



Assessment of balance and functional capacity in fibromyalgia patients' with and without migraine

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Edited by:

Juliana Ramos de Andrade

Keywords:

Fibromyalgia
Migraine
Functional capacity
Balance

Abstract

Objective

To evaluate the balance and functional capacity of fibromyalgia patients' with and without migraine.

Methods

Observational study with 60 women, between 20 and 60 years old (47 ± 9 years), who were allocated into the following groups: 1. fibromyalgia and migraine ($n=49$); 2. only fibromyalgia ($n=11$). The following were used: Migraine Disability Assessment Test (MIDAS) to analyze the impact of migraine on quality of life; Revised Fibromyalgia Impact Questionnaire (FIQ-R) to assess the impact of fibromyalgia; six-minute walk test (6MWT) to assess functional capacity and Berg Balance Scale (BBE) for balance analysis.

Results

There was no difference between groups 1 and 2 regarding functional capacity (TC6M: $308.7 \text{ m} \pm 107.33$ vs. $298.8 \text{ m} \pm 153.54$; $p=0.55$) and balance (BBE: 48 ± 14 vs. 47 ± 16 ; $p=0.68$) as well as the impact on quality of life (FIQ: 78.8 ± 14.77 vs. 74.4 ± 13.99 ; $p=0.28$ and MIDAS: 31 ± 24).

Conclusions

Our study showed that there was no difference in functional capacity, balance and quality of life in fibromyalgia patients compared to patients with fibromyalgia associated with migraine.



Introduction

Fibromyalgia is a disease characterized by chronic pain, which affects mostly women. The main aspects of the fibromyalgia syndrome are generalized body pain and diffuse hyperalgesia.^{1,2} Migraine, in turn, is a primary and disabling headache, characterized by episodes of headaches, which have a unilateral, pulsatile character, with intensity from moderate to severe, duration of 4-72 hours, presence of symptoms such as nausea and/or vomiting, and photophobia and/or phonophobia. It can be classified as chronic migraine, with or without aura (focal neurological symptoms that may accompany or precede a headache episode).³

The prevalence of migraine in patients with fibromyalgia is 55.8%⁴, while the prevalence of fibromyalgia in patients with migraine is above 30%.^{5,6} The association between fibromyalgia and migraine could characterize a distinct disease, called fibromyalgia, which has common pathophysiological mechanisms.⁷ Patients with fibromyalgia, like migraine patients, have a decrease in functional capacity, expressed in the physical inability to perform activities of daily living.^{8,9} In addition, the balance of these patients may be impaired and associated with an increased number of falls.^{10,11}

These findings can be even more disabling in patients with fibromyalgia and migraine. The presence of migraine in patients with fibromyalgia may promote a greater reduction in functional capacity, to intensifying other symptoms such as sleep disturbances and increased pericranial sensitivity.^{12,13} In addition, migraine patients have balance disorders, which can be intensified in the presence of fibromyalgia.¹¹

There is little evidence in the literature of studies that compare balance and functional capacity in groups of patients with fibromyalgia in relation to patients with fibromigraine. Thus, the development of the present study can help in a better direction for evaluation and future treatments for patients with fibromyalgia and fibromigraine, two distinct conditions that can change the balance and functional capacity of patients individually. Therefore, the aim of this study is to evaluate the balance and functional capacity of fibromyalgia patients with and without migraine.

Methods

This is an observational, cross-sectional study, comparing two groups, developed from August 2019 to June 2020, in the

(Laboratory of Locomotor System), located in the Department of Physical Therapy of the Federal University of Pernambuco, in Recife, Pernambuco, Brazil. The research was approved by the Ethics Committee for Research with Human Beings of the Health Sciences Center - UFPE (number: 3.899.305). All participants signed the Informed Consent Form.

Sample

The sample consisted of women aged 20 to 60 years old, with a diagnosis of fibromyalgia established by a rheumatologist according to the criteria of the American College of Rheumatology.¹ For the diagnosis of migraine, an evaluation was performed by a physical therapist, with questions containing the diagnostic criteria for migraine established by the International Classification of Headache Disorders Criteria - beta version 2018.³

Women who had some other cardiorespiratory or cardiovascular disease that made it impossible to perform the physical tests used in the research, patients who used walking aids, those who had cognitive deficits or neurological disease that impaired understanding and performance of the evaluation were excluded.

Data Collection Procedures

The volunteers were screened by the list of medical records of the Rheumatology Outpatient Clinic of the *Hospital das Clínicas* of UFPE and invited to participate in the research through a phone call. Those who agreed to participate, affirmed their participation by signing an Informed Consent Form. Subsequently, the patients answered a socio-demographic questionnaire to characterize the groups.

Outcome Assessment

To evaluate the impact of migraine on quality of life, in the group of fibromyalgic and migraine patients, the Migraine Disability Assessment Test (MIDAS) was used. This test contains five items that measure the number of days lost in activities of daily living (ADLs) and professional (ADPs) due to the presence of migraine in the last three months. The patient states the number of days and, from the sum of the scores, the individual's degree of disability is classified (0-5 points: grade I - minimal disability; 6-10 points: grade II - mild disability; 11-20 points: grade III - moderate disability; >20 points: grade IV - severe disability).¹⁴



Similarly, to analyze the impact of fibromyalgia on the performance of activities of daily living, the Revised Fibromyalgia Impact Questionnaire (FIQ-R) – questionnaire validated and translated for the Brazilian population (Cronbach's alpha coefficient of 0.96). The instrument is composed of 21 questions that address three domains: function, global impact of fibromyalgia, and symptom intensity. The score can range from 0-100, the higher the score, the worse the quality of life.¹⁵

To analyze functional capacity, the six-minute walk test (6MWT) was performed, following the recommendations of the American Thoracic Society (ATS). Before the test, the patient rested for at least ten minutes. During this period, contraindications, blood pressure data, pulse oximetry, dyspnea level (Borg Scale), and heart rate were analyzed. Immediately after the collection of vital data, the patients were instructed to walk in a 30-meter corridor for 6 minutes. The distance walked (in meters) on the 6MWT of the patients was used to evaluate this outcome.¹⁶ To calculate the expected test distance for the study population, the following equation was used: $\text{expected distance} = (2.11 \times \text{height in cm}) - (2.29 \times \text{weight in Kg}) - (5.78 \times \text{age}) + 667 \text{ m}$. 139 m is subtracted from the final value for the lower limit of normality of the range.¹⁷

For the analysis of balance, the Berg Balance Scale (BBS) was used, which evaluates the dynamic and static balance of patients, as well as the risk of falls, considering

the influence of the environment on the individual's functionality. The BBS evaluates the functional balance performance with 14 tests, with the objective of analyzing the individual's ability to sit, stand, reach, turn around, look over his shoulders, stand on unipodal support, and go up and down steps. It has a maximum score of 56 points and a minimum score of 0 points. Each test has five alternatives ranging from 0 to 4 points. A score of 45 was considered as the cutoff point for risk of falls.¹⁸

Statistical Analysis

The database was entered into the Microsoft Excel program, version 2007, and the data were exported to the SPSS program, version 20.0, for data analysis, correcting possible errors. The data were presented as mean and confidence interval or n (number) and percentage. We used the Mann-Whitney test to assess differences between groups, considering significant when $p \geq 0.05$ and 95% confidence interval (CI).

Results

Of the 419 patients screened, 197 declined the invitation to participate in the research; 44 did not meet the eligibility criteria; and 68 patients were not located. Of the 110 eligible patients, 50 did not attend the evaluation. Finalizing the sample with 60 patients. Figure 1 shows the

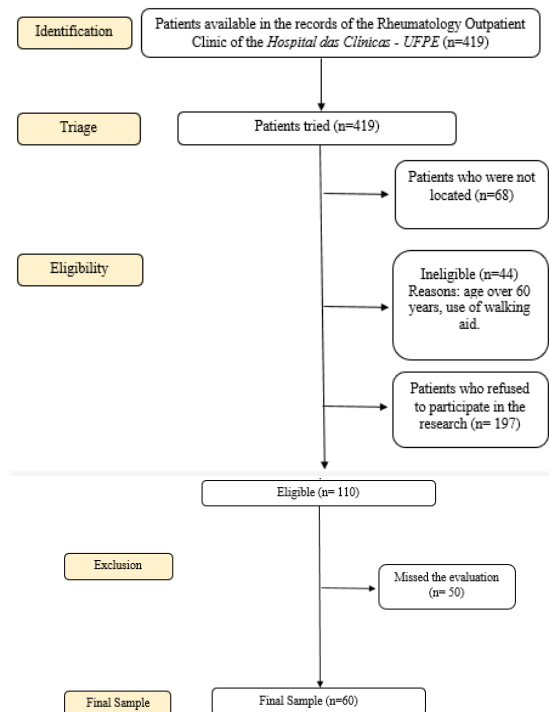


Figure 1. Flowchart of patient recruitment.



flowchart of the sample capture.

General characteristics of patients

The 60 patients evaluated were divided into two groups. Group 1 (n=49 volunteers) with fibromyalgia and migraine and group 2 (n=11 volunteers) with fibromyalgia. The characterization of the sample is described in table 1. There were no differences between the groups regarding the impact of fibromyalgia on the quality of life of the volunteers (G1=78,8±14,77 vs. G2=74,4±13,99; p=0,28).

Table 1. Demographic and laboratory parameters in the study cohort

Variables	Group Fibromyalgia and migraine (n= 49)	DP	Group Fibromyalgia without migraine (n= 11)	DP	p value*
Age (years)	47 (45-50)	(9)	50 (45-55)	(8)	0.35
Weight	71.8 (68-75.5)	(13.37)	70.5 (61.4-79.9)	(15.50)	0.41
Height	1.59 (1.56-1.61)	(0.08)	1.58 (1.53-1.62)	(0.07)	0.63
Time of diagnosis of fibromyalgia (years)	8 (7-10)	(6)	8 (4-12)	(6)	0.82
Aura					
yes (%)	29 (59.2%)				
no (%)	20 (40.8%)				
Frequency of headache (days/month)	14 (8-30)				
Intensity of headache (days/month)					
Weak	1 (2.0%)				
Moderate	17 (34.7%)				
Intense	31 (63.3%)				
Duration of headache (h/day)	19 (13-25)	(21)			
Impact of migraine (MIDAS)	31 (14.25-79.50)	(24)			
Impact of fibromyalgia (FIQ-R)	78.8 (74.7-83)	(14.77)	74.4 (66-82.7)	(13.99)	0.28

*p value Mann-Whitney test. Data were presented as mean and confidence interval or n (number) and percent. MIDAS: Migraine Disability Assessment; FIQ-R: Revised Fibromyalgia Impact Questionnaire.

Patients' characteristics regarding balance and functional capacity

The analysis of balance and functional capacity is described in table 2. Of the patients allocated in group 1, only 12% reached the predicted distance for the 6MWT; in group 2, this percentage increased to 27%. There was no difference between the groups regarding balance (48±14 vs. 47±16; p=0,68) and functional capacity (G1=308,7±107,33 vs. G2=298,8±153,54 meters covered; p=0,55).

Table 2. Functional Capacity and Balance Evaluation in a sample of 60 volunteers

Variables	Fibromyalgia and migraine (n=49)	DP	Fibromyalgia without migraine (n=11)	DP	p value*
Functional Capacity (6MWT - distance walked in meters)	308,7 (278.6-338,7)	(107.33)	298,8 (208.1-389,4)	(153.54)	0.55
Berg Balance Scale (BBS)	48 (44-51)	(14)	47 (38-57)	(16)	0.68

*p Mann-Whitney test value. Data were presented as mean and confidence interval.

Discussion

The present study pointed out that patients with fibromyalgia, when compared to patients with fibromigraine, do not present differences in balance and functional capacity. There is little evidence in the literature that compares functional capacity and balance in fibromyalgia patients with and without migraine. Therefore, this article is a pioneer study that investigates these outcomes in this population with the worst spectrum of pain. We emphasize the importance of conducting studies with this population of patients with fibromyalgia because their shared clinical and pathophysiological characteristics contribute significantly to the impact of these diseases on these individuals' lives.^{7,8}

Although this study did not find differences between the groups, a relevant reduction in functional capacity during the evaluation of the patients in both groups was remarkable. The patients walked a much shorter distance than that stipulated, according to what was expected for their anthropometric characteristics, during the 6MWT. This reduction was more evident in the group of patients with fibromigraine (88% of the patients did not reach the expected distance for the test) than in the group of patients with fibromyalgia (73% of the patients did not reach the expected distance). Therefore, a large part of the patients presented deficits in functional capacity, agreeing with the evidence reported in the literature.^{8,9}

Even with the reduction in functional capacity presented in the sample as a whole, no differences were found in this variable in relation to the presence of migraine among the fibromyalgia patients. A similar finding was found in a study¹⁹, in which the population analyzed was patients with fibromyalgia and migraine. In this study, it was observed that there was no difference between the functionality of patients with different levels of physical activity. However,



these findings diverge from most of the analyses found in the literature.^{7,20,21} Patients who have fibromyalgia and migraine may present a different clinical picture regarding symptomatology and the impact on the ability to perform activities of daily living, compared to patients who have only one of the disorders in isolation.⁷ In addition, fibromyalgia patients have a more severe pain spectrum condition, with worsening of both fibromyalgia and migraine.²⁰ The foremost differences observed between these findings and the study conducted are: the population, the instruments used, and the outcomes analyzed.

One of the factors that reinforce the fact that patients with the worst chronic pain spectrum will have the worst functional capacity is the presence of fatigue.²² Fatigue is a prevalent symptom in patients with fibromyalgia and it is related to the functional capacity, since it influences the performance of daily life activities.^{22,23} A cross-sectional observational study of 160 patients analyzed the presence of fatigue and other variables in women with migraine, fibromyalgia, or fibromigraine. The analysis concluded that there is an increased frequency of fatigue in women with fibromyalgia and migraine, which could suggest a worsening in functional capacity in this group compared to patients with fibromyalgia only.²⁴

When analyzing balance, no significant differences were found between the groups. Balance was evaluated by means of the Berg Balance Scale (BBS), in which the lower the score, the worse the balance, and a score below 45 was considered a negative indicator for balance that indicates risk of falls.^{18,25,26} It is known that the presence of chronic headache and aura in migraine patients triggers more reports of falls and dizziness²⁵ to the point of interfering with daily living activities.²⁶ These data diverge from what was found in the present study, where the BBS mean scores of patients in both groups were above 45, suggesting no increased risk of falls in the groups, especially in the group of women with migraine and fibromyalgia.

Despite this result, balance disorders are known to be among the 10 most disabling symptoms in adult fibromyalgia sufferers²⁷, besides presenting a negative deficit in patients with migraine, especially in static balance.¹¹ In a survey of 486 patients with fibromyalgia, it was found that approximately a little less than 70% of this population had balance disorders.²⁶ In addition, patients with migraine have dynamic and functional balance changes that impact the functional capacity of these patients.²⁷ The functional mobility/agility between migraine patients and healthy individuals are significantly different.²⁷

Nevertheless, the interference of migraine in patients with fibromyalgia did not alter the balance or the functional capacity of the patients analyzed in this study. Our results point to the need for new studies with larger and equally distributed samples for a broader analysis of the results. It is worth pointing out that the irregular distribution of the sample *n* in the groups occurred because the number of patients available for research who had fibromigraine was higher than the number of patients who had only fibromyalgia. This finding seems to be common in clinical practice because of the high prevalence of migraine in patients with fibromyalgia.⁴⁻⁶

As limitations of the study, we have the sample size and the uneven distribution of migraine among patients. About 81% of the sample had both associated conditions, which corresponds to what is expected by epidemiological data.⁶ In addition, all the patients were screened from a single center, which could compromise the extrapolation of these results to the general population.

The clinical implications of these findings consist in the fact that they highlight the importance of investigating the interference of migraine in the functional characteristics and balance of patients with fibromyalgia, since the association between these two conditions may lead the individual to be more exposed to dysfunctions by the factors demonstrated here. In view of the above, we conclude that women who have fibromyalgia associated with migraine, when compared with women who have fibromyalgia only, do not have differences in balance and functional capacity.

Authors' contributions

LSTN, conception, design, data collection, article writing; MMMBB, concept, design, analysis and interpretation of data, critical review and approval of the final version; TSV, data collection, study design; DAO, design, orientation; critical review and approval of the final version; DW, conception, orientation, MCMM, critical review and approval of the final version.

Funding: Institutional Program for Scientific Initiation Scholarships – PIBIC/UFPE for the scholarship granted to student Larissa Stefany Tavares Notaro.

Conflict of interest: The authors declare that there is no conflict of interest.

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