Pain self-efficacy and physical activity during COVID-19-related social distancing: cross-sectional study

Autoeficácia para dor e atividade física durante o distanciamento social relacionado à COVID-19: estudo transversal

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ABSTRACT

BACKGROUND AND OBJECTIVES: The COVID-19 pandemic has impacted the practice of physical activity in the population with musculoskeletal pain, and one of the ways to increase the performance of physical activity is to stimulate pain self-efficacy. However, to date, no study that brought the association between self-efficacy and physical activity in this population has been observed in the literature. The aim of this study was to analyze the association of the level of pain self-efficacy and physical activity weekly time in the population with pain during social distancing related to the COVID-19 pandemic in the states of Ceará and São Paulo.

METHODS: This study is characterized as a cross-sectional study with a quantitative approach. Data collection was performed using an electronic form. To identify the association between pain self-efficacy (*Pain Self-Efficacy Questionnaire*) and physical activity weekly time (dependent variable) in the population with pain, a multiple linear regression was performed.

RESULTS: Self-efficacy showed a direct association (ß = 0.015; p = 0.0016) with the time of physical activity practiced during the pandemic. Other variables were associated with longer time of physical activity, such as lower pain intensity during the pandemic (ß = -0.064; p = 0.0223), lower body mass index (ß = -0.036; p = 0.0004), the male gender (ß = -0.441; p<0.0001) and absence of reported comorbidities (ß = -0.297; p = 0.0116). The history of positive diagnosis for COVID-19 was not associated with the physical activity duration (p = 0.5347) in an alternative model.

CONCLUSION: A direct association between pain self-efficacy and time of physical activity in the population with musculoskeletal pain during COVID-19-related social distancing was identified.

Keywords: Exercise therapy, Health belief model, Pain.

RESUMO

JUSTIFICATIVA E OBJETIVOS: A pandemia de COVID-19 impactou a prática de atividade física da população com dor musculoesquelética (DME), e um dos modos de ampliar a realização da atividade física é estimulando a autoeficácia para dor. Entretanto, até o momento, não se observou na literatura qualquer estudo que trouxesse a relação entre autoeficácia e atividade física nessa população. O objetivo deste estudo foi analisar a associação do nível de autoeficácia e do tempo semanal de prática de atividade física na população com dor durante o distanciamento social relacionado à pandemia de COVID-19 nos estados do Ceará e São Paulo.

MÉTODOS: Este estudo se caracteriza como um estudo transversal com abordagem quantitativa. A coleta de dados foi realizada a partir de um formulário eletrônico. Para identificação da associação entre autoeficácia (Pain Self-Efficacy Questionnaire) e tempo semanal de prática de atividade física (variável dependente) na população com dor, foi realizada uma regressão linear múltipla.

RESULTADOS: A autoeficácia apresentou relação direta (ß = 0,015; p = 0,0016) com tempo de atividade física praticada durante a pandemia. Outras variáveis apresentaram associação com maior tempo de prática de atividade física, como menor intensidade de dor durante a pandemia (ß = -0,064; p = 0,0223), menor índice de massa corporal (ß = -0,036; p=0,0004), ser do sexo masculino (ß = -0,441; p<0,0001) e relatar ausência de comorbidades (ß = -0,297; p = 0,0116). O histórico de diagnóstico positivo para COVID-19 não apresentou associação com tempo de atividade física (p = 0,5347).

CONCLUSÃO: Identificou-se associação direta entre autoeficácia para dor e tempo de prática de atividade física na população com dor musculoesquelética durante o distanciamento social relacionado à COVID-19.

Descritores: Dor, Modelo de crenças de saúde, Terapia por exercício.

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HIGHLIGHTS

- Greater self-efficacy for pain management was associated with more time of physical activities during the pandemic.
- More time of physical activities was also associated with lower pain intensity during the pandemic.
- History of positive diagnosis for COVID-19 did not show association with time of physical activity during the pandemic.

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INTRODUCTION

The pandemic caused by the new coronavirus (COVID-19) was declared a global emergency by the World Health Organization[1], with a higher death rate among middle-aged and older adults in different geographic locations worldwide[2]. In Brazil, the broad impact of COVID-19 has also been observed. From February to December 2020, 462149 hospital admissions were recorded in the Hospital Information System (*Sistema de Informações Hospitalares)* of the Brazilian public health system, SUS (*Sistema Único de Saúde*), with the main objective of treating the population contaminated by the SARS-CoV-2 virus, corresponding to a cost of about R$ 2.2 billion Brazilian *reais*[3].

To control COVID-19 worldwide, a series of measures were recommended with the goal of reducing the population's physical contact, such as closing public spaces and schools, reducing international flights, and, the main one: social distancing[4]. This social distancing was also implemented in Brazil with the recommendation that it should reach more than 55% of the population for an effective reduction in the number of deaths[5]. In Brazil, different characteristics in the adherence to social distancing were observed: women adhered more than men, people with higher schooling had less adherence, on the other hand, people with higher schooling restricted more the circulation of non-residents in their homes[6].

In addition, different levels of adherence to social distancing were observed among geographically and economically different states, such as Ceará (43.4%) and São Paulo (37.1%)[7], in addition to different specific social distancing measures determined by the governors of each state over time[8]. These local conditions of management of COVID-19 may be related to the different conditions of coping and severity of the disease over time, since in Fortaleza - CE, the mortality rate was 191 per 100000 inhabitants, while in the city of São Paulo - SP it was 125 per 100000 inhabitants[9].

However, social withdrawal also caused repercussions in the population with musculoskeletal pain (MSP), of which 65.3% believe they experienced increased severity and 64.7% increased pain interference during social distancing in the United States, measured by the Brief Pain Inventory, which contemplates performing activities, abilities to walk and enjoy life, work, mood and sleep[10].

The definition of pain is constructed from unpleasant sensory and emotional experiences, but it also shares individualized psychosocial factors[11], such as stress and anxiety levels, which are directly related to the degree of interference of pain during social distancing[10]. MSP can also be divided according to its duration into acute and chronic (more than 3 months) and, in Brazil, it affects about 45% of the general population[12]. One of the possible ways to act in the management of acute and chronic MSP during the pandemic of COVID-19 is through strategies that increase the patient's self-efficacy for symptom management[13].

Pain self-efficacy is defined as the confidence one has in dealing with his or her pain, and pain coping behavior involves the belief in one's ability to provide the resources necessary to deal with pain[14]. Higher levels of self-efficacy have been related to lower pain intensity, greater perception of clinical improvement and fewer physical therapy sessions[15]. One of the tools to act on the level of self-efficacy for pain are the performance of tasks associated with physical and verbal feedback. In addition, the patient's recognition that the task was successfully performed can help maintain the behavior of interest[14].

Another possibility to increase levels of self-efficacy for pain is education in pain neuroscience, especially in the first weeks of treatment, through oral explanations, metaphors, and diagrams[16]. In the context of the COVID-19 pandemic, higher self-efficacy has been related to lower levels of anxiety[17] and psychological stress, meaning that individuals with higher self-efficacy and engagement in preventive behaviors against COVID-19 have better mental health in times of crisis[18].

COVID-19 brought yet another limitation to the population with MSP, the reduction of physical activity, both in Brazil[19] and other countries[10,20]. In that sense, social distancing interfered in the physical strategies related to pain management[11], such as reducing the amount of physical activities[10,19,20]. Physical activities and exercise are effective means to treat MSP, and they can produce beneficial effects on pain intensity, physical function and quality of life of the practitioner[21,22].

Stimulating self-efficacy is one of the ways to increase exercise[23], including in patients with MSP[24]. However, so far, there has been no study observed in the literature that brings the association between self-efficacy and physical activity in the population with MSP during the COVID-19 pandemic. The association between the level of pain self-efficacy and time performing physical activities in the population with pain is relevant and needs to be investigated also during social distancing. Thus, since there is a correlation between social, biological, and psychological factors, as well as variables related to confinement[25], self-efficacy for pain may be presented as a therapeutic alternative for the population with pain in the current pandemic context.

The objective of the present study was to analyze the association of the level of self-efficacy and physical activity in the population with pain during social distancing related to the COVID-19 pandemic in the states of Ceará and São Paulo.

METHODS

The STrengthening the Reporting of OBservational studies in Epidemiology (STROBE Checklist) guidelines were considered for the proper reporting of the study steps.

Study design

This study is characterized as a cross-sectional observational study with a non-experimental quantitative approach. The study was approved by the Research Ethics Committee (CAAE No. 40922620.4.0000.5040, opinion No: 4.482.525).

Sample calculation, criteria, and origin of participants

The sample collected was calculated considering the tolerable sampling error of 5%, through the formula n= (N.n0) /(N+n0), using Microsoft Excel®. The minimum approximate sample size calculated was 400 (n0) individuals in Ceará and 400 individuals

in São Paulo, for a total of 800 people. Individuals over the age of 18 years old, of both genders, residents in these states and with a report of pain during social withdrawal were included. A total of 127 people were excluded from the data collection, among the reasons being the non-acceptance of the Free and Informed Consent Term (FICT) located at the beginning of the questionnaire, which did not generate responses (4 responses). In addition, 123 people who answered the questionnaire but did not report MSP during the pandemic in their answers were also excluded. Therefore, a total of 913 respondents was obtained, 431 individuals from the state of Ceará and 482 from São Paulo.

Variables and description of data collection

Data collection was done using an electronic form with objective questions. The recruitment of participants was done through sharing the link to the Google® electronic form, along with a summary about the study objectives, through social networks and electronic newspaper. The period of dissemination, follow-up, and data collection occurred from December 2020 to May 2021. The electronic form was composed of three stages. The first was about agreeing to the research by signing the FICT. The second one contained a sociodemographic questionnaire, and the third one contained the Pain Self-Efficacy Questionnaire (PSEQ-10), to assess the level of self-efficacy in the studied population.

Sociodemographic questionnaire

The second stage of the form was composed of a questionnaire with questions for the characterization of the sample with questions about age, gender, weight (kg), height (m), presence of comorbidities, report of positive COVID-19 diagnosis, and hospital stay status during the pandemic. Body mass index (BMI) was later calculated from the answers of weight (kg) and height (m), with the formula BMI=weight/height^2. There were questions regarding compliance with social distancing (no, partially, totally) and duration of MSP before the pandemic. The answers were grouped in a binary condition (yes/no) regarding the presence of chronic pain (longer than three months) or not (lasting less than three months or no report of pain before the pandemic).

In addition, the average pain intensity before and during the pandemic was assessed in a self-reported manner, through a numeric pain scale from zero to 10 points, in which zero would be a pain-free condition and 10 would be the worst pain imaginable[21].

Self-reported levels of stress and anxiety were measured by means of a zero to 10-point scale, in which zero corresponds to no anxiety/no stress and 10 refers to extreme stress/anxiety.

The practice of physical activities was answered with five options (zero = did not perform physical activity; 1 = less than 30 minutes per week; 2 = 30 to 75 minutes per week; 3 = 75 to 150 minutes per week; 4 = more than 150 minutes per week).

Pain self-efficacy (PSEQ)

The quantification of self-efficacy was obtained by the PSEQ[22]. This questionnaire, in its Portuguese language version, has adequate validity and reproducibility (Cronbach's alpha of 0.90)[22]. The questionnaire consists of 10 items referring to the performance of daily tasks, evaluated on a scale of zero to six, where zero corresponds to not at all confident and six corresponds to totally confident. The total score ranges from zero to 60, with higher scores reflecting stronger self-efficacy beliefs.

Strategies for minimizing biases

As strategies to minimize biases, simple and easy-to-interpret language was used, avoiding very difficult words. In addition, questions with ready answers (to tick) were prioritized, in order to better direct respondents in comprehending the questions, as well as in choosing their answers.

Statistical analysis

The data were organized in Microsoft Excel® and later processed in GraphPad Prism® version 9.0. For the sample characterization, data were described as absolute and percentage frequency, when categorical. Numerical data were expressed as mean and standard deviation. A multiple linear regression was performed in order to identify the association between self-efficacy and level of physical activity (dependent variable) in the population with pain.

The selection of variables for this model was performed according to Directed Acyclic Graphs (DAG)[26], constructed based on the following categorized variables: age (1 = 18 to 35 years; 2 = 36 to 65 years; 3 = over 65 years), gender (1 = male; 2 = female), presence of comorbidities (zero = no; 1 = yes), state during the pandemic (1 = Ceará; 2 = São Paulo), compliance with social distancing (zero = did not withdraw; 1 = did partial distancing, which included going to the supermarket, pharmacies, and work; 2 = fully adhered to social distancing, except for hospital emergencies), prior chronic MSP longer than 3 months before the pandemic (1 = yes) or lasting less than three months or no report of pain (zero = no).

Furthermore, the following continuous variables were added to the model: pain intensity before and during the pandemic (zero to 10 points scale), self-reported stress levels (zero to 10 points scale), self-reported anxiety level (zero to 10 points scale), and BMI (Figure 1). A second multiple linear regression was conducted with the addition of the variable related to COVID-19 diagnosis, considering positivity or not (zero = no; 1 = yes) during this period. A comparison between the two models was also performed to identify a model to be prioritized with the extra sum-of-squares F test. A significance level of 5% was determined for the proposed analyses.

RESULTS

This study had a total of 913 respondents, most of whom were female, aged 18 to 35 years, with a postgraduate degree, and with no comorbidities. The majority of the population partially adhered to social distancing, which included going to the supermarket, pharmacies, and work. Less than 21% of the respondents had a confirmed diagnosis of COVID-19. As for the time of exercise during the pandemic, the majority of the population in this study was sedentary, on the other hand, less than 20%

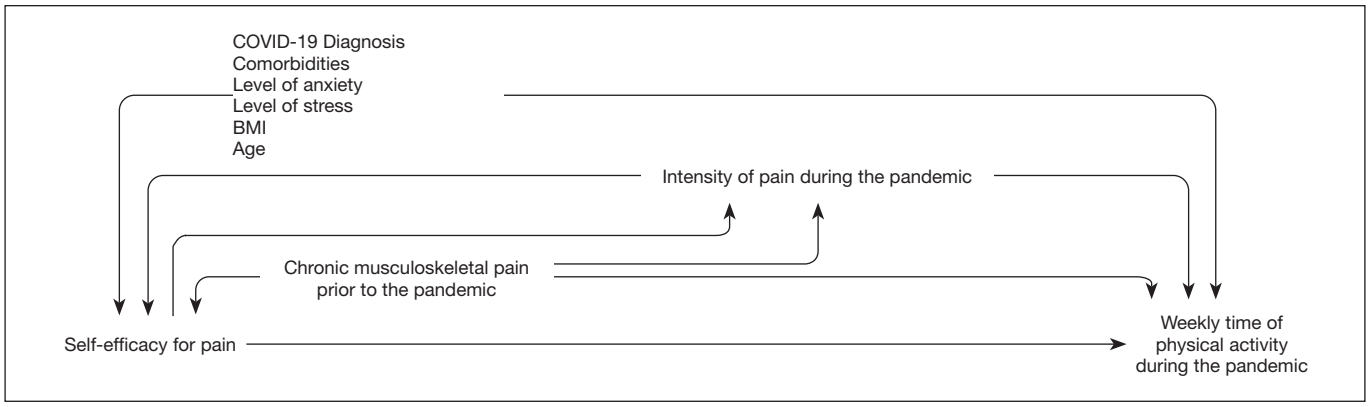

Figure 1. Directed Acyclic Graphs of the association model between studied variables for the verification of the association between self-efficacy for pain and weekly time of physical activity during the COVID-19 pandemic.

Table 1. Characterization of the sample and life habits in the population analyzed in the states of Ceará, São Paulo, and in a cluster analysis (n=913).

	Ceará (n=431) n (%)	São Paulo (n=482) n (%)	All data (n=913) n (%)
Gender			
Male	122 (28.3)	128 (26.6)	250 (27.4)
Female	309 (71.7)	354 (73.4)	663 (72.6)
Age (years)			
18 to 35	276 (64)	243 (50.4)	519 (56.8)
36 to 65	148 (34.3)	228 (47.3)	376 (41.2)
More than 65	7 (1.6)	11 (2.3)	18 (2)
Schooling			
Elementary incomplete	4 (0.9)	5 (1)	9 (1)
Elementary complete	1 (0.2)	2 (0.4)	3 (0.3)
Secondary incomplete	1 (0.2)	7 (1.5)	8 (0.9)
Secondary complete	45 (10.4)	66 (13.7)	111 (12.2)
Higher education incomplete	123 (28.5)	78 (16.2)	201 (22)
Higher education complete	103 (23.9)	125 (25.9)	228 (25)
Post-graduation	154 (35.7)	199 (41.3)	353 (38.7)
Alcoholism			
No	191 (44.3)	164 (34)	355 (38.9)
Yes	240 (55.7)	318 (66)	588 (61.1)
Smoking			
No	411 (95.4)	434 (90	845 (92.6)
Yes	20 (4.6)	48 (10)	68 (7.4)
Presence of comorbidities			
No	310 (71.9)	347 (72)	657 (72)
Yes	121 (28.1)	135 (28)	256 (28)
Weekly time of exercise during the pandemic			
No exercise	129 (29.9)	123 (25.5)	252 (27.6)
Less than 30 minutes per week	39 (9.0)	46 (9.5)	85 (9.3)
From 30 to 75 minutes per week	94 (21.8)	119 (24.7)	213 (23.3)
From 75 to 150 minutes per week	88 (20.4)	96 (19.9)	184 (20.2)
More than 150 minutes	81 (18.8)	98 (20.3)	179 (19.6)
Adherence to social distancing			
No	26 (6)	40 (8.3)	66 (7.2)
Partially	327 (75.9)	386 (80.1)	713(78.1)
Fully	78 (8.1)	56 (11.6)	134(4.7)

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Table 1. Characterization of the sample and life habits in the population analyzed in the states of Ceará, São Paulo, and in a cluster analysis (n=913) – continuation.

	Ceará (n=431) n (%)	São Paulo (n=482) n (%)	All data (n=913) n (%)
Confirmed COVID-19 diagnosis			
No	311 (72.2)	411 (75.3)	722 (79.1)
Yes	120 (27.8)	71 (14.7)	191 (20.9)
Chronic pain prior to the pandemic			
No	176 (40.8)	181 (37.5)	357 (39.1)
Yes	255 (59.2)	301 (62.5)	556 (60.9)

Table 2. Psychosocial factors, pain and body mass index of the population analyzed in the states of Ceará and São Paulo and in cluster analysis (n=913).

	Ceará (n = 431) Mean (SD)	São Paulo (n = 482) Mean (SD)	All data (n = 913) Mean (SD)
Pain self-efficacy (0-60 points)	47.8 (10.1)	44.4 (12.1)	46.0 (11.3)
Stress levels (0-10 points)	7.6 (2.5)	7.8 (2.4)	7.7 (2.4)
Anxiety levels (0-10 points)	7.3 (2.8)	7.7 (2.4)	7.5 (2.6)
Mean pain intensity before the pandemic (0-10 points)	3.9 (3.0)	3.8 (3.1)	3.8 (3.0)
Mean pain intensity during the pandemic (0-10 points)	6.6 (2.1)	6.6 (2.2)	6.6 (2.1)
BMI (kg/m^2)	27 (5.1)	26.2 (5.2)	26.6 (5.2)

BMI = body mass index; SD = standard deviation

reported practicing more than 150 minutes of physical activity per week (Table 1). As a characterization of body mass, the mean BMI was greater than 26 kg/m^2 (Table 2).

Regarding psychosocial factors, self-reported stress and anxiety were higher than seven/10 points. In addition, variation in MSP

Table 3. Association between level of pain self-efficacy and time of physical activity practice during social distancing related to COVID-19.

	Model influenced by COVID-19			Model not influenced by COVID-19		
	β	95% CI	P value	β	95% CI	P value
Time of physical activity practice	-	-	-	-	-	-
Chronic pain prior to the pandemic	0.1514	-0.04299 to 0.3458	0.1267	0.1523	-0.04203 to 0.3465	0.1244
Anxiety levels (0-10 points)	0.03975	-0.01305 to 0.09256	0.1399	0.04069	-0.01201 to 0.09339	0.1301
Stress levels (0-10 points)	-0.04766	-0.1056 to 0.01026	0.1067	-0.04837	-0.1062 to 0.009492	0.1012
Pain during the pandemic (0-10 points)	-0.05840	-0.1120 to -0.004817	0.0327*	-0.05863	-0.1122 to -0.005075	0.0319*
Pain self-efficacy (0-60 points)	0.01477	0.005403 to 0.02414	0.0020*	0.01482	0.005456 to 0.02418	0.0020*
Brazilian state during the pandemic COVID-19	0.1307	-0.06063 to 0.3221	0.1803	0.1391	-0.05044 to 0.3286	0.1501
Age	-0.08943	-0.2788 to 0.09989	0.3541	-0.08300	-0.2712 to 0.1052	0.3869
BMI (kg/m^2)	-0.03520	-0.05533 to -0.01508	0.0006*	-0.03547	-0.05557 to -0.01537	0.0006*
Gender	-0.4370	-0.6546 to -0.2193	<0.0001*	-0.4352	-0.6527 to -0.2177	<0.0001*
Presence of comorbidity	-0.3025	-0.5339 to -0.07113	0.0105*	-0.3038	-0.5351 to -0.07254	0.0101*
COVID-19 diagnosis	-0.07292	-0.3033 to 0.1575	0.5347	-	-	-

*Multiple linear regression (p<0.05). β= estimated values. 95% CI = 95% confidence interval. Practicing physical activities was answered with five options (0 = did not perform physical activity; 1 = less than 30 minutes per week; 2 = 30 to 75 minutes per week; 3 = 75 to 150 minutes per week; 4 = more than 150 minutes per week). Age (1 = 18 to 35 years; 2 = 36 to 65 years; 3 = over 65 years), gender (1 = male; 2 = female), presence of comorbidities (0 = no; 1 = yes), state during the pandemic (1 = Ceará; 2 = São Paulo), compliance with social distancing (0 = did not withdraw; 1 = did partial distancing, which included going to the supermarket, pharmacies, and work; 2 = fully adhered to social distancing, except for hospital emergencies), chronic pain longer than three months before the pandemic (1 = yes) or lasting less than three months or no report of pain (0 = no). Pain intensity before and during the pandemic (0 to 10 points scale), self-reported stress levels (0 to 10 points scale), self-reported anxiety level (0 to 10 points scale), and BMI (Weight/Height^2). COVID-19 diagnosis (0 = no; 1 = yes).

intensity of approximately three points more was identified between reports during the pandemic and reports of preexisting MSP (Table 2).

Two multiple linear regression models were previously constructed and confirmation of the diagnosis of COVID-19 was added as a possible confounding variable in Model 2. However, the models showed no difference between them (p=0.534). Therefore, the Model 1 was chosen to answer the study question.

Self-efficacy was directly related to the time of physical activity during the pandemic (0.01482; 95% CI 0.005456 to 0.02418; p=0.0020). Other variables also showed association with longer time of physical activity, such as lower pain intensity during the pandemic (-0.05863; 95% CI -0.1122 to -0.005075; p=0.0319), lower BMI (-0.03547; 95% CI -0.05557 to -0.01537; p=0.0006), male gender (-0.4352; 95% CI 0.6527 to -0.2177; p<0.0001) and reporting no comorbidities (-0.3038; 95% CI -0.5351 to 0.07254; p=0.0101) (Table 3).

A few exploratory analyses were performed in this study. In the first analysis, a higher level of self-efficacy was identified in the population of the state of Ceará in relation to the state of São Paulo (-4; 95% CI -4 to -1; p<0.0001), using the Mann-Whitney test. The second analysis compared mean pain intensity before the pandemic with mean pain intensity during the pandemic and showed a difference of two points in the median of the paired Wilcoxon test (2; 95% CI 2 to 3; p<0.0001). In the third analysis, a negative and moderate Spearman correlation (r = -0.487; p<0.0001) was identified between the level of pain self-efficacy and pain intensity during the social distancing imposed by the pandemic.

DISCUSSION

The higher self-efficacy for pain was indeed directly associated with more weekly time of physical activities in the population with pain during social distancing in São Paulo and Ceará. Higher levels of self-efficacy for pain management have also been related to more practice of physical activities in patients with osteoarthritis[27] and cardiac problems[23], acting as a possible mediator of adherence to physical activity[28]. Thus, the use of diversified strategies such as pain neuroscience education[16] and performance of graded tasks associated with immediate feedbacks[14] can be a means of promoting increased levels of self-efficacy for pain.

The present study showed that less than 40% of the investigated population reached the time of physical activity practice recommended by international agencies, regardless of the intensity of the exercise. Physical activities practice has specific guidelines, and the American College of Sports Medicine[29] suggests these guidelines for the general population, and the International Association for the Study of Pain[30] guides the practice of physical activity for the population with chronic pain.

In both recommendations, the time to be achieved is 150 minutes of moderate activity or 75 minutes of vigorous activity[29,30]. Considering the updated physical activity practice guideline published by the World Health Organization in 2020, in which the time to be spent is now 150 to 300 minutes of moderate activity and 75 to 150 minutes of vigorous activity for adults[29], the present sample would present even lower adherence to the new recommendations, both for adults and older adults. The low adherence to the recommendations for physical activity observed in the sample may have

occurred because part of the respondents are still in the process of progressively resuming the frequency and/or duration of physical activity after relaxing the measures of isolation and social distancing, which have coincided with the time of data collection in the present study.

On the other hand, about 27% of respondents did not practice physical activities. Already in 2019, in the national surveillance study of risk factors and chronic diseases, the number of people considered physically inactive in Brazil was 13.9% of the population[31], showing a substantial increase. This is a worrisome data, because non-adherence to the recommended time of physical activity[29,30] can influence the intensity of MSP[21]. Furthermore, physical activity was compromised in several countries[10,19,24] due to the COVID-19 pandemic, which may have reinforced sedentary behavior in the population[25], including in the population with pain.

The inverse relationship of time practicing physical activities and pain intensity during the pandemic was also observed in the present multivariate model. Exercise and physical activity have already been widely reported in the literature as a possible pathway to reduce pain intensity, both in chronic MSP conditions in general[21] and in specific sites, such as the lumbar spine[16,22] and shoulder[32,33]. However, pre-existing chronic pain was not related to the weekly duration of physical activity in this model, meaning that the current pandemic context had a greater influence on the duration of physical activity.

Other variables in the model also showed an association with longer time of physical activity, such as lower BMI and being male. Overweight is already associated with an impact on the level of physical activity during the pandemic of COVID-19[19].

In addition, longer weekly time of physical activities tends to provide weight loss and reduce abdominal obesity[29]. Regarding the participants gender, there are three different observations in the literature. The first study showed no difference between genders regarding the level of physical activity[19], while the second and third studies showed males to be more physically active both in conditions prior to the pandemic[31] and during the pandemic[25]. This difference in physical activity practice between men and women may be related to different distancing habits, with males adhering less to distancing[6]. On the other hand, an increase in sedentary behavior is also observed in females, with more television and tablet/computer use time during the pandemic[25].

The other variables (chronic pain before the pandemic, home state during the time of social distancing, anxiety level, stress level, age, and confirmation of COVID-19 diagnosis) showed no association with the model. In this context, no difference was observed in the weekly time of physical activity among the Brazilian states studied, even though they had different characteristics both in adherence to social distancing[7] and adherence to the 150-minute weekly time of physical activity before the pandemic[31]. As for the comparison of the proposed statistical models, the COVID-19 diagnosis was not decisive for the construction of a model that could represent how pain self-efficacy influenced the practice of longer periods of physical activity during social distancing.

Possible Implications for clinicians and future directions

The data were collected during the COVID-19 pandemic, and approaches directed toward improving self-efficacy for pain may be an alternative to extending weekly physical activity time for the pain population during the pandemic, including via telerehabilitation. It is essential for clinicians to develop skills to work with pain self-efficacy strategies in the clinical setting in order to increase the weekly time of physical activity, increasing the ability to manage MSP conditions. With this increase in physical activity, the belief is that pain intensity can be modulated more efficiently, as already described in the literature[21,22]. Furthermore, the moderating effect of the level of self-efficacy on the time of physical activity practices should be investigated in a longitudinal study.

Limitations of the study

The study presented some limitations. Firstly, the study was composed of a population with a high level of schooling, which could be divergent if the data was extrapolated to the general population. The second is related to the identification of exercise intensity, whether moderate or vigorous, because vigorous exercises can be performed with a shorter weekly duration than moderate exercises, according to international recommendations[29,30]. Also, the individualization of exercise and the respondents' level of knowledge about what would be considered vigorous or moderate intensity for them could have different interpretations, making classification difficult, especially for the population with lower schooling levels. The third limitation is related to the questions about pain in the moments prior to the pandemic, because memorization bias may interfere with the confidence of the answers found. Finally, the last limitation is that, since this is an internet-dependent data collection, the population without internet access may not have been effectively represented.

CONCLUSION

An association was identified between pain self-efficacy and time spent in physical activity practices in the population with MSP during the social distancing imposed by the COVID-19 pandemic in the two Brazilian states investigated. Other factors were also associated with greater weekly time of physical activities, such as lower pain intensity during the pandemic, being male and reporting no comorbidities.

AUTHORS' CONTRIBUTIONS

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Statistical analysis, Data Collection, Conceptualization, Resource Management, Project Management, Research, Methodology, Writing – Preparation of the original, Writing – Review and Editing

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