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Research paper

Does volume of physical exercise have an effect on depression in patients with fibromyalgia?☆

Alexandro Andrade*, Ricardo de Azevedo Klumb Steffens, Guilherme Torres Vilarino, Sofia Mendes Sieczkowska, Danilo Reis Coimbra

Department of Physical Education, Laboratory of Psychology of Sport and Exercise, Center of Health Sciences and Sports, Santa Catarina State University, Brazil

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ABSTRACT

Background: Fibromyalgia Syndrome (FMS) is a musculoskeletal disorder frequently associated with depression. We aimed to investigate the association between physical exercise (PE) and depression in patients with FMS, and to evaluate the effect of the weekly volume of PE on depression.

Methods: A total of 215 FMS patients with depression were evaluated with the Beck Depression Inventory, and were also classified as inactive, insufficiently active, or active. We performed binary logistic regression, with PE as the dependent variable and the level of depression as an independent variable. We also used the Mann-Whitney *U* test. An alpha value of 0.05 was determined to have significance ($p < 0.05$).

Results: Inactive patients with FMS have a higher rate of moderate to severe depression (29.1%) and major depression (25%) when compared with active patients. In comparing the depression index between inactive, insufficiently active, and active FMS patients according to the reported weekly volume of PE, we observed differences between inactive and active patients (p=0.035). The level of depression was positively associated with physical inactivity in FMS, and FMS patients with severe depression had 3.45 1.23–9.64) times the likelihood of being inactive than patients without depression or with minimal depression.

Limitations: The classification of PE does not distinguish between types of PE, or whether differences in activity can have different results in depression.

Conclusion: There was an association between PE and lower values of depression in patients with FMS, and the level of depression was positively and significantly associated with physical inactivity.

1. Introduction

Fibromyalgia syndrome (FMS) is characterized by chronic, widespread pain lasting more than three months, associated with other symptoms such as fatigue, morning stiffness, depression, and sleep disorders (Wolfe et al., 2010).

The etiology of FMS is still unknown; in the absence of diagnostic tests, the definition is controversial. A study in five European countries found a point prevalence of 2.9% in the FMS population (Branco et al., 2010), and the probability of FMS developing in women is nine times greater than in men (Berger et al., 2007).

Depression is listed as one of the main symptoms of FMS, and the prevalence ranges from 20% to 86%, depending on the study (Borchers and Gershwin, 2015); however, this relationship is not well understood. A study by Gracely et al. (2011) found that the influence of genetics and the environment and the interactions between these may predispose individuals to develop FMS and depression.

Aguglia et al. (2011) reported that 83.3% of FMS patients had clinically significant depressive symptoms; the worse these symptoms were, the higher the scores for pain levels and the lower the quality of life, compared to those without depressive symptoms.

The literature reports that physical exercise (PE) is important to lessen the depressive symptoms in patients with FMS. Häuser et al. (2010) observed through a meta-analysis that aerobic exercise reduces depression scores in this population. Vural et al. (2014) observed that aerobic exercise is effective in the treatment of FMS, with significant improvement in the average values for functionality, pain, fatigue, rest, stiffness, anxiety, depression, and impact on quality of life.

In addition to aerobic exercise, strength training also has positive effects in reducing depressive symptoms. Bircan et al. (2008) found significant differences in depression reduction in groups of patients with FMS who performed aerobic exercise or strength training;

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* Correspondence to: Center of Health Sciences and Sports, Santa Catarina State University. Pascoal Simone no 358, Santa Catarina, Brazil.
E-mail address: alexandro.andrade.phd@gmail.com (A. Andrade).

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however, there was no significant difference between the two exercise groups.

Thus, the objectives of this study were to investigate the association between PE and depression in patients with FMS, and to evaluate the effect of the weekly volume of PE on depression in these patients.

2. Methods

2.1. Participants

This cross-sectional cohort study included 215 residents of Florianópolis – SC with a clinical diagnosis of FMS and an average age of 51.27 (± 9.57) years, mostly composed of women. The sample was selected through the Sport Psychology Extension and Exercise applied health program at the State University of Santa Catarina – UDESC, and the inclusion criterion was a clinical diagnosis of FMS. The data were collected from 2009 to 2014. This study was approved by the Ethics Committee for Research Involving Human Subjects - University of the State of Santa Catarina, under numbers 18/2009 and 103/2010.

2.2. Measurement

2.2.1. Beck depression inventory

We used the Beck Depression Inventory (BDI) (Beck et al., 1961) for the assessment of depression; this instrument was validated by Gorenstein and Andrade (1996) for the Portuguese language. The BDI is an instrument commonly used to assess depression in FMS (Rivera et al., 2006); this instrument consists of 21 items on a scale from 0 to 3 points. The scale was categorized by Gorenstein and Andrade (1998) as: without depression or minimal depression, mild to moderate depression, moderate to severe depression, and severe depression.

2.2.2. Physical exercise

The level of physical exercise was assessed with a self-reported measure of PE, in which the patient reported what exercise was performed and the weekly volume. Patients were classified as inactive (do not perform any physical exercise regularly), insufficiently active (perform up to three times a week) or active (perform more than three times a week). The minimum practical duration was 30 min per session, but the intensity of PE was not verified. Self-reporting of PE performance is a valid and reliable measure, as demonstrated by Culos-Reed and Brawley (2000).

2.3. Statistical analyses

All analyses were conducted with Statistical Package for the Social Sciences (SPSS) for Windows (Version 20.0) using descriptive and inferential statistical procedures. First, we conducted an analysis using a binary logistic regression model, with the BDI scale as a predictor and binary PE as the outcome. The Pearson chi-square test was used to assess demographic variables mediating the association between PE and depression level. Results with $p < 0.2$ (Economic Status, Education and Employment) were entered into an adjusted model.

Next, we conducted binary logistic regression analysis to assess the association between volume of PE as a predictor and binary depression as the outcome. Data were adjusted for demographic variables (Age, Marital Status, Economic Status, and Employment). For all tests the *p*-value adopted was < 0.05.

3. Results

Two hundred and fifteen patients with FMS were selected, of which 209 (97, 2%) were women. The mean age of the sample was 51.27 ± 9.57. All other socio-demographic and clinical characteristics are displayed in Table 1. The main types of physical exercise practiced by patients with FMS included walking (40%), hydrogymnastics (8.57%), Pilates (7.14%), resistance exercise (5.71%), stretching (4.28%), walking and stretching (4.28%), yoga (2.8%), dance (1.42%), and physiotherapy (1.42%). Seventeen patients (24.28%) did not specify an exercise.

Table 1
Demographics variables of patients with fibromyalgia.

	N	M ± SD
Age (years)	215	51.27 ± 9.57
	N	Percentage
Gender		
Male	06	2.8%
Female	209	97.2%
Marital Status		
Single	35	16.3%
Married	127	59.1%
Separated	37	16.7%
Widower	17	7.9%
Economic Status[a]		
High	29	15.1%
Middle	29	15.1%
Low	134	69.8%
Employment[a]		
Yes	52	24.3%
No	60	28%
Retired	57	26.6%
Departed	45	21%
Education[a]		
Incomplete School	161	76.3%
Complete School	50	23.7%

[a] Missing in the variable.

The results of this study showed that of 215 patients with FMS, 75.34% (n=162) had depressive symptoms, ranging from mild to severe. Among inactive patients with FMS, 29.1% had moderate to severe depression and 25% had severe depression; active patients with FMS had lower rates:26.1% and 8.7%, respectively (Fig. 1).

Fig. 1 shows the depression level (BDI) in a general sample and in active and inactive fibromyalgia patients.

In the crude analysis, the probability of being inactive was greater in patients with FMS with severe depression (odds ratio [OR]=3.45; confidence interval [CI]=1.23–9.64). After adjusting the OR, only Education interfered with the association between PE and depression Level (OR=3.13; CI=1.10–8.87) (Table 2).

An association was observed between the volume of PE and depression, and the volume of PE needed to exert a protective effect for depression. Patients with fibromyalgia who exercise more than three times a week have an 87.5% lower risk of depression. However, in the adjusted OR this association was not significant ($p < 0,05$) (Table 3).

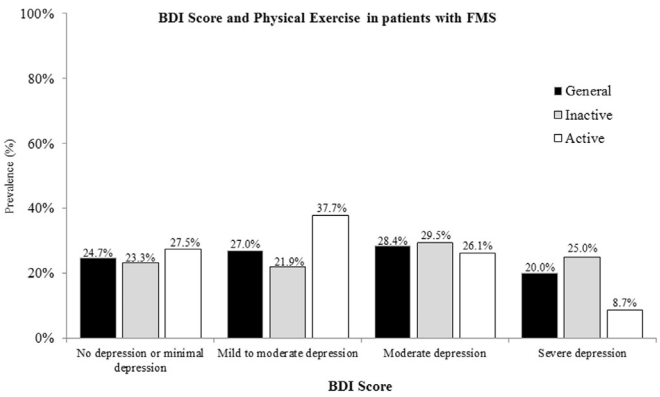

Fig. 1. Depression level (BDI) in general sample and among active or inactive fibromyalgia patients.