Physical inactivity predisposes worst pain, anxiety, and sleep quality in chronic pain during COVID-19 pandemic: COVID-or survey study

Inatividade física predispõe piora de dor, ansiedade e qualidade de sono em indivíduos com dor crônica durante a pandemia por COVID-19: estudo observacional COVID-or

La inactividad física predispone el peor dolor, la ansiedad y la calidad del sueño en el dolor crónico durante la pandemia de COVID-19: COVID-or estudio observacional

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Abstract
Objective: The aim of this study is to assess the influence of COVID-19 quarantine on pain, psycho-emotional aspects, quality of life and sleep of chronic pain patients. Methodology: Individuals with fibromyalgia, migraine and chronic low back pain were included. The survey was carried out through a questionnaire attached to the Forms application, from Google Drive™, with objective questions about painful and emotional aspects. Results: About 70% of the sample reported worsening of pain intensity and 52% showed an increase in the daily frequency of pain during quarantine. More than half of the individuals (58.8%) reported intense anxiety. In addition, half of the sample (47.1%) reported poor quality of life and poor quality of sleep (51.8%). Just over 60% of the sample did not practice physical activity. In regression analysis, lack of physical activity had 335% chance of increasing pain intensity (β: -1.095, OR: 0.335, p = 0.025), of increasing anxiety by 244% (β: -1.412, OR: 0.244, p = 0.013) and 250% of causing insomnia (β: -1.353, OR: 0.250, p = 0.010). Conclusions: The increase in pain and anxiety in individuals with chronic pain during COVID-19 pandemic negatively influenced quality of life and sleep. Physical inactivity during quarantine predisposed to worsening pain and psycho-emotional aspects.
Keywords: COVID-19; Chronic pain; Anxiety; Sleep quality; Sedentary behavior.

Resumo
Objetivo: Avaliar a influência da quarentena por COVID-19 na dor, nos aspectos psicoemocionais, na qualidade de vida e de sono da dor crônica. Metodologia: Foram incluídos indivíduos com fibromialgia, enxaqueca e lombalgia crônica. O levantamento foi realizado por meio de questionário anexado no aplicativo Forms, do Google Drive, com perguntas objetivas sobre aspectos álgicos e emocionais. Resultados: Responderam ao formulário 85 indivíduos. Cerca de 70% da amostra relatou piora da intensidade de dor e 52% apresentaram aumento da frequência diária de dor. Mais da metade dos indivíduos (58,8%) referiu ansiedade intensa. Além disso, metade da amostra (47,1%) relatou qualidade de vida ruim e qualidade de sono ruim (51,8%). Pouco mais de 60% da amostra não praticou atividade física. Na análise de regressão, a falta de atividade física apresentou uma chance de 335% de aumentar a intensidade de dor (β: -1,095, OR: 0,335, p= 0,025), de aumentar a ansiedade em 244% (β: -1,412, OR: 0,244, p= 0,013) e de 250% de causar insônia (β: -1,353, OR: 0,250, p= 0,010). Conclusão: O aumento da dor e da ansiedade nos indivíduos com dor crônica durante a

pandemia por COVID-19 influenciaram negativamente a qualidade de vida e do sono. A inatividade física durante a quarentena predispôs piora da dor e de aspectos psicoemocionais.
Palavras-chave: COVID-19; Dor crônica; Ansiedade; Qualidade do sono; Comportamento sedentário.

Resumen
Objetivo: Evaluar la influencia de la cuarentena por COVID-19 en dolor, aspectos psicoemocionales, cualidad de vida y sueño en el dolor crónico. Metodología: Se incluyeron personas con fibromialgia, migraña y dolor lumbar crónico. La encuesta se realizó a través de un cuestionario adjunto a la aplicación Formularios, de Google Drive, con preguntas objetivas sobre aspectos dolorosos y emocionales. Resultados: 85 individuos respondieron al formulario. Alrededor del 70% de la muestra informó un empeoramiento de la intensidad del dolor y el 52% había aumentado la frecuencia diaria del dolor. Más de la mitad de los individuos (58,85) relataron ansiedad intensa. Además, la mitad de la muestra reportó mala calidad de vida (47,1%) y del sueño (51,8%). Algo más del 60% de la muestra no practicaba actividad física. En el análisis de regresión, la falta de actividad física tenía un 335% de posibilidades de aumentar la intensidad del dolor (β: -1,095, OR: 0,335, p= 0,025), aumentar la ansiedad en un 244% (β: -1,412, OR: 0,244, p= 0,013) y causar insomnio en un 250% (β: -1,353, OR: 0,250, p= 0,010). Conclusión: El aumento del dolor y la ansiedad en personas con dolor crónico durante la pandemia de COVID-19 influyó negativamente en la cualidad de vida y del sueño. La inactividad física durante la cuarentena predispone al empeoramiento del dolor y aspectos psicoemocionales.
Palabras clave: COVID-19; Dolor crónico; Ansiedad; Calidad del sueño; Conducta sedentaria.

1. Introduction

On March 11th 2020, World Health Organization (WHO) declared a COVID-19 pandemic (*CoronaVirus Disease*-2019) (Pfefferbaum & North, 2020). Socioeconomic measures began to be implemented such as greater allocation of funds for public health and the beginning of social distance (Silva, 2020). In turn, the WHO´s care to prevent the spread of the disease, overload of health systems and excessive increase in the number of deaths, generated several uncertainties, speculations, assumptions and, consequently, anxiety in the population (Baqui et al., 2020; Pfefferbaum & North, 2020; Silva, 2020).

Psycho-emotional and social factors resulting from the fear of contamination by Sars-Cov-19, the deprivation of the population's routine and the readjustment of life habits, have been targets of researchers of human behavior, in order to try to understand and minimize undesired reactions arising quarantine (Galea et al., 2020; Pfefferbaum & North, 2020). Mainly, consequences of the pandemic on the pathological repercussions for subjects in risk disease groups have been discussed as cardiopathy (Zaman et al., 2020) and diabetic (Hussain et al., 2020) patients as well as health professionals (Lai et al., 2020). However, some comorbidities are closely linked to factors such as anxiety and fear, as in the case of people with chronic pain (CP) (Crofford, 2015; Woo, 2010).

CP is characterized by pathophysiological changes, resulting from a period equal to or greater than three months of pain experience (Treede et al., 2019), which leads to chronic pain disease, specified in the new edition of the International Classification of Diseases (ICD-11), adopted by WHO in 2019 (Treede et al., 2019). Pain experience does not necessarily need to be generalized (in all body) as in fibromyalgia (Bradley, 2009). It may have a specific area of coverage, as in headache and low back pain (Ahmed, 2012). However, it is already known that, in many cases, the main factor of chronic pain is the change and adaptation of the central nervous system (CNS) (Rocha et al., 2007), such as central sensitization and neurochemical disorders (Crofford, 2015).

In addition, the recently revised definition of pain by the International Association for the Study of Pain (IASP), describing it as "an unpleasant sensory and emotional experience associated with, or similar to that associated with, a real or potential tissue injury", highlights the influence of personal psycho-emotional aspects among the factors linked to CP disease (Desantana et al., 2020; Raja et al., 2020).

Social distancing can influence the worsening of pain intensity, as pain is associated with brain cognitive behavior culminating catastrophization (Flink et al., 2013). Another factor associated with CP is the reduction of mobility and overall physical activity (Sluka et al., 2018). Thus, in the case of CP, mobility and psycho-emotional and social aspects are outcomes

inherent to the patient's clinical condition, and the fear and social distance from the pandemic by COVID-19 may be exacerbating these factors.

DeSantana (2020) highlighted the importance of health professionals and researchers to be aware of these factors, aiming at the repercussions of changes in the pain characteristics of these patients in the post-pandemic period (DeSantana, 2020).

Thus, the aim of this study, called COVID-or ('Dor' is pain in Portuguese), was to evaluate the influence of the period of social distance and reduced mobility due to the COVID-19 pandemic on the pain, behavioral and psycho-emotional aspects of patients with chronic pain. Conducted by means of a virtual questionnaire, respecting the recommendations of WHO and the Brazilian Ministry of Health and respecting the virus prevention rules.

2. Methodology

2.1 Study type

This is an epidemiological, observational, and cross-sectional study (Pereira et al., 2018). The sample consisted of volunteers with CP who were evaluated by the team at the Outpatient Clinic of the Neuroscience Research Laboratory (LAPENE) at the Federal University of Sergipe (UFS) prior to the pandemic, confirming a clinical diagnosis of chronic pain. Furthermore, only participants who had agreed to participate in the experiment had their data collected by reading and signing the Free and Informed Consent Form.

2.2 Ethical criteria and casuistry

The research was developed in the period between April and July 2020, being accepted by the Ethics and Research Committee on Human Beings of the Federal University of Sergipe (CAAE: 30901720.2.0000.5546) and redirected to the National Research Council (CONEP), respecting the research standards with COVID-19 in Brazilian territory, regulated by the Ministry of Health at the beginning of the pandemic.

2.3 Participants

The sample consisted of participants of both sexes, without age restriction and who had a proven diagnosis of chronic pain. Volunteers were invited to participate in the study through a questionnaire link made available via WhatsApp® application (transmission lists) or on LAPENE's social networks (@lapene.ufs) and through wide dissemination in other networks.

There were no exclusion criteria for associated comorbidities, length of treatment or previous treatments, medications, etc. We justify this type of data collection due to the possibility of determining population strata, psychosocial scopes and generating domains for later data analysis.

2.4 Variables

This research worked using intensity of pain as dependent variable, in against the independents were level of physical activity, anxiety, quality of life, quality of sleep, depression, appetite, socioeconomic factors, despite employment, housing and, social conditions (for example contact with virtual social networks) (Severino, 2013).

2.5 Types of variables and responses

The questionnaire had 100 (one hundred) questions distributed in discrete and categorical variables, with types of answers in multiple choice, such as the level of education, and open, as medicines used. In addition, to ensure reliability and

understanding of the questions by the volunteers, we sought to maintain a standard of clear and objective language, in addition to popular sentences in the evaluation of individuals with chronic pain, such as the 11-point numerical scale (Jensen et al., 1986).

2.6 Data collection

Data acquisition was done through a digital questionnaire, with questions formulated according to group consensus and experience with data from clinical research on CP, previously performed at LAPENE over the years. Questionnaire was composed of a single block of questions that cover the domains described in the study variables. Those questions included pain, psycho-emotional and mobility factors.

2.7 Materials

The questionnaire was made available via the Forms tool, which belongs to the Google® network for content sharing, data storage and formation of charts and spreadsheets. Google Forms is a free search maintenance application, included in the Google Drive office package, along with Google Docs, Google Sheets and Google Slides. After creating the questionnaire on the platform, an electronic link was generated, which was initially tested by 10 people invited to ensure ease of completion and, later, it could be easily accessed through any internet provider. The tool also assured the user of information confidentiality and high data storage capacity. In addition, this article follows the regulations for processing of personal data of General Data Protection Law (law No. 13.709/18), in accordance with Brazilian law.

2.8 Graphics and spreadsheets

All data collected were automatically allocated to Google spreadsheets by the platform. With these spreadsheets, it was possible to track the number of participants who agreed to participate in the survey and answered all questions. It was also possible to generate percentiles using this tool. However, all data were studied using descriptive statistics.

2.9 Data analysis

Initially, we performed descriptive statistical analysis through the relative and absolute frequencies of the sample or measures of central tendency and dispersion. Then, 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 psycho-emotional state, quality of life and sleep with the independent variables of social and practical isolation. 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, psycho-emotional status and quality of life and sleep during social isolation and the possible decrease in physical activity. Finally, we present the effect size (Cohen's d). The significance level adopted was $p \leq 0.05$ and data were analyzed using the SPSS Statistics 22 software (SPSS Inc.®, Chicago, IL, USA).

3. Results

3.1 Sociodemographic characteristics

Sociodemographic characteristics of this sample are shown in Table 1, using absolute (n) and relative (%) values. Eighty-five subjects with CP were evaluated, most of them female (98.8%), aged between 30 and 50 years (57.6%) and with clinical diagnosis of fibromyalgia (63.5%). 83.5% of these subjects reported being quarantined, while 58.8% reported being in social isolation during the COVID-19 pandemic period.

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

Variables		n	%
Sex	Female	84	98.8
	Male	1	1.2
Age (years)	Until 30 years	12	14.1
	30-50 years	49	57.6
	> 50 years	24	28.2
Scholarity	Primary	6	7.1
	Incomplete high school	8	9.4
	Complete high school	28	32.9
	Incomplete graduation	12	14.1
	Graduated	31	36.5
Clinical diagnoses	Fibromyalgia	54	63.5
	Migraine	16	18.8
	Low Back Pain	15	17.6
Included in the risk group?	No	35	41.2
	Yes	50	58.8
Have family and / or friends become infected?	No	79	92.9
	Yes	6	7.1
Have you been contaminated?	No	70	64
	I don`t know	15	82.4
	Yes	0	17.6
City residence	Aracaju (capital)	54	63.5
	Nossa Senhora do Socorro	11	12.9
	São Cristóvão	9	10.6
	Other	11	12.9
Is someone giving you support?	No	9	10.7
	Yes	75	89.3
Do you receive some information about pandemic from friends or/and family?	No	12	14.1
	Yes	73	85.9
Did you receive any fake news?	No	24	28.2
	Yes	61	71.8
Employment before the pandemic	Unemployed	17	20.2
	Student	4	4.8
	Temporary employee	2	2.4
	Permanent employee	27	32.1
	Self-employed	21	25
	Retired	13	15.5
If employed, do you continue to work?	Yes (in workstation)	14	20.6
	Yes (home office)	12	17.6
	No (temporarily)	23	33.8
	No (unemployed)	19	27.9
Total		85	100%

Source: Authors.

In addition, 58.8% reported being included in the risk group, and 82.4% said they did not know if they had already been infected. Regarding the possible economic impact, 59.5% had job before the pandemic, but only 38.2% reported continuing to work at home or in an essential sector.

3.2 Sample clinical profile

Clinical characteristics of this sample are shown in Table 2. Among these subjects with CP, 92.9% felt pain during the last month, with 51.8% feeling pain every day for the previous 7 days, with severe pain reported in 56.5% of the cases and 68.2 % reported worsening of pain during the pandemic compared to the previous period.

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

Variables		n	%
Have you felt pain?	No	6	7.1%
	Yes	79	92.9%
Did the pain get better or worse?	Better	6	7.1%
	Worst	58	68.2%
	No changes	21	24.7%
Pain intensity in the last seven days	Mild (0-3)	6	7.1%
	Moderate (4-7)	31	36.5%
	Intense (8-10)	48	56.5%
How many days have you been in pain this past week?	Every day	44	51.8%
	Almost everyday	25	29.4%
	A few days	11	12.8%
	A few days	4	4.7%
	No day	1	1.2%
Have you been doing physical activity?	No	50	60.2%
	Yes	33	39.8%
How much anxiety have you felt in the past seven days? (0-10)	Light (0-3)	12	14.1%
	Moderate (4-7)	23	27.1%
	Intense (8-10)	50	58.8%
Has anxiety interfered with your activities in the past seven days?	Did not interfere	7	8.2%
	A little	16	18.8%
	Moderately	19	22.4%
	Quite	43	50.6%
Are you afraid?	Never	9	10.6%
	Few times	11	12.9%
	Sometimes	33	38.8%
	Oftentimes	19	22.4%
	Ever	13	15.3%
How is your quality of life?	Good	10	11.8%
	Regular	35	41.2%
	Bad	40	47.1%
Compared to before the pandemic, how is your overall health?	Much better	1	1.2%
	Few better	7	8.2%
	The same way	21	24.7%
	A little worst	45	52.9%
	Pretty worst	11	12.9%
How is the quality of your sleep?	Good	17	20.0%
	Regular	24	28.2%
	Bad	44	51.8%
Have you been insomnia?	No	22	25.9%
	Yes	63	74.1%
Total		85	100%

Source: Authors.

Additionally, 54.1% of the subjects reported that pain interfered a lot in daily activities and 60.2% of these were not practicing any physical activity. In psycho-emotional aspects, 84.7% said they were feeling sad despite 89.3% reporting that they had family support, 41.2% answered "many times" for the feeling of concern in the last 7 days and 38.8% answered that sometimes they were afraid. Anxiety was described as intense by 58.8% of the subjects, significantly interfering in daily activities for 50.6% of them.

Insomnia was another complaint widely reported by the sample (74.1%), who said they had poor sleep quality (51.8%). However, 57.1% were not using sleep-inducing drugs. Most subjects with chronic pain (52.9%) reported worsening health in general compared to before the pandemic and rated their quality of life as poor (47.1%) or regular (41.2%).

3.3 Pain characterization, psycho-emotional aspects, and physical activity level

In the association analyzes by using chi-square test presented in Table 3, intensity and frequency of pain showed a significant association with feelings of sadness, days feeling good, anxiety, insomnia, quality of sleep and life (p<0,05). Anxiety, on the other hand, showed a significant association with pain intensity, days feeling good, insomnia, quality of sleep and life (p<0.05). Practice of physical activity showed a significant association with intensity of pain, anxiety, insomnia, quality of sleep and life (p<0.05). However, sociodemographic, and clinical variables of this sample were not related to quarantine and social isolation (p>0.05) (Table 3).

Table 3 - Associations between pain intensity, pain frequency, anxiety, physical activity practice, quarantine, and social isolation (sociodemographic and clinical variables of subjects with chronic pain during the COVID-19 pandemic).

Variable	Pain intensity		Pain frequency		Anxiety		Physical activity		Quarantine		Social isolation	
	x^2	p	x^2	p	x^2	p	x^2	p	x^2	p	x^2	p
Age	4.18	0.349	2.11	0.331	5.99	0.189	2.99	0.215	1.07	0.545	1.18	0.580
Scholarity	7.20	0.462	2.99	0.488	6.38	0.597	2.34	0.706	1.69	0.836	6.52	0.155
Risk group	2.45	0.284	0.20	0.687	2.28	0.330	0.17	0.821	1.09	0.294	0.40	0.527
Has felt pain	-	-	-	-	14.83	0.001*	1.95	0.209	2.24	0.134	0.16	0.686
Pain days in the last week	-	-	-	-	12.42	0.133	7.21	0.091	1.09	0.852	2.09	0.798
Pain intensity	-	-	-	-	16.39	0.003*	6.93	0.024*	0.86	0.652	1.81	0.431
Days feeling good	25.8	0.005*	16.1	0.001*	22.8	0.019*	9.32	0.206	2.51	0.955	9.26	0.212
Has been feeling sad	17.0	0.001*	13.1	0.004*	13.3	0.001*	0.61	0.433	0.86	0.354	0.04	0.829
Anxiety	11.2	0.017*	9.97	0.003*	-	-	11.7	0.003*	0.32	0.917	1.67	0.458
Insomnia	6.00	0.040*	1.95	0.332	7.43	0.021*	7.12	0.008*	0.06	0.802	0.95	0.329
Sleep drugs	0.75	0.691	0.13	0.714	4.11	0.146	0.57	0.498	0.00	1.000	0.06	0.797
Quality of sleep	18.4	0.001*	9.42	0.003*	22.1	0.001*	6.85	0.032*	2.53	0.240	3.89	0.144
Appetite	6.06	0.176	4.36	0.120	2.91	0.559	5.00	0.082	2.66	0.264	2.38	0.304
Quality of life	19.3	0.001*	18.2	0.001*	15.0	0.003*	6.45	0.040*	2.70	0.242	0.12	0.870

x2 = Chi-square test of independence; * Significant association = p <0.05; Pain intensity = 11-point numerical scale. Source: Authors.

Binary or multinominal logistic regression analyzes showed that the presence of pain had a 610% chance of increasing the feeling of sadness (β: 2.805, OR: 0.610, p = 0.003) and 1398% of decreasing the quality of life (β: 21.05, OR: 13.98, p = 0.001). Moderate anxiety presented a odds ratio of 417% of the individual having worsened sleep quality (β: 1.429, OR: 4.17, p = 0.029). Additionally, the lack of physical activity had a 33.5% chance of increasing the intensity of moderate pain (β: -1.095, OR: 0.335, p = 0.025) and presented a 25.9% chance of increasing the insomnia (β: -1.353, OR: 0.25, p = 0.010) (Table 4).

Table 4 - Binary logistic regression analysis to estimate the possibility of insomnia in chronic pain through the practical factor of physical activity and the frequency of pain during the COVID-19 pandemic.

Classification	β	OR	Lower/ Upper Limit	p
Physical activity	-1,353	0,259	0,93-0,72	0,010*
Has felt pain	0,825	0,438	0,75-2,56	0,360

B = beta (effects of the independent variable); OR = odds ratios; * p <0.05.
Source: Authors.

In addition, not practicing physical activity had a 19.8% and 24.4% chance of increasing mild and moderate anxiety, respectively (mild = β: -1.622, OR: 0.198, p = 0.039; moderate = β: -1.412, OR: 0.244, p = 0.013) (Table 5). The odds ratios for the other variables were not statistically significant.

Table 5 - Multinomial logistic regression analysis to estimate anxiety of subjects with chronic pain through clinical factors during the COVID-19 pandemic.

Classification	β	OR	Lower/ Upper Limit	p
Mild				
Physical activity (yes)	-1,622	0,198	0,042-0,921	0,039*
Physical activity (no)		1	1	1
Pain intensity (mild)	2,373	10,72	0,657-17,52	0,096
Pain intensity (moderate)	-0,333	0,716	0,134-3,838	0,697
Pain intensity (intense)		1	1	1
Has felt pain (no)	2,569	13,05	0,777- 21,94	0,074
Has felt pain (yes)		1	1	1
Moderate				
Physical activity (yes)	-1,412	0,244	0,800-0,742	0,013*
Physical activity (no)		1	1	1
Pain intensity (mild)	1,027	2,791	0,139-56,03	0,502
Pain intensity (moderate)	0,399	1,490	0,478-4,641	0,492
Pain intensity (intense)		1	1	1
Has felt pain (no)	0,777	2,174	0,113-41,91	0,607
Has felt pain (yes)		1	1	1

Reference category = intense; B = beta (effects of the independent variable); OR = odds ratios; * p <0.05. Source: Authors.

4. Discussion

We observed in our study the worsening of pain aspects of individuals with chronic pain when facing the pandemic COVID-19 according to self-report. It is known that CP disease, once developed, involves psycho-emotional and social factors, which go beyond the modifiable biological aspects of peripheral and central sensitization (Rocha et al., 2007; Tompkins et al., 2018; Treede et al., 2019).

Among them, pain catastrophizing in the chronification process is related to behaviors and cognitive changes, such as hypervigilance, fear, and avoidance, in addition to limiting beliefs and knesiophobia (Flink et al., 2013; Miller et al., 2020; Quartana et al., 2009). These aspects common to individuals with CP are associated with an increase in glutamatergic neuroexcitatory cascades or reduced GABAergic inhibition, leading the individual to a constant waking state, culminating in changes in sleep and mood (Bradley, 2009; Tompkins et al., 2018). In addition, they are associated with serotonergic and dopaminergic functioning, causing increased stress, perception of pain, depressive symptoms, and catastrophizing (Flink et al., 2013; Quartana et al., 2009).

That said, with the recent advent of the new coronavirus pandemic, some studies have already suggested its impact on mental health of the general population, as its confrontation involves not only the sphere of health, but also social and economic dimensions (Chow et al., 2020; Galea et al., 2020; Lai et al., 2020; Pfefferbaum & North, 2020).

In the present study, the worsening of pain increased the feeling of sadness. Excessive worry and fear have also been reported. These repetitive thoughts associated with stress, social distance and financial problems can show how these patients react with catastrophizing pain stimuli (Flink et al., 2013). In addition, patients with chronic pain, for example, with fibromyalgia,

have low self-efficacy (Crofford, 2015), in other words they have difficulty to regulating symptoms related to their own pain and/or understanding to take self-care measures.

Another important result of our findings is the self-reported symptoms of anxiety, which are often present in patients with CP (Heer et al., 2014; Woo, 2010). Anxiety and chronic pain have similar cognitive and behavioral processes, such as catastrophizing, hypervigilance and fear avoidance (Woo, 2010). In addition, anxiety and depression disorders share the same pathophysiological pathways as pain. They facilitate central modulation of pain response in periaqueductal gray matter, amygdala, and hypothalamus (Heer et al., 2014). Therefore, reciprocity may have been observed in this research, in which the worsening of pain caused more anxiety symptoms, which made the individual more sensitive to pain, consequently, also aggravated anxiety.

In addition, most of the sample in this study reported insomnia and poor sleep quality, and these symptoms worsened with increased anxiety and pain, corroborating other studies with patients with CP (Mathias et al., 2018; Nilsen & Sand, 2018; Wiklund et al., 2018). Sleep disorder is one of the most common comorbidities in patients with CP, being frequently associated with cognitive, concentration and memory changes, with an impact on physical and mental health (Mathias et al., 2018).

Among the physiological changes are brain changes, such as increased limbic activity, atrophy of the hippocampus and dopaminergic changes (Mathias et al., 2018; Nilsen & Sand, 2018). Also, as anxiety and poor sleep quality can predispose or perpetuate CP (Mathias et al., 2018). Therefore, the increase in the severity of pain in patients with CP in this study, together with the increase in psychological disorders due to the COVID-19 pandemic, reflected in the worsening of anxiety and insomnia. It is worth mentioning that the lack of health care during this period may have further aggravated the pain of these patients.

The fact that part of the sample was obeying social isolation and quarantine, and another was not, did not influence the pain and psycho-emotional aspects. What we assume is that the concerns and fears inherent in the period are the main factors for the behavioral changes found in this research. Given the unpredictability of the appearance of the COVID-19 pandemic, we had no previous data on pain characteristics and psycho-emotional aspects to compare the sample profile before and during quarantine. Which would allow us to infer better characteristics about the cognitive behavioral status of these patients.

In our results, the lack of physical activity indicated a predisposition to worsen pain, psycho-emotional aspects, and sleep disturbance. There are several factors that may have contributed to these individuals not having practiced physical activity during the quarantine, among them kinesiophobia (fear of movement), beliefs about avoiding exercise and low self-auto efficacy, in which the individual's intention is to avoid pain, behaviors frequently present in patients with chronic pain (Larsson et al., 2016b, 2016a). In addition to these, the restriction of physical exercise services, difficulty for accessing telerehabilitation and economic factors may have influenced the physical inactivity of the sample.

Some studies have shown that the psycho-emotional aspects are related to the decrease in both physical activity and the daily activity level of patients with chronic pain (Larsson et al., 2016b; Miller et al., 2020), corroborating our findings that patients also reported a decrease in daily activities. It is known that these facts can favor a vicious cycle of fear of movement, avoidance behavior, functional decrease, and exacerbation of pain (Larsson et al., 2016b; Miller et al., 2020; Vicent et al., 2014). In other words, hypomobile can also culminate in catastrophizing pain.

Although in this study the catastrophizing of pain and kinesiophobia was not investigated as the objective of the research was to assess the influence of the pandemic on the pain and behavioral profile of patients with chronic pain, these are phenomena inherent to the most of CP patients and probably have influenced our findings. However, to date, there are no published studies that evaluated these aspects during quarantine.

Physical exercise is considered a "gold standard" non-pharmacological treatment in CP (Geneen et al., 2017) with proven efficacy for improving pain intensity and frequency, modifying psycho-emotional aspects, including anxiety, depression and kinesiophobia, in addition to improving quality of life and sleep (Geneen et al., 2017; Sluka et al., 2018). It is one of the

main modulators of the regulation of endorphins, enkephalins, reduction of glutamatergic and substance P excitation in the CNS (Sluka et al., 2018). It is also known that multimodal therapies, associating exercise with pain education programs and cognitive behavioral therapy, bring more benefits to these patients (Joypaul et al., 2019).

In addition, physical inactivity may also be associated with decreased cardiovascular, respiratory, and musculoskeletal capacity during the COVID-19 pandemic (Woods et al., 2020). That said, WHO recommended that exercises and other health care be carried out by telerehabilitation during the pandemic period (Woods et al., 2020). However, some guidelines for implementation and professional training need to be considered, such as establishing efficient communication with the patient, encouraging self-care, using motivation strategies, and educating the patient with accessible language (Fioratti et al., 2020). Also, further studies are needed to prove the effectiveness and cost-effectiveness of a new model of care for CP.

The realization of this study with individuals with chronic pain who had already been seen by a pain and movement clinic (LAPENE-UFS) took place to guarantee the clinical diagnosis of the sample as attested by the team, with the research being carried out remotely, and as a mean of aiding these unassisted patients due to quarantine. However, with this, the inference of this sample has a regional aspect and may not be applicable to all CP patients from other locations.

It is worth mentioning that the incidence and lethality rates for COVID-19 in Brazil varied between regions, with Sergipe, a state in the Northeast region, where this study was conducted, presented approximately 322.8 cases for every 10,000 inhabitants and a lethality rate 2% (Martins-Filho et al., 2020). In Brazil, these rates are strongly associated with social inequality, with factors such as education, housing, and income, influencing the highest number of cases in peripheral urban areas (Pires et al., 2020).

As we can see in our study, most of the sample lived in the capital, in neighborhood houses, sharing their residence with 2 to 4 people, high school education and higher level of unemployment. We emphasize that our data collection was done at the time of the greatest quarantine restriction, which started in Sergipe on March 17, 2020.

Despite the regional factor, this research has important clinical relevance to understand the influence of the pandemic on individuals with chronic pain and to direct health care for these patients during this period as *a posteriori*.

5. Conclusion

Physical inactivity during the quarantine period of the COVID-19 pandemic has been shown to predispose the worsening of pain characteristics and psycho-emotional aspects in individuals with chronic pain. The increase in the intensity and frequency of pain and anxiety in these patients negatively influenced the quality of sleep, increased the feeling of sadness and fear, and consequently, impaired the quality of life. We emphasize the need to prepare health professionals and researchers in pain to care for these patients in the post-pandemic moment, considering the multidimensional character of pain and changes that the forties period caused in individuals with chronic pain. We are also able to highlight the need to encourage regular physical exercise for patients with chronic pain.

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