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Fatigue, mental health and sleep quality during the COVID-19 pandemic in Brazilian women with rheumatological diseases: comparative study

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Article

Keywords: Women's health, Rheumatology, Quality of life, Public health

Posted Date: August 27th, 2026

DOI: https://doi.org/10.21203/rs.3.rs-9546156/v1

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Additional Declarations: No competing interests reported.

Abstract

Introduction: The COVID-19 pandemic generated worldwide changes, including social distancing with still unknown impacts, since most people have never experienced such a situation. Some studies indicated health damage in different populations. Implications resulting from the pandemic also occurred in the female population, which has the highest prevalence of rheumatological diseases, and it showed difficulties in accessing health services, social participation, worsening sleep quality, and mental health symptoms.

Objectives: The objective of this study was to evaluate the quality of sleep, fatigue, and mental health symptoms in women with rheumatologic diseases, during the pandemic period compared with a healthy group.

Methods: This was an online cross-sectional survey. Brazilian women with and without rheumatologic diseases, aged 18 to 65 years, participated in this study. In an online questionnaire, composed of questions from the Pittsburgh Sleep Quality Index, Fatigue Severity Scale and Hospital Anxiety and Depression Scale, we sought to evaluate the proposed outcomes. Data were descriptively analyzed, and the groups were compared using the chi-square test for categorical variables and the Mann Whitney test for quantitative variables. Within the group of women with rheumatological diseases, the chi-square test was used for comparison between the types of disease: degenerative, autoimmune, and fibromyalgia. The significance level was 5%.

Results: Women with rheumatological diseases showed lower outcomes of sleep quality, fatigue, and mental health (anxiety, depression and anxiety and depression) when compared to the healthy group ($p<0.01$). Among the group of women with rheumatologic diseases, fibromyalgia also decreased all evaluated outcomes ($p<0.01$).

Conclusion: During the COVID-19 pandemic in Brazil, women with rheumatological diseases experienced worse sleep quality, fatigue and mental health conditions compared to women without rheumatological diseases. Women with fibromyalgia were the most affected in all evaluated outcomes.

1. INTRODUCTION

The official declaration of a pandemic by the World Health Organization led safety and behavioral measures to be adopted with the aim of containing the spread of COVID-19, with emphasis on social distancing [1, 2, 3]. This measure, although necessary, has caused impacts in several areas for the world population, such as the loss of social skills, financial difficulties, access to health, among others, negatively impacting physical and psychological health [4, 5].

Individuals who have rheumatologic diseases (RD) have experienced difficulties in the pandemic, with an important concern regarding their treatments, commonly performed with immunosuppressants and

disease-modifying drugs [6, 7, 8], in addition to interruptions or decreases in the number of consultations, health treatments, and lack of medicines [9].

RD has an impact on different life contexts, such as quality of life, sleep, pain or discomfort, mobility, and mental health issues such as worry, exhaustion, stress [10, 11]. In addition, compared to women without chronic diseases, women with RD report higher levels of stress, tiredness, and a worse perceived physical health status, factors that are directly linked to overall health status and well-being [12, 13].

During the COVID-19 pandemic, Brazilian women showed worsening in the symptom of fatigue, this symptom was also associated with depression, anxiety, and worsening sleep quality in the first year of the pandemic [14]. These data raised the need for further investigation of these aspects in women with RD, who may present an even more important worsening, since the disease itself is already a factor that compromises several aspects of these women's lives.

Thus, the objective of this study was to evaluate the impact of the COVID-19 pandemic period on sleep quality, fatigue, and mental health in women with RD compared to healthy women. This study also aimed to evaluate, among some categories of RD (inflammatory, degenerative diseases, and fibromyalgia), whether there is any group or disease that may have a worse impact in relation to the outcomes evaluated.

2. METHODS

2.1 Study design

This is a cross-sectional observational study that was conducted at the Department of Physical Therapy of the Federal University of São Carlos (UFSCar).

This study followed the recommendations of the Checklist for Reporting Results of Internet E-Surveys (CHERRIES) [15]. The data collection timeframe was from March to September 2020.

2.2 Recruitment process and description of sample

An open survey was conducted in the form of an online questionnaire through the Google Forms platform to collect data from the participants. To be included in this study, the participants had to be female, aged between 18 and 65 years old, and self-reported rheumatologic disease. The participants were divided into two groups: DR group (GDR) and control group (CG).

Participants were recruited through social media (Instagram and Facebook) and the press. Links, digital folders, and calls were sent on social networks, in groups of women with RD, and through articles and interviews in local newspapers and magazines.

Statement on the Participation of Human Subjects in Research

The study was submitted to and approved by the Human Research Ethics Committee of the Federal University of São Carlos (CAAE No. 36469420.1.0000.5504). The research was performed in accordance with Declaration of Helsinki. All volunteers signed a formal free and informed consent form (ICF), online, prior to completing the questionnaire. After completing the questionnaire, a copy of this term signed by the researchers was sent to all participants. All data were used exclusively for the benefit of science and measures regarding the preservation and sharing of these data were carried out to maintain the confidentiality and security of the participants.

2.3 Procedures

The participants who agreed to participate in the research had a link available that gave access to the online questionnaire on the Google Forms platform. The online questionnaire was divided into 6 sections, as described below:

Section 1

presentation of the research and ICF, which should be consented so that it could be moved on to the next section;

Section 2

questions regarding personal data (name, age, email, telephone number, occupation, anthropometric data), identification of RD, diagnosis of COVID-19 or if someone close to the participant was diagnosed or died from this disease;

Section 3

questions extracted from the Pittsburgh Sleep Quality Index [16] that evaluates the participant's sleep quality in the last month;

Section 4

questions referring to the Fatigue Severity Scale [17] to assess the participant's fatigue status during the previous week;

Section 5

questions that aimed to assess the participant's mental health status, which were extracted from the Hospital Depression and Anxiety Scale [18];

Section 6

acknowledgments for participating in the research and contacting the researcher by phone and e-mail for any questions and suggestions.

After the end of the questionnaire, the answers were sent and stored in a specific "answers" tab on the Google Forms platform, where only the main researcher had access. No data was collected or stored if the participant had given up answering the questions in the middle of the questionnaire or if the participant contacted the researcher requesting the removal of his participation, without causing him any harm. All ethical precepts in research with human beings were adopted and guaranteed to the participant through the ethics committee of the institution of this research.

2.4 Data analysis

The data were analyzed descriptively, by calculating absolute and relative frequency, means, and standard deviation. The comparison between the groups with and without RD was performed using the Chi-square test for categorical variables and the Mann Whitney test for quantitative variables (non-normal distribution in the Kolmogorov Smirnov test). Subsequently, women with RD were subdivided into three categories: women with degenerative diseases (low back pain, osteoarthritis, and osteoporosis), women with autoimmune diseases (rheumatoid arthritis, systemic lupus erythematosus, Sjögren's syndrome, scleroderma, psoriatic arthritis, and spondyloarthritis); and women with fibromyalgia. The three subgroups were compared using the Chi-square test. All analyses were performed using the IBM SPSS Statistics for Windows, Version 19.0 software. Armonk, NY, USA and the level of significance adopted was 5%.

3. RESULTS

The sample consisted of 650 women, 400 (61.5%) without rheumatologic disease (CG) and 250 (38.5%) with rheumatologic disease (RG), whose demographic data are presented in Table 1. The study had the participation of women from all Brazilian regions.

Table 1
Sociodemographic characteristics of the women evaluated (n = 650) separated according to groups. Data are presented in absolute and relative frequency [n(%)] unless otherwise indicated .

Features	**Total**		**GDR**		**GC**		***P***
	n	**%**	**n**	**%**	**n**	**%**	
Age [mean (SD)]	35,3	12,7	42,4	11,5	30,9	11,4	< 0.01
BMI [mean (SD)]	26,6	5,9	28,4	5,8	25,6	5,7	< 0.01
Color/Race							< 0.01
White	442	68,5	154	61,6	288	72,9	
Black/brown/indigenous/yellow	203	31,5	96	38,4	107	27,1	
Region							< 0.01
North	16	2,5	7	2,8	9	2,3	
Northeast	39	6,0	20	8,0	19	4,8	
Midwest	26	4,0	16	6,4	10	2,5	
Southeast	494	76,0	161	64,4	333	83,3	
South	75	11,5	46	18,4	29	7,2	
Education							< 0.01
EFI	9	1,4	6	2,4	3	0,8	
OBE	13	2,0	9	3,6	4	1,0	
EMI	14	2,2	10	4,0	4	1,0	
EMC	114	17,5	78	31,2	36	9,0	
ESI	164	25,2	40	16,0	124	31,0	
ESC	336	51,7	107	42,8	229	57,3	
(PE = elementary school; EM = high school; ES = higher education; I/C = incomplete/complete)							

There was a statistical difference between the two groups for all the sociodemographic data collected. The average GDR was higher in relation to age (42.4 years), while the average for the CG was 30.9 years. BMI was also higher in the GDR (28.4 kg/cm2).

The CG had a higher percentage of white women (72.9%) when compared to the GDR (61.6%), with a significant difference ($p < 0.01$). Regarding the level of education, there was a significant difference between the two groups evaluated ($p < 0.01$), and in both the highest rate of women had completed higher education.

The comparison between the groups for sleep quality, fatigue, anxiety, depression, and diagnosis of COVID-19 is presented in Table 2. A difference was found between the groups for the number of women who reported changes in sleep, fatigue, anxiety, depression, and anxiety and depression, and the proportion of women with these conditions was higher in the GDR. There was no significant difference between the groups in relation to the diagnosis of COVID-19 by themselves or someone close to them, as well as the occurrence of death from the disease ($p > 0.05$).

Table 2
Comparison between groups for COVID-19 diagnosis, sleep quality, fatigue, anxiety, depression and anxiety, and depression

Features	**Total**		**GDR**		**GC**		***P***
	n	**%**	**n**	**%**	**n**	**%**	
COVID diagnosis	58	8,9	29	11,6	29	7,2	0,06
Diagnosis of COVID in a close person	367	56,5	137	54,8	230	57,5	0,50
Death of a close person due to COVID	67	10,3	28	11,2	39	9,8	0,55
Poor sleep or sleep disorder	563	86,6	230	92,0	333	83,3	< 0.01
Fatigue	515	79,2	229	91,6	286	71,5	< 0.01
Anxiety	492	75,7	227	90,8	265	66,3	< 0.01
Depression	396	60,9	214	85,6	182	45,5	< 0.01
Concomitant anxiety and depression	371	57,1	206	82,4	165	41,3	< 0.01

There was a significant difference between the groups for all outcomes evaluated, with the scores being worse in the GDR ($p < 0.01$). Poor sleep or sleep disturbance was present in 92% of the GDR and in 83% of the CG. Fatigue was 91.6% in the GDR and 71.5% in the CG.

For the mental health outcomes, anxiety symptoms were the most frequent, with 90.8% of the women in the GDR reporting this symptom. Depression was reported by 85.6% of the women in the GDR and in 45.5% in the CG. The women who presented symptoms of anxiety and depression together were 82.4% in the GDR and 41.3% in the CG.

Table 3 presents a comparison between the subgroups according to the types of RD: autoimmune diseases (e.g., systemic lupus erythematosus), fibromyalgia, and degenerative diseases (e.g., osteoarthritis) for the outcomes of sleep quality, fatigue, mental health, and diagnosis of COVID-19.

Table 3
Comparison between groups for COVID-19 diagnosis, sleep quality, fatigue, anxiety, depression, and anxiety and depression

Features	Autoimmune disease		Fibromyalgia		Degenerative disease		*P*
	n	%	n	%	n	%	
COVID diagnosis	10	8,9	12	16,7	7	10,6	0,27
Diagnosis of COVID in a close person	67	59,8	37	51,4	33	50,0	0,35
Death of a close person due to COVID	13	11,6	10	13,9	5	7,6	0,49
Poor sleep or sleep disorder	103	92,0	70	97,2	57	86,4	0,06
Fatigue	101	90,2	69	95,8	59	89,4	0,30
Anxiety	97	86,6	72	100,0	58	87,9	**< 0.01**
Depression	89	79,5	69	95,8	56	84,8	**< 0.01**
Anxiety and depression	83	74,1	69	95,8	54	81,8	**< 0.01**

The most frequent RDs were autoimmune diseases (n = 113; 45.2%), followed by fibromyalgia (n = 72; 28.8%) and degenerative diseases (n = 65; 26%). Among these groups, there was no significant difference ($p > 0.05$) for the diagnosis of COVID-19, close people diagnosed with COVID-19, and close people who died from COVID-19. There was a difference between the groups in relation to the proportion of women with anxiety, depression, and anxiety associated with depression, and the proportion of these conditions was higher in the group with fibromyalgia ($p < 0.01$).

4. DISCUSSION

This study aimed to evaluate, during the pandemic period, the quality of sleep, fatigue, and mental health of women with and without RD, and to investigate within the group of diseases, which would have greater impairments in relation to the outcomes evaluated. The results indicated that women with RD, whether degenerative, autoimmune, or fibromyalgia, had worse outcomes when compared to the group of women without RD. It was also possible to notice worse outcomes in women with fibromyalgia when compared to other types of RD.

The study by Molteni et al. demonstrated that patients with RD did not have worse outcomes regarding the duration of the disease and symptoms for COVID-19 disease [19], but there is a concern regarding individuals who use high doses of glucocorticoids and who have compromised immune systems, which

is common in this population, which categorizes autoimmune patients with RD as a risk group [20, 21, 22]. The present study found no difference between the groups in relation to having been diagnosed with COVID-19, although it is a fact that we should look at with caution because it is not possible to determine whether there was a higher number of hospitalizations in women with RD who were diagnosed with COVID-19 or even if they died.

A study that evaluated the behavior of patients with RD during the pandemic pointed to moderate knowledge about the pandemic, in addition to more than 25% of participants notoriously noticing a worsening of their diseases and more than two-thirds of these made changes in their usual medication or its interruption [23]. It is known that there are factors related to a worsening in general quality of life and stressful factors, caused by the pandemic in the rheumatological population, which ended up triggering complex reactions at the molecular level that are linked to a reaction called "unhealthy behavior", which in general, increases the levels of several stress signals, such as interleukins, which can determine, for example, sleep disorders [24]. One study found a worsening in sleep quality through the Insomnia Severity Index in patients with systemic lupus erythematosus compared to a control group, and in patients with inflammatory RD [25]. These data are in line with our findings that point to lower sleep quality scores in women with RD when compared to women without these diseases during the pandemic period.

Fatigue is a prevalent symptom among people with RD [26]. RD individuals showed increased fatigue levels during the COVID-19 pandemic [27], in addition to other factors that compromise well-being, which can exacerbate fatigue levels in this population [28]. In addition, patients with rheumatoid arthritis in social isolation and who practiced physical activity during the pandemic had lower levels of fatigue when compared to patients with the same disease who did not perform any physical activity [29]. This study found that women with RD had higher levels of fatigue when compared to the group without RD, however, the level of physical activity among the study participants was not evaluated, which limits us to attribute our findings to the consequences of the disease, or to this factor associated with the limitations imposed by the pandemic. However, the rate of women who have RD and who experienced fatigue during the pandemic is significant, as shown in the study by Manusco et al., 2020 [30].

Regarding mental health, several studies point to a worsening of this condition in patients with different RD during the pandemic [9, 31]. Patients with arthritis had a high level of emotional distress and depression during the pandemic [32]. A worsening of mental health was also found, with high levels of depression and anxiety in patients with systemic lupus erythematosus when compared to a control group without this disease [33]. Tee et al. [34] found levels of moderate to severe anxiety in 38.7% and moderate to severe depression in 27% in patients with lupus and rheumatoid arthritis. All these data corroborate the findings of the present study since we found high frequencies of mental health problems, such as anxiety, depression and anxiety, and depression in the group of women with RD. Factors such as fear of infection, the presence of comorbidities, or falling into a risk group, caused fibromyalgia and rheumatoid arthritis individuals to present high levels of depression and anxiety in the pandemic [35, 36]. Thus, it is possible that the impairment of these women's mental health may be

related to the fact that, in addition to having to deal with their own disease and its signs and symptoms, they began, during the pandemic, to have to worry about issues related to COVID-19 infection and how much this could further compromise their current health condition, in addition to possible worse outcomes.

A study in which 233 patients with fibromyalgia during the pandemic evaluated 233 patients with fibromyalgia during the pandemic showed that they have higher scores in relation to anxiety and depression, in addition to these outcomes being correlated with higher levels of pain, sleep disturbance, and subjective perception of deterioration [37]. In addition, the study shows that avoidant coping style during the pandemic was strongly associated with higher levels of anxiety, depression, sleep disturbance, and pain levels [37]. The worsening of symptoms such as pain, depression, anxiety, in addition to the reduction in the level of physical activity, leading to the worsening of the impact of the disease were found in other studies in patients with fibromyalgia [38, 39]. These data support the findings of this study regarding the worse levels of mental health and sleep quality in patients with RD, including those with fibromyalgia.

Inanucelli et al. (2021) [40] evaluated mental health in patients with rheumatoid arthritis, fibromyalgia, and a control group and identified that patients with fibromyalgia were those with emotional disorders, 36.7% of anxiety levels requiring psychiatric attention in patients with fibromyalgia and 50% of depression levels, followed by patients with rheumatoid arthritis (14.6% and 17.1%) and finally the control group without diseases (12.5% and 15%). Thus, it can be suggested that the stress caused by the pandemic may have aggravated the symptoms in the fibromyalgia group, a disease that is already known to be directly linked to mental health impairment.

The findings of this study demonstrate the importance of looking at biopsychosocial aspects in women with RD, since the results point to impairment in all outcomes evaluated during the pandemic period. In addition, intervention measures are essential to minimize the impacts that may have been caused by the COVID-19 pandemic. It is also noteworthy that despite the significant difference between the groups, high levels of sleep disorders and fatigue were found in women without RD, data that raise concern in relation to the population of women in general during the pandemic.

The limitations of this study are the lack of evaluation of other aspects that are considered important during the pandemic period, such as pain, level of physical activity and quality of life of women. As a strong point, it can be pointed out that the sample was significant and nationally representative, which provides a broader view of the Brazilian female population with and without RD during the pandemic.

It is important to emphasize that it cannot be stated that the losses presented in the outcomes are exclusively linked to the pandemic, for this, an evaluation prior to the arrival of COVID-19 would be necessary. Therefore, it is suggested that post-pandemic studies can investigate the prevalence of these aspects in the female population, whether with or without RD, and use the present study as a comparison for this.

It is concluded that women with RD during the period of the COVID-19 pandemic in Brazil had worse outcomes in relation to sleep quality, fatigue and mental health, especially women with fibromyalgia, when compared to women without these conditions in Brazil, during the same period.

Declarations

Compliance with Ethical Standards

Ethics approval and informed consent

The present study was approved by the Ethics Committee for Research on Human Beings of University Federal of São Carlos nº CAAE 36469420.1.0000.5504. All volunteers had to sign a free and informed consent for, prior to the evaluation.

Consent for publication

All authors are aware of and authorize the publication of this manuscript.

Competing interests

All authors declare no conflicts of interest in this work.

Funding

This study was financed in part by the Coordenação de Aperfeiçoamento de Pessoal de Nível Superior - Brasil (CAPES) - Finance Code 001

Author Contribution

GBS and PRMSS conceived the work; GBS, as the main author, wrote the manuscript, collected data through an online questionnaire, and organized the main results; ACSB and CC made important contributions during the work, which contributed substantially to the final result, as did TOS, who also performed the statistical analysis of the data. All authors read, offered suggestions, and made corrections to the manuscript.

Acknowledgement

We would like to thanks to the Coordenação de Aperfeiçoamento de Pessoal de Nível Superior – Brasil (CAPES). The authors also appreciate the involvement of the participants in this study.

Data Availability

The authors declared that the data is available and the principal author, Gabriel Bernardi dos Santos, should be contacted if someone wants to request the data from this study.

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