia, ICAF = index of severity of fibromyalgia, IES-R = impact event scale-revised, JBI = Joanna Briggs institute, PGIC = patient global impression of change, PsA = Psoriatic arthritis, PSS = perceived stress scale, RD = Rheumatic disease.

Ingegnoli et al^[26] also conducted a cross-sectional study aimed at finding out the psychosocial impact of the COVID-19 pandemic on patients with rheumatic disorders. Patients were contacted online between May and September 2020 and asked to fill in surveys anonymously. These surveys included the perceived stress scale and the impact event scale-revised. For the PSS, higher values were associated with younger age, women, overweight people, and people with psychiatric pharmacotherapy and anxiety generated by loss of income. In the impact event scale-revised, the highest values were related to patients with bowel diseases, women, anxiety, and health concerns. A noteworthy point of this study is that people with fibromyalgia had higher values on all scales.

In the study by Macfarlane et al,^[27] performed between July and December 2020, participants were contacted to complete a questionnaire with validated questions that were compared to pre-pandemic data. Demographics, quality of life, sleep problems, COVID-19 related questions, and quantitative measurement of fibromyalgia with *Fibromyalgia severity score from the 2011 research criteria* were assessed. A slight increase in fibromyalgia symptom severity but also a slight decrease in sleep problems was detected. The values were compared between men and women, with no differences found.

Koppert et al^[28] conducted a cross-sectional study involving 3 phases in which an online survey was conducted, the first 1 in November 2018 to May 2019 (before the pandemic), and the next 2 phases from March to May 2020, extending to 2021; these were periods with large numbers of deaths and hospitalizations due to COVID-19. Participants were mostly selected through social networks and they completed the surveys on a secure university website. The Dutch version of the RAND 36-item short form health survey was used, which measured 8 dimensions of health, physical and social functioning, role limitations due to physical or emotional problems, mental health, fatigue, pain, and perceived general health, with higher values indicating better health rankings. Standard measurements were also carried out for women without fibromyalgia in order to compare results. The results showed worse health scores than the standard values, but in the second questionnaire there was a slight improvement in pain and physical role, and again a slight improvement in the longer interval, this time in pain and physical functioning.

Cankurtaran et al^[29] conducted a pilot study along the lines of a cross-sectional study. Patients were divided into 2 groups, 1 consisting of people with fibromyalgia and a control group with healthy people. Symptom severity was assessed with the

revised fibromyalgia impact questionnaire, sleep quality with the pittsburgh sleep quality index, and mood with the hospital anxiety depression scale. Fear and anxiety caused by COVID-19 were also assessed with the fear of COVID-19 scale and the Coronavirus anxiety scale. The results obtained revealed higher values in the fibromyalgia patient group and related COVID-19 anxiety and fear to worse outcomes in symptom severity, sleep quality, and mood.

4. Discussion

Changes in symptoms and in sensitivity to pain were found in the vast majority of studies.^[24,25,27-29] Also, similarities were found in how the pandemic had affected women's mental health or how they perceived their own health status.^[24-26,28,29] The studies by Koppert et al^[28] and Rivera et al^[24] can be related in this sense, as both focused on the self-perceived health of their sample and agreed that there was a perceived worsening of it. However, Rivera et al^[24] stated that the worsening of perceived health due to the pandemic was similar to that of people with other chronic diseases. The study by Hruschak et al^[25] also discussed catastrophic thinking, which had increased in people with fibromyalgia and was related to a reduced self-perception of health.

Regarding women's sleep quality, similar low results appeared between the studies by Cankurtaran et al^[29] and Macfarlane et al^[27] However, although the assessments were similar, discrepancies could be found. The study by Cankurtaran et al^[29] stated that patients with fibromyalgia showed an increase in sleep problems during the pandemic, manifested by decreased sleep quality. In contrast, the study by Macfarlane et al^[27] explained that sleep problems were reduced, albeit to a small extent, and justified this by a greater amount of time and better sleep patterns. This may be due to the different scales used to measure it, as 1 deals with quality and the other with time and sleep patterns.

Nonetheless, in the studies by Cankurtaran et al^[29] and Macfarlane et al,^[27] their results showed that fibromyalgia symptoms showed a general increase in severity, with the study by Macfarlane et al^[27] being the only 1 to confirm that there was no difference in the results between men and women, as in this study data were collected from both groups and compared. In addition, the study by Rivera et al^[24] stated an increase in symptoms, but also claimed that these were not significant as there was no clinical impact and that they proved to be more related to mental health and how patients perceived it than to the symptoms themselves. It should be noted that this study already had data on patients before the pandemic.

In the study by Hruschak et al,^[25] it was observed that patients with fibromyalgia had a greater severity of pain than other patients with chronic pain, and it was also highlighted that being a woman was also a factor related to this increase in pain. In general terms, the study focused on how the pandemic had increased the severity of pain in these patients, and it concluded by mentioning measures for improvement to avoid the possible worsening of symptoms.

Contrary to the previous studies is the research by Koppert et al,^[28] which stated as a result that far from what might be expected during the pandemic, the severity of symptoms remained the same and even improved in some of the patients. The main difference between these studies is that in Koppert et al^[28] no specific survey was applied for symptoms, but instead several health variables were taken into account. However, in the other studies, that is, Cankurtaran et al,^[29] Hruschak et al,^[25] Ingegnoli et al,^[26] Macfarlane et al,^[27] and Rivera et al,^[24] specific surveys were applied for the symptom or pain variables.

Overall, all those who reported a worsening of symptoms or pain, whether significant or not, attributed this largely to

psychosocial factors and mental health. These psychological factors are specially reinforced by the studies by Koppert et al^[28] and Rivera et al^[24] Also, as far as mental health is affected, all studies agreed that there was a worsening in people affected by fibromyalgia. The studies by Cankurtaran et al^[29] and Ingegnoli et al^[26] emphasized a significant increase in anxiety during the pandemic in people affected by fibromyalgia, and specifically the study by Ingegnoli et al^[26] also mentioned that women suffered the most this increase in stress and anxiety. As a special feature, the study by Cankurtaran et al^[29] also evaluated how fear of COVID-19 had increased, showing a tendency to increase in people with fibromyalgia and relating it directly to the worsening of other health variables.

4.1. Limitations of the review

The reason for conducting the systematic review with only 6 studies is based on the scarcity of studies related to the main objective and inclusion criteria, as many studies found during the first searches dealt with how suffering from COVID-19 affected patients with rheumatic diseases but left out the psychological aspect and the possible physical problems triggered by the change in lifestyle during the pandemic confinement. Furthermore, women were selected as the main study population because they are the most affected by fibromyalgia, which is why the studies presented below have a significantly high percentage of women or separate and compare the results between sexes. Nevertheless, the number of studies that did not meet this characteristic was also significantly low.

In line with this, the results of this review should be considered with caution given a number of limitations. To begin with, the most significant 1 is the paucity of eligible studies. Consequently, even by broadening the spectrum of the search, no more studies were found that matched the objectives of this study. Secondly, not having a larger number of studies did not provide an overview of a population in this particular area. Finally, all the studies used different measurement instruments and, although they can be associated, the results obtained could be more homogeneous if they had used similar measurement criteria.

5. Conclusion

Overall, a deterioration in health status during the COVID-19 pandemic could be observed in women with fibromyalgia. Only 1 study was largely opposed to this.

The mental health of women with fibromyalgia was more affected during the COVID-19 pandemic period than that of non-fibromyalgia sufferers. This was also reflected in the worsening of symptoms and weakness in performing daily activities.

Although the evolution of COVID-19 is favorable worldwide, multiple variables related to psychological health and the response to stressors seem to have triggered symptomatologic responses in fibromyalgia patients. Therefore, further studies on the relationship of mental health and fibromyalgia are needed to be able to conclude more accurate results.

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