

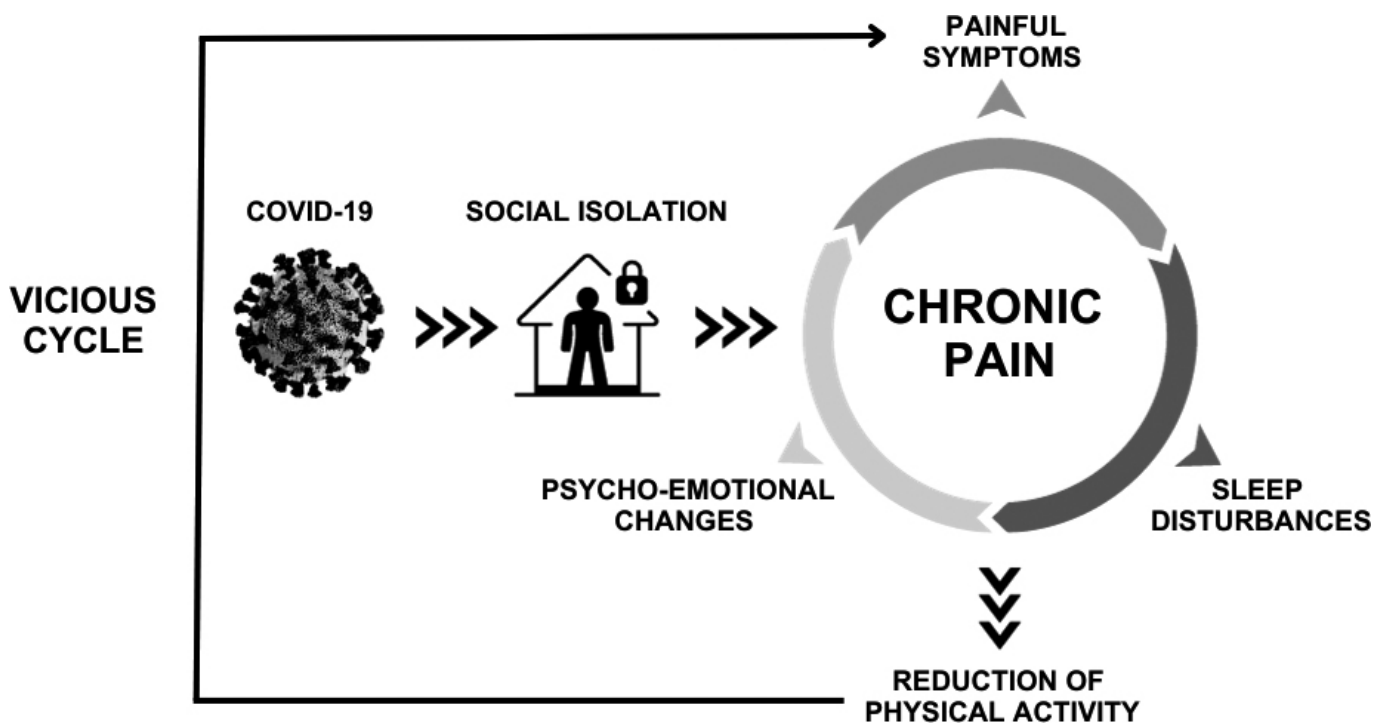
Influence of the COVID-19 pandemic on sleep quality, psychosocial aspects, and physical activity levels in patients with chronic pain in Brazil: COVIDor cross-sectional study

Influência da pandemia de COVID-19 na qualidade do sono, em aspectos psicoemocionais e no nível de atividade física de pacientes com dor crônica no Brasil: estudo observacional COVIDor

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GRAPHICAL ABSTRACT



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ABSTRACT

BACKGROUND AND OBJECTIVES: The social distancing of COVID-19 pandemic exacerbated symptoms of chronic pain patients. Furthermore, it is necessary to consider the sociocultural context of coping with the pandemic in different countries. The objective of this study was to evaluate pain, psychoemotional symptoms, sleep quality, and level of physical activity in chronic pain patients during the COVID-19 pandemic in Brazil.

METHODS: Individuals with fibromyalgia, migraine and chronic low back pain were included. The survey was performed through a questionnaire elaborated by researchers on the Forms application, from Google Drive, in the period between October 2020 and March 2021, with straight and clear questions about pain, psychoemotional aspects, sleep quality, and level of physical activity. Binary or multinomial logistic regression analysis was performed to identify possible predictors.

RESULTS: 973 people were evaluated, 63.5% had fibromyalgia, and 98.3% were female. Anxiety increased the odds ratio in 395% of chronic pain patients to feel pain (β : 1.375; OR: 3.956; $p=0.001$) and a greater intensity of pain increases in 62.3% the chance of these individuals not performing physical activity (β : -0.474; OR: 0.623; $p=0.001$). Pain intensity increased the odds ratio of having insomnia by 186.9% (β : 0.625; OR: 1.869; $p=0.001$) and the chance of taking sleep drugs by 160.4% (β : 0.472; OR: 1.604; $p=0.001$).

CONCLUSION: The social isolation of COVID-19 pandemic maximized the vicious cycle between painful symptoms, anxiety, and sleep disorders in chronic pain patients in Brazil. The intensification of these factors is associated with the reduction of physical activity levels.

Keywords: Anxiety, Chronic pain, COVID-19, Physical activity, Sedentary behavior, Sleep quality.

RESUMO

JUSTIFICATIVA E OBJETIVOS: A pandemia de COVID-19 exacerbou os sintomas de pacientes com dor crônica. Porém, é necessário considerar o contexto sociocultural de enfrentamento da pandemia nos diferentes países. O objetivo deste estudo foi avaliar a dor, os sintomas psicoemocionais, a qualidade do sono e o nível de atividade física em pacientes com dor crônica durante a pandemia de COVID-19 no Brasil.

MÉTODOS: Foram incluídos indivíduos com fibromialgia, enxaqueca e dor lombar. O levantamento foi realizado por meio de questionário elaborado pelos pesquisadores no aplicativo *Forms*, do *Google Drive*, entre outubro de 2020 e março de 2021, com perguntas diretas e claras sobre dor, aspectos psicoemocionais, qualidade do sono e nível de atividade física. Análise de regressão logística binária ou multinomial foi realizada para identificar possíveis preditores.

RESULTADOS: Foram avaliadas 973 pessoas, 63,5% apresentavam fibromialgia, sendo 98,3% do sexo feminino. A ansiedade aumentou a razão de chances em 395% dos pacientes com dor crônica sentirem dor (β : 1,375; OR: 3,956; $p=0,001$) e a dor aumentou em 62,3% a chance desses indivíduos não realizarem atividade física (β : -0,474; OR: 0,623; $p=0,001$). A intensidade da dor aumentou a razão de chances de ter insônia em 186,9% (β : 0,625; OR: 1,869; $p=0,001$) e a chance de tomar fármacos para dormir em 160,4% (β : 0,472; OR: 1,604; $p=0,001$).

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HIGHLIGHTS

- Social isolation of COVID-19 pandemic maximized painful symptoms in chronic pain.
- COVID-19 pandemic exacerbated anxiety and reduced sleep quality in chronic pain.
- These factors were associated with the reduction of physical activity levels.

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CONCLUSÃO: O isolamento social da pandemia de COVID-19 maximizou o ciclo vicioso entre sintomas dolorosos, ansiedade e distúrbios do sono em pacientes com dor crônica no Brasil. A intensificação desses fatores está associada à redução de atividade física.

Descritores: Ansiedade, Atividade física, Comportamento sedentário, COVID-19, Dor crônica, Qualidade do sono.

INTRODUCTION

The coronavirus (COVID-19) pandemic caused by the infection with the SARS-Cov-2 virus, beginning at the end of 2019, caused high infection and mortality rate throughout the world¹. However, the required measures to contain the spread of the virus brought other public health problems. Some researchers suggest that the period of social distancing and the uncertainties regarding the pandemic scenario, caused a worsening in the physical, behavioral, and psychological aspects of the population^{2,3}. In addition, the worsening of pre-existing chronic diseases was observed, possibly linked to difficulty in accessing public health services^{4,5}.

Among these studies, some have shown the influence of the pandemic on patients with pre-existing chronic pain, such as fibromyalgia, low back pain, and migraine⁶⁻⁸. It is suggested that the stress and crisis condition of this period made these patients more susceptible to exacerbation of pain, worsening of psycho-emotional aspects, such as anxiety and sadness, of sleep quality, such as insomnia and non-restorative sleep, and of functionality, such as reduced ability to perform activities of daily living^{6,8-12}. Therefore, it is evident the need for health professionals to adapt to the management of this population during and after the pandemic¹³.

Moreover, sedentary behavior and physical inactivity, aggravated by the quarantine^{14,15}, increased the recommendation of the practice of physical exercises at home to mitigate the impact on pain, physical and mental health¹⁵. Nevertheless, this practice for patients with chronic pain (CP) results in barriers such as fear and avoidance of movement and low self-efficacy^{16,17}, revealing the need for more assertive treatment strategies to improve exercise adherence in these patients.

However, it is important to note that COVID-19 did not occur in a similar way in the world, and that mortality, quarantine adherence and socioeconomic measures were different among countries^{1,18}. In addition, the sociocultural characteristics of each country interfered in the population's coping with the pandemic. In Brazil, the first reported case of coronavirus infection was on February 26, 2020, and since then there were more than 35 million cases and more than 689,000 deaths¹. Although, contamination rates, adherence to isolation measures, overcrowding of health services and economic assistance to the population were different among Brazilian states¹⁹⁻²¹.

This fact is of great relevance when dealing with patients with CP. Recent research has shown that cultural and social aspects have considerable relationship with self-management, vigilance and limiting beliefs of these individuals^{17,22,23}. Therefore, it is necessary to understand the influence of the COVID-19 pandemic on CP considering the pandemic scenario in different countries. This fact is important for mapping the impact of pandemic worldwide.

That said, the objective of this study, called COVID-or (“dor” is pain in Portuguese), was to evaluate the characteristics of pain, the perception of psycho-emotional symptoms, the state of sleep quality and the level of physical activity in patients with CP during the COVID-19 pandemic in Brazil.

METHODS

This is an epidemiological, observational, and cross-sectional study. The research was developed in the period between October 2020 and March 2021, being accepted by the Ethics and Human Research Committee of the Federal University of Sergipe (UFSE) (CAAE: 30901720.2.0000.5546) and redirected to the National Research Council (CONEP), respecting the research standards with COVID-19 in the Brazilian territory. In addition, only participants who agreed to participate in the experiment by reading and signing the Free and Informed Consent Term (FICT) had their data collected.

Participants

The sample consisted of Brazilian participants of both genders, without age restriction and who had a pre-existing diagnosis of CP. Volunteers were invited to participate in the study through a questionnaire link made available on LAPENE's social networks (@lapene.ufs) and by wide dissemination in other networks.

There were no exclusion criteria regarding associated comorbidities, treatment time, or previous treatments, drug use, etc. This type of data collection is due to the possibility of determining population strata, psychosocial scopes, and generation of domains for further data analysis.

Data collection instrument

The methodology of this study was tested in the authors' previous study with 85 patients with CP in the state of Sergipe, Northeast region of Brazil²⁴.

The data acquisition was done through a digital questionnaire available via Forms tool, belonging to the Google® Network, and developed in Brazilian Portuguese, the vernacular language of the sample. The questions were formulated according to group consensus and experience with data from clinical trials focused on CP, previously conducted at Neuroscience Research Laboratory (LAPENE) of UFS. The questionnaire consisted of a single block of questions covering the domains described in the study variables.

After creating the questionnaire on the platform, an electronic link was generated, which was initially tested by 10 people with CP invited to participate through on LAPENE's social networks, to ensure ease of filling out the answers and, later, could be easily accessed through any internet provider. The tool also assured the user confidentiality of information and high data storage capacity.

Study variables

The questionnaire had 100 questions distributed in discrete and categorical variables, with multiple choice answers (via supplementary material). For example, it was asked: “Do you think

your pain has increased in the last week”? With the following alternatives: a) Yes, b) No, and: “During this period, how much did anxiety interfere with your activities (such as homework, study)?” With the following alternatives: a) Did not interfere, b) A little, c) Moderately, d) A lot. In addition, to ensure reliability and understanding of the questions by the volunteers, it was sought to maintain a clear and objective language pattern, in addition to popular sentences in the evaluation of individuals with CP, such as the 11-point pain scale²⁴.

The present study had as dependent variable the intensity of pain, in addition, the independent variables level of physical activity, anxiety, quality of life, quality of sleep, depression, appetite, socioeconomic factors, regarding employment, housing and social conditions.

Generating charts and spreadsheets

All data collected was automatically allocated to Google® spreadsheets. With these spreadsheets, it was possible to generate percentiles through this tool. However, all data were studied using descriptive statistics.

Statistical analysis

Initially, the authors performed descriptive statistical analysis through the relative and absolute frequencies of the sample or measures of central tendency and dispersion. Then, the chi-square test of independence was performed to identify the association (relationship) of the dependent variables (frequency and intensity of pain), in addition to the psychoemotional state, quality of life and sleep with the independent variables of social isolation and practice of physical activity.

Then, binary logistic regression analysis was performed when the outcome variable was dichotomous or multinomial logistic regression analysis when the outcome variable had more than two categories. Such regressions were used to identify possible predictors of frequency and intensity of pain, psychoemotional state and quality of life and sleep during social isolation and possible decrease in physical activity. Finally, the effect size (Cohen's d) is presented. The significance level used was $p \leq 0.05$ and the data were analyzed with the *SPSS Statistics 22 software* (SPSS Inc.®, Chicago, IL, USA).

RESULTS

Sociodemographic characteristics can be seen in table 1. In this study, 973 individuals with chronic pain were evaluated, among them 63.5% with a clinical diagnosis of fibromyalgia. The sample was composed mostly of female volunteers (98.3%), aged between 31 and 59 years old (80%), residents of many Brazilian states.

Regarding quarantine, 61.4% said they were in social isolation and 62.3% of them consider themselves to belong to the risk group for COVID-19 contamination, besides that, 62.3% reported that family members and/or friends were infected, however, 59.9% said they had not acquired the disease so far.

When asked about missing the pre-pandemic routine, 56.1% of respondents reported “missing it a lot” and 92.9% said “not enjoying being at home”. In addition, most of the interviewees

Table 1. Sociodemographic characteristics of subjects with chronic pain during the COVID-19 pandemic period.

Variables	n	%
Gender	Female	956 98.3
	Male	17 1.7%
Age (years)	12 - 20	16 1.6%
	21 - 30	148 15.1%
	31 - 59	783 80.1%
	≥ 60	30 3.1%
Schooling	Primary	24 2.5%
	Incomplete high school	54 5.6%
	Complete high school	209 21.6%
	Undergraduate	167 17.3%
	Graduate	512 53.0%
Social isolation	No	374 38.6%
	Yes	594 61.4%
Employment before the pandemic	Unemployed	172 17.8%
	Student	57 5.9%
	Temporary employee	44 4.5%
	Permanent employee	410 42.3%
	Self-employed	234 24.1%
	Retired	52 5.4%
Did you keep working?	Yes (essential sector)	188 23.4%
	Yes (remote work)	247 30.7%
	No (temporarily)	172 21.4%
	No (unemployed)	198 24.6%
If a student, were your classes maintained by virtual means?	Yes	223 76.9%
	No, suspended classes	49 16.9%
	No, I don't have equipment or internet access	18 6.2%
Total	973	100%

Sample frequencies represented in absolute (n) and relative (%) values. n = number of participants.

(80.6%) reported having no family support. Most of the sample pointed to the low quality of information about the pandemic received through friends and family, television and WhatsApp® groups (> 82.9%).

Among the economic aspects, participants reported being permanently employed (42.3%), followed by self-employed in 24.2% of the sample. The students in the sample indicated that they were watching virtual classes (76.9%).

Clinical features of pain

All clinical characteristics can be seen in table 2. The presence of pain among these individuals with chronic pain was 99.1% and 74.9% reported worsening of painful symptoms during the pandemic. High pain intensity was reported (8 to 10, on the 11-point numeric scale) in the last 7 days (68.6%) every single day (66.7%), and pain was reported at the time of the evaluation of this research by 92.3% of the participants. Additionally, the sample reported that pain greatly interfered with their work and/or study activities for 53.3% of them.

Table 2. Clinical characteristics of subjects with chronic pain during the COVID-19 pandemic period.

Variables		n	%
Have you felt pain?	No	9	0.9
	Yes	968	99.1
Did the pain get better or worse?	Better	76	7.8
	Worse	732	74.9
	No changes	169	17.3
Pain intensity in the last seven days	Mild (0-3)	27	2.8
	Moderate (4-7)	279	28.6
	Intense (8-10)	668	68.6
How many days have you been in pain this past week?	Every day	652	66.7
	Almost everyday	213	21.8
	Couple of days	72	7.4
	A few days	35	3.6
	No day	6	0.6
How much pain interfered with your activities at home?	Did not interfere	22	2.3
	A little	138	14.2
	Moderately	241	24.7
	A lot	574	58.9
How much pain interfered with your work or study activities?	Did not interfere	45	4.8
	A little	128	13.6
	Moderately	267	28.3
	A lot	502	53.3
Have you been doing physical activity?	No	644	66.5
	Yes	324	33.5
Frequency of physical activities (days)	1 – 2	127	37.0
	3 – 4	132	38.5
	5 – 7	84	24.5
Have you helped with household chores?	Everyday	514	52.8
	Almost every day	153	15.7
	Couple of days	136	14.0
	A few days	146	15.0
	No day	25	2.6
Anxiety	No anxiety (0)	15	1.5
	Mild (1-4)	60	6.2
	Moderate (5-7)	255	26.2
	Intense (8-10)	643	66.1
Has anxiety interfered with your activities in the past seven days?	Did not interfere	83	8.5
	A little	178	18.2
	Moderately	241	24.7
	A lot	474	48.6
Sleep quality	Very good	21	2.2
	Good	64	6.6
	Regular	258	26.4
	Bad	302	30.9
	Very bad	331	33.9
Have you had insomnia?	No	214	22.0
	Yes	760	78.0
Did you take sleeping pills before the pandemic?	No	510	52.4
	Yes	464	47.6
Are you taking sleeping pills?	No	465	47.7
	Yes	510	52.3
Total		973	100

Sample frequencies represented in absolute (n) and relative (%) values. n= number of participants. Pain and anxiety intensity = 11-point numeric scale.

Self-report of psychoemotional symptoms

Intense anxiety symptoms (8 to 10, on the 11-point scale) were reported by the chronic ill patients in this study in 66.1%, and these greatly interfered with their activities in the last seven days (48.6% of the sample). Additionally, feelings of sadness, fear, and worry were reported in 81.4%, 92.6% and 99.7% of the sample, respectively. Moreover, the individuals in this survey reported that their health in general was slightly worse (43.8%) and pointed out their quality of life as poor (33.5%) (Table 2).

Status of sleep quality of the sample

The individuals with CP in this study reported having insomnia in 78% of the sample, in addition, 52.3% were using sleep drugs, and 52.4% did not take them before the pandemic. When classifying sleep quality, 33.9% classified it as “very poor”, 30.9% as “poor” and 26.4% as “regular” (Table 2).

Frequency of physical activity and practice of physical exercise

Regarding the practice of physical exercise, 66.5% of the sample reported not practicing exercise regularly and among those who were practicing exercise regularly only 38.5% did it for 3 or 4 days a week. However, most individuals (52.8%) maintained the daily frequency of physical activity related to household chores (Table 2).

Associations between variables

In the Chi-square analysis, social isolation was associated with the interference of pain in daily activities. The intensity and presence of pain were significantly associated with worsening pain during the pandemic, anxiety, feelings of sadness and fear, insomnia, quality of sleep and life ($p < 0.05$). Anxiety, on the other hand, showed a significant association with intensity, frequency and presence of pain, insomnia, sleep quality, use of drugs for sleep and quality of life ($p < 0.05$).

The use of sleep drugs was significantly associated with the intensity and interference of pain in daily activities, anxiety, sleep quality, insomnia, and physical activity ($p < 0.05$). Additionally, the practice of physical activity showed a significant association with the intensity, frequency and worsening of pain, anxiety, insomnia, quality of sleep and life ($p < 0.05$). Quarantine was significantly associated with physical activity ($p = 0.03$).

Logistic regression associations between pain, psychoemotional, physical activity and sleep disturbance variables are summarized in a diagram in figure 1.

Binary or multinomial logistic regression analyses showed that anxiety increased the odds ratio in 395% of individuals with CP to feel pain (β : 1.375; OR: 3.956; $p = 0.001$) (Table 3) and the greater intensity of pain increases in 62.3% the chance of these individuals not performing physical activity (β : -0.474; OR: 0.623; $p = 0.001$).

Additionally, it was observed that pain and anxiety increase the chance of having feelings of sadness by 182% (β : 0.599; OR: 1.820; $p = 0.001$) and 235.9% (β : 0.858; OR: 2.359; $p = 0.001$), respectively. Meanwhile, the practice of physical activity decreases the chance of individuals with CP feeling sad by 62.2% (β : -0.475; OR: 0.622; $p = 0.008$).

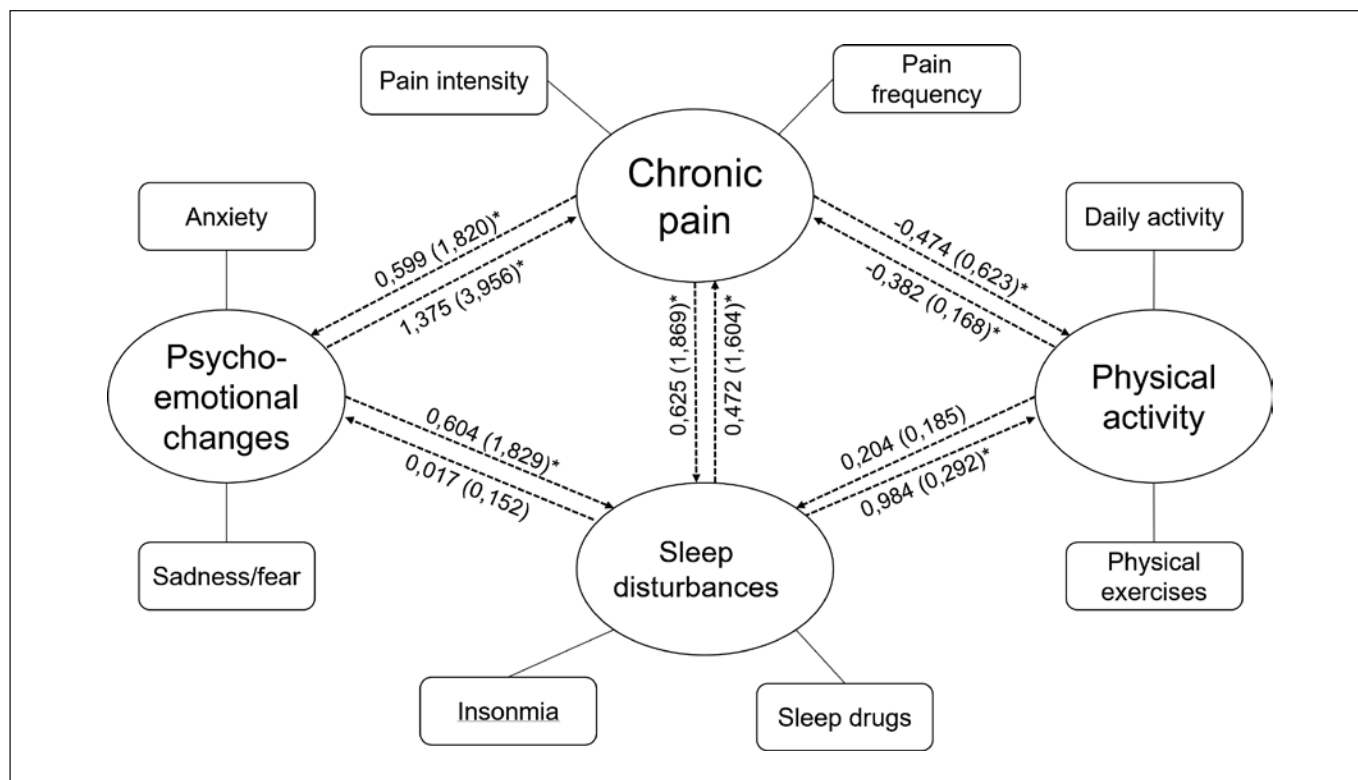


Figure 1. Logistic regression association between pain, psychoemotional, sleep disturbance and physical activity variables.

Table 3. Binary logistic regression analysis to estimate the possibility of experiencing pain (dependent variable) in subjects with chronic pain through the anxiety (independent variable) during the COVID-19 pandemic.

Classification	β	OR	Lower/upper limit	p-value
Anxiety	1.375	3.956	2.079-7.529	0.000*
Constant	0.413	1.511	-	0.642

Anxiety = 11-points numeric scale; β = beta (effects of the independent variable); OR = odds ratios; * p <0.05.

Regarding the perception of quality of life of the sample, pain intensity and anxiety increased by 126.8% and 133.1%, respectively, the chance ratio of chronic patients to have a very poor quality of life (pain intensity= β: 0.238; OR: 1.268; p=0.001), (anxiety= β: 0.286; OR: 1.331; p=0.001). And not performing physical activity showed a 53.4% reduction in the chance of having a good quality of life (β: -0.627; OR: 0.534; p=0.02).

In addition, pain increased the odds ratio of individuals with CP having insomnia by 186.9% (β: 0.625; OR: 1.869; p=0.001), as well as anxiety, which increased by 182.9% (β: 0.604; OR: 1.829; p=0.001). It was also pointed out by binary logistic regression that the use of sleep drugs can increase the chance of having insomnia by 244.8% (β: 0.895; OR: 2.448; p=0.001) (Table 4).

However, pain intensity increases the chance of individuals with CP taking sleep drugs by 160.4% (β: 0.472; OR: 1.604; p=0.001) (Table 5). And not taking these drugs increased the chance in 267.5% of chronic patients to increase the frequency of physical activity (β: 0.984; OR: 2.675; p=0.001) (Table 6).

Table 4. Binary logistic regression analysis to estimate the possibility of having insomnia (dependent variable) in subjects with chronic pain through the factors of pain intensity, anxiety, physical activity, and sleep drug (independent variable) during the COVID-19 pandemic.

Classification	β	OR	Lower/upper limit	p-value
Has felt pain	0.261	1.298	0.259-6.498	0.751
Pain intensity	0.625	1.869	1.382-2.528	0.000*
Anxiety	0.604	1.829	1.461-2.290	0.000*
Physical activity	-0.194	0.824	0.586-1.158	0.265
Sleep drug	0.895	2.448	1.752-3.419	0.000*
Constant	-4.640	0.010	-	0.004

Pain and anxiety intensity = 11-points numeric scale; β = beta (effects of the independent variable); OR = odds ratios; * p <0.05.

Table 5. Binary logistic regression analysis to estimate the use of sleep drug (dependent variable) in subjects with chronic pain through pain intensity and anxiety (independent variable) during the COVID-19 pandemic.

Classification	β	OR	Lower/upper limit	p-value
Intensity of pain	0.472	1.604	1.252-2.054	0.000*
Anxiety	0.168	1.183	0.972-1.439	0.093
Constant	-2.223	0.108	-	0.000

Pain and anxiety intensity = 11-points numeric scale; β = beta (effects of the independent variable); OR = odds ratios; * p <0.05.

Table 6. Multinomial logistic regression analysis to estimate the frequency of physical activity (dependent variable) in subjects with chronic pain through clinical factors (independent variable) during the COVID-19 pandemic.

Classification	β	EP	OR	Lower/ upper limit	p-value
1 - 2 days					
Quarantine (No)	-0,277	0.282	0.758	0.436-1.319	0.327
Quarantine (Yes)		1	1	1	1
Sleep drug (No)	0.572	0.254	1.771	1.078-2.912	0.024*
Sleep drug (Yes)		1	1	1	1
5 - 7 days					
Quarantine (No)	-0.465	0.337	0.628	0.324-1.216	0.168
Quarantine (Yes)		1	1	1	1
Sleep drug (No)	0.984	0.292	2.675	1.509-4.740	0.001*
Sleep drug (Yes)		1	1	1	1

Reference category = 3 - 4 days. β = beta (effects of the independent variable); OR = odds ratios; * <0.05 .

DISCUSSION

The present study evaluated characteristics related to pain, psychological, and emotional traits, perception of quality of life and sleep, social and economic aspects of individuals with chronic pain in Brazil during the COVID-19 pandemic. Exacerbation of painful and psycho emotional symptoms related to poor sleep quality and feelings of fear, sadness, and concern inherent to the Brazilian reality of coping with the pandemic were observed.

Some recent research has shown the impacts suffered during and after the pandemic in more vulnerable populations, such as patients with CP^{7,11,14,25}, whose great interest in health-related studies was due to the need for social isolation, change in routine and restriction of access to health services that could contribute to the increase in the symptoms of these individuals^{25,26}.

It has been evidenced, mainly, the relationship between increased pain intensity and psychoemotional symptoms^{11,14,25}. Corroborating these findings, the individuals with CP in the sample reported worsening pain intensity and frequency, as well as severe anxiety symptoms, with great interference of these symptoms in the performance of routine and leisure activities.

Additionally, most of these studies, being carried out in developed countries, relate the worsening of these symptoms to the impact of social distancing caused by health policies, like the lockdown, which affected social interaction and the perception of loneliness in the CP population^{12,14,26}. The present research also showed an association between social isolation and pain. However, in Brazil, despite the adoption of social distancing as an obstacle to the advance of the COVID-19 virus, adherence by the population was low compared to countries in Europe, for example¹⁹. The 61% of isolates in the sample corroborates this fact.

That said, considering socio-cultural and economic differences²⁷, other factors seem to have a greater contribution to the exacerbation of existing CP in Brazilians. Among these, some risk factors have been pointed out, such as female gender, lower education level, and employment difficulties¹¹. The large number of women in this research corroborates this data. However, most of sample remained employed at homework and had completed higher education.

Patients with fibromyalgia, among other CP, seem to have suffered a greater impact on pain in the face of the pandemic scenario^{8,11}. This may be due to the very characteristics of the disease, being a nociplastic, generalized, and high intensity pain syndrome, accompanied by symptoms such as fatigue, changes in sleep, and psychoemotional factors^{8,26}. This fact is consistent with more than 617 fibromyalgia individuals interviewed in this study.

It is known that this population of fibromyalgia patients presents high levels of anxiety²⁸, because pain presents a strong psychosomatic factor due to the convergence of pathways of the limbic system and pain processing in the central nervous system²⁹. The increase in anxiety symptoms observed in this study is related to symptoms of sadness, fear, and the increase in pain itself. The pandemic scenario brought several concerns regarding the possibility of contamination and aggravation by SARS-CoV-2 infection, uncertainties regarding information on the real pandemic scenario, financial difficulties, and changes in occupational and recreational routine¹². In addition, these patients were restricted to health services, including psychological therapies⁸.

These services were not completely interrupted due to the increased use of virtual telehealth care¹⁵. However, some recommendations were pointed out for the implementation of telerehabilitation services in Brazil, including informing with clarity of language how the treatment will be carried out, using simple commands during care, understanding patients' expectations and barriers in relation to telerehabilitation, understanding sociodemographic conditions, including familiarity with digital resources and access to the internet and using strategies to motivate the patient to participate³⁰. However, there are some studies that point out the difficulty of patients with CP to adhere to these services associated with high intensities of pain and anxiety, and the characteristics of low self-efficacy and poor coping strategies in relation to the disease^{31,32}. Sleep disorders are another important condition associated with CP. In a recent systematic review with meta-analysis, the prevalence of poor sleep quality in patients with CP was 75.3%, while in fibromyalgia the prevalence was 95.5%³³. Since CP has a major impact on patients' quality of life, these data highlight the need for early management of sleep disorders in this population, especially in patients with fibromyalgia.

In the present study, it was observed that the exacerbation of pain and anxiety symptoms were related to a greater prevalence of insomnia and poor sleep quality reported by the sample. The recent study³⁴, in which sleep quality was identified as a significant positive mediator between CP intensity and depression, corroborates the present data. Therefore, the period of coping with the pandemic and its negative interference in psychoemotional aspects may have contributed to this bidirectional cycle between pain and sleep quality.

In an important review on the understanding of mechanisms involved between sleep disorders and CP, a study pointed out that reduced sleep quality seems to inhibit mediators with analgesic properties, such as the opioid, melatonin and dopamine signaling systems, while activating mediators with predominantly hyperalgesic action, such as nitric oxide and adenosine signaling, and inflammatory mediators in the immune system³⁵.

In addition, the worsening of the pain of these individuals during the pandemic seems to have influenced the beginning of the use of sleep drugs. Some types of drugs are used for this purpose, such as hypnotics, benzodiazepines, and antidepressants such as zolpidem, lorazepam, and amitriptyline³⁵. These may be necessary to improve sleep hygiene. However, when used for a medium and long time, the drugs have side effects, including drowsiness and difficulty of concentration³⁵⁻³⁷. That said, the use of non-pharmacological treatments for insomnia and poor sleep quality, such as cognitive behavioral therapy³⁶ and physical exercises³⁸, are promising.

Highlighting physical exercises, these are considered as gold standard treatment for pain reduction in both healthy individuals and patients with CP^{39,40}. The authors gathered data that support the role of physical exercise in pain modulation, in which its regular practice provides a balance between inhibitory and facilitatory areas in the brain stem, with the greatest activation of opioid and serotonergic systems, in addition to modulation of the immune system, contributing to the prevention of hyperalgesia and production of analgesia³⁹.

It is also known the benefits of reducing anxiety and depression⁴⁰ and improving sleep quality³⁸. In this study, it was observed the influence of the frequency of physical activity on the use of sleep drugs. In addition, reduced levels of physical activity in general, including daily routines such as cleaning the house and moving to the workplace, are related to the worsening of these factors⁴¹.

In the authors' previous study, similarly to this one, physical inactivity was the main factor related to the severity of pain and anxiety, and higher levels insomnia in patients with CP during the COVID-19 pandemic in Sergipe, located in the Northeast of Brazil²⁴.

It was observed that, while pain and anxiety increased the chance of having low quality of life, physical exercise improves this situation.

However, patients with CP tend to have low adherence to exercise programs³², largely for fear of movement that could exacerbate the pain⁴² and by the presence of kinesiophobia and catastrophization¹⁶. In the sample, this fact may explain the association between pain and non-performance of physical activities.

This fact has a direct impact on the present findings, in which it was possible to observe a vicious cycle between worsening pain characteristics, anxiety, and sleep quality related to reduced physical exercise and general physical activity level.

It is important to emphasize that the data observed in this research reflects the painful and psychoemotional state of patients with CP during the pandemic, between the months of November 2020 and March 2021. One limitation of this study is the variation in COVID-19 contamination and different quarantine restrictions during these months and the differences in Brazilian regions^{21,27}, which may have influenced participants' responses. Even though, the data obtained between the present study with the Brazilian population and the previous COVID-or study with patients with CP only from the state of Sergipe (Brazil) are similar in terms of impact on pain, anxiety, insomnia, and levels of physical activity²⁴.

Another limitation of this study is due to the non-verification of diagnosis of CP of participants by medical report or diagnostic criteria. This fact is justified due to the difficulty of carrying out asynchronous evaluations in pandemic period. Furthermore, further studies are needed to compare the impact of the COVID-19 pandemic between patients with CP who were infected with those who were not infected by coronavirus, since it was not investigated in the present study.

In addition, the present findings are extremely important for comprehending the impact suffered by these individuals with CP and how the pandemic period exacerbated their symptoms. Especially when it comes to a study with the population of Brazil, which was considered one of the countries with the worst mortality indicators due to COVID-19 and with a longer contamination rate than developed countries, according to Our World in Data, from the University of Oxford⁴³. Therefore, the impact on pain, psychoemotional aspects and sleep quality of patients with CP may be influenced by the national pandemic scenario⁴⁴. Based on this understanding, pain management and future treatment strategies need to accommodate the new needs of these patients. As a future perspective, it is advisable that studies about treatments for patients with CP take into consideration the knowledge of the impacts of the COVID-19 pandemic.

CONCLUSION

Coping with the COVID-19 pandemic has increased the vicious cycle between exacerbation of pain intensity, worsening of anxiety, and poor sleep quality in patients with CP in Brazil. In addition, it was observed the intensification of these factors associated with reduced physical exercise and physical activity levels. Understanding the impact of crisis periods for individuals with CP helps to develop new management and treatment strategies.

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