Influence of the Pilates method on quality of life and pain of individuals with fibromyalgia: integrative review

Influência do método Pilates na qualidade de vida e dor de indivíduos com fibromialgia: revisão integrativa

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ABSTRACT

BACKGROUND AND OBJECTIVES: Fibromyalgia syndrome is linked to a process of pain and loss of quality of life. The Pilates Method can be a form of physical exercise that alleviates pain. Thus, the aim of this study was to investigate whether interventions with the Pilates method can provide improvements in pain and quality of life for people with fibromyalgia syndrome.
CONTENTS: A database integrative review, searching for original articles published until November 2019. This review reports the main results for pain and quality of life for people with fibromyalgia syndrome who participated in Pilates interventions, as well as the method's prescription, the variables and the instruments used in the interventions to better understand the physical education professional who will intervene with the Pilates method in people with fibromyalgia syndrome. Following the inclusion criteria, 5 studies were selected. The results found improved quality of life and decreased pain.
CONCLUSION: It was found that the Pilates method may be an interesting intervention for individuals with fibromyalgia syndrome, because of its safety and therapeutic effects on the adversities of fibromyalgia already within 4 weeks of training. Still, it's important to highlight the importance of continuing training to obtain its beneficial effects on pain and quality of life of individuals.
Keywords: Exercise movement techniques, Fibromyalgia, Training.

RESUMO

JUSTIFICATIVA E OBJETIVOS: A síndrome de fibromialgia está ligada a um processo de dor e perda da qualidade de vida, o método Pilates pode ser uma forma de exercício físico que atenua as dores. Dessa forma, o objetivo deste estudo foi investigar se intervenções com o método Pilates pode propiciar melhoras na dor e qualidade de vida de pessoas com síndrome da fibromialgia.
CONTEÚDO: Trata-se uma revisão integrativa nas bases de dados, com busca por artigos originais publicados até novembro de 2019. Buscou-se relatar os principais resultados para dor e qualidade de vida das pessoas com síndrome da fibromialgia que participaram de intervenções com Pilates, a prescrição do método, as variáveis e os instrumentos utilizados nas intervenções para melhor compreensão do profissional de educação física que venha a intervir com o método Pilates em pessoas com síndrome da fibromialgia. Seguindo os critérios de inclusão, 5 estudos foram selecionados. Os resultados encontrados apontaram melhoras na qualidade de vida e diminuição da dor.
CONCLUSÃO: Observou-se que o método Pilates pode ser uma intervenção interessante para indivíduos com síndrome de fibromialgia pela sua segurança e efeitos terapêuticos nas adversidades da fibromialgia já com 4 semanas de treinamento. Ainda assim, é importante destacar a importância da continuidade do treinamento para obtenção dos seus efeitos benéficos para dor e qualidade de vida dos indivíduos.
Descritores: Fibromialgia, Técnicas de movimento do exercício, Treinamento de Pilates.

INTRODUCTION

Fibromyalgia syndrome (FMS) is the world's second most common rheumatological disorder and is present in 0.7 to 5% of the general population[1]. In Brazil, fibromyalgia (FM) is the second most common rheumatological disease, present in 2.5% of the population, mostly females with an average age of 35 to 55 years old[2]. FM is a rheumatological syndrome featuring a diffuse and chronic musculoskeletal pain scenario, which is associated to others symptoms like fatigue, sleep disorders, morning stiffness, cognitive disorders, chronic headache, irritable bowel syndrome, vague complaints of edema, as well as some psychological disorders like anxiety and depression[1].
Although not characterized by lethality, FMS generates a large impact in the functional capacity of all aspects of life, like work, lei-

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sure and family relationship, aggravating psychological factors and influencing quality of life (QL) of the individuals affected by it[3].

With a still unknown etiology, FMS is a chronic and real pain syndrome, caused by the sensitization of the central nervous system to pain through a disorganized process of nociceptive impulses[4], like the serotonin neurotransmitters (5HT) and P substance, which suffer alterations in their routes and result directly in the amplification of pain perception, quality of sleep, mood and many other symptoms that are related to FMS[5]. Yet, FM may still be easily misunderstood as mood and anxiety disorders, which can lead to incorrect diagnosis[5]. The diagnosis proposed in 1990 by the American College of Rheumatology (ACR)[6] observed the pain sensibility in 11 of the 18 trigger-points (TP) located throughout the body, associated with generalized pain lasting for more than three months. After two decades the ACR reconsidered the diagnosis through TP and started to advocate the diagnosis through the means of questionnaires and scores, which take into account the clinical symptoms of FMS, like fatigue and cognition problems[1].

Treatment may be pharmacological or not, with the intention of attenuating pain and the general symptoms related to FMS[7]. In the non-pharmacological context, physical exercises practice has been recommended as a form of effective treatment on the improvement of pain, physical function and general well being[8,9]. In that regard, aerobic exercise[10], strength training[11] or the combination of both[1,12] are suggested as interventions more effective for the reduction of pain, improvement of QL and lessening of the depression symptoms.

Through that perspective, the practice of these methods of physical exercise may help patients with FMS through the release of hormones related to the sensation and modulation of pain and improvement of physical function, like endorphin and serotonin, providing the patient with a sensation of well being and self control during daily life activities[4,9]. Nevertheless, some researchers[4,12] believe that adherence to physical conditioning and exercise by the people who suffer from FMS is still low, a fact that may be related to the ''fear of pain induced by inappropriate physical exercise"[12]. Thus, it's suggested that the understanding of instruction on low impact physical exercises enables more adherence of this population to the practice.

Therefore, although the recommendations for exercise propose aerobic and strength exercises, other training methods have been indicated for patients with FMS, such as the Pilates method (PM)[13], with the objective of relieving symptoms. In patients with chronic non-communicable diseases, the PM has been able to increase exercise tolerance, attenuate disease symptoms and provide QL to the patients[14]. In patients with chronic lower back pain, the PM reduced pain levels[15]. In a pilot study conducted with patients with FMS, the PM attenuated pain levels and this seems to have been related to a lower late muscle pain, low impact and lower production of peripheral fatigue induced by training[14].

The PM is characterized by the philosophy of balance between body and mind and its principles are concentration, breathing, flow, control, precision and centralization[13]. The PM is divided into free exercises, performed on the ground with the use of mattresses, lying down, sitting, standing, or the same exercises but performed on devices that use springs for greater assistance or resistance to movement[13]. Among the benefits of PM, the following stand out: improved coordination, flexibility, balance, body awareness, physical conditioning, posture, muscle tone, joint mobility, blood circulation, in addition to integrating body and mind, and can be performed by people of all ages, and with discipline its practitioners can find a fast and effective result in improving QL[16,17]. In this light, despite the benefits of PM being observed in several conditions, there is a lack of concise knowledge about its benefits in people suffering from FMS. Consequently, the present study's objective was to investigate, if the PM can improve QL and pain for people with FMS. Furthermore, the study also intended to report the prescription, the variables and tools used in the interventions in order to enlighten the professional that may come to work with the PM and FMS.

CONTENTS

The present study performed an integrative review, which consists in a systematic, ordered, and comprehensive search, leading to a complete synthesis of studies, developing critical thought over the investigate subject and its practice.

The research was applied in the following databases: Pubmed, Scielo and BVS. Associated with the keywords and Booleans, the following terms were used: "exercise movement techniques" OR "Pilates" OR "Pilates based exercises" OR "Pilates training" AND Fibromyalgia. These descriptors should have been present at least in the title, abstract or keywords. Studies with clinical or quasi-experimental intervention in English and Portuguese were selected, published until November 2019. In the studies, the interventions with the PM should have been applied, with evaluation of pain and/or QL in the pre and post-intervention periods. Review studies, graduation final works, dissertations and thesis were excluded.

After searching for the terms and collecting the studies, a reading of the titles and abstracts was made to assess the adequacy as to the eligibility criteria. From the studies that entered the criteria, the texts were read in full, and from those the data was collected (Figure 1).

The search returned 35 articles, however, after selection by eligibility criteria, 5 articles were included, being two pilot studies, one case stu-

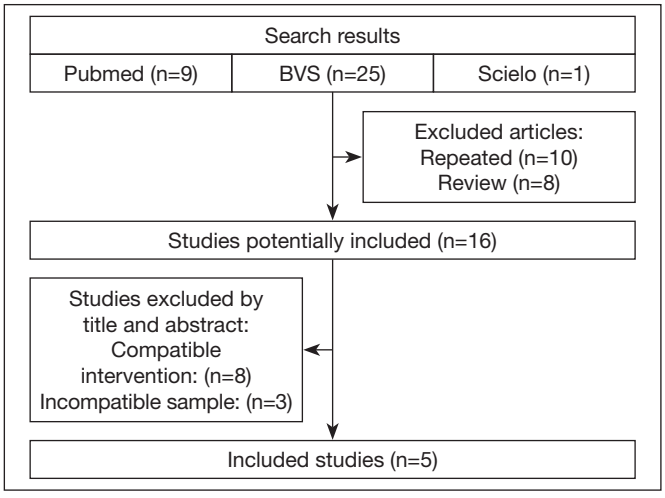

Figure 1. Flowchart of the studies search

Table 1. List of articles resulting from the bibliographical survey

Authors	Sample	Investigated variables	Evaluation method	Training prescriptions	Results
Kumpel et al.[21]	20 W from PG and 20 from CG (54±5,1 years old)	Quality of life, pain and quality of sleep	VAS FIQ PSQS	Protocol: PG Duration: 8 weeks Frequency: 2x/week Session: 60 min	↑ Quality of life ↑ Quality of sleep ↓ Pain
Altan et al.[30]	49 W from PG (48,2±6,5 years old) 24 from FG (50,0±8.4 years old)	Quality of life Pain	VAS FIQ	PG Protocol: GP Duration: 12 weeks Frequency: 3x/week Session: 60 min CG Protocol: stretching/relaxation exercises Duration: 12 weeks Frequency: 3x/week Session: 60 min	PG ↑ Quality of life ↓ Pain
Ekici et al.[22]	36 W from PG and 15 from CG (37,13±6,37 years old) 21 from CG (36.86±7.73 anos)	Quality of life Pain Points of pain Anxiety	VAS FIQ NHP STAI	PG Duration: 4 weeks Frequency: 3x/week Session: 60 min. ST: 10 min PM: 40 min RL: 10 min CG Connective tissue massage (CTM) Duration:4 weeks Frequency: 3x/week Session: 5 – 20 min.	PG ↑ Quality of life ↓ Pain ↓ Anxiety CG ↑ Quality of life ↓ Pain
Komatsu et al.[23]	20 W from PG and 13 from CG (47,85±9,82 years old) CG 7 W (53,29±12,27 years old)	Quality of life, pain, anxiety and depression	VAS FIQ BAI BDI	PG Duration: 8 weeks Frequency: 2x/week Session: 60 min. CG Continued with previous treatment, unchanged interventions and therapies	PG ↑ Quality of life ↓ Pain ↓ Anxiety ↓ Depression
Cury and Vieira[24]	1 W (63 years old)	Quality of life Pain Flexibility	VAS FIQ Adapted flexitest	GP and PM and PE exercises Session: 60 min Frequency: 2x/week Duration: 4 weeks Training protocol WU: 5 min GP: 25 min. PE: 25 min RL: 5 min.	PG ↑ Quality of life ↑Flexibility ↓Pain

W = woman; PG = Pilates group; CG = control group; FG = flexibility group; WU = warming up; ST = stretching; PM = Pilates method; GP = ground Pilates; PE = Pilates with equipment; RL = relaxation; VAS = visual analog scale; NHP = Nottingham Health Profile; PSQS = Pittsburg Sleep Quality Score; FIQ = Fibromyalgia Impact Questionnaire; STAI = State-Trait Anxiety Inventory; BAI = Beck Anxiety Inventory; BDI = Beck Depression Inventory.

dy and two clinical trials. Table 1 describes the included articles and their main data related to samples, evaluated variables, evaluation methods, prescription of interventions and their main results.

DISCUSSION

The sample found in the studies was exclusively composed of women, a fact that is confirmed by the findings in the literature[18], which show that FM affects women six times more than men. This can be justified because its easier to make the diagnose in women, since they report the sensation of pain more than men, according to the 1990 ACR's criteria. Based on the new diagnosis criteria, the authors[19] assessed the prevalence of 2:1 for the presence of FM in women in relation to men. However, these results could contain a bias due to the fact that men have more difficulty to report pain in the process of diagnosis[20].

Regarding age, the average was 35 to 65 years old, which is similar to the sample of the study20, with an average of 59.7±13.5 years old.

As for the investigated variables, all the studies evaluated pain and QL, however, some studies investigated other variables that are also related to the FMS deficits. In the study[21] quality of sleep was evaluated, in two other studies[22,23] the researchers assessed anxiety and, in the study[24], flexibility. Although these variables are different from the primary outcome of this review, they are all strongly related to the QL[25-27].

For the assessment of pain, all articles used the VAS, which consists of a 10cm straight line, in which zero corresponds to no pain and 10 to extremely severe pain. During evaluation, the patient was instructed to point out the level of pain he was in. A study that sought to verify the effect of resisted training on pain reduction in women with FM found that the VAS was the most used instrument in the reviewed articles,

highlighting it as a reliable instrument that has simple application and low cost.

For the assessment of QL, all articles used the Fibromyalgia Impact Questionnaire (FIQ), a tool specific for the FMS population, measuring the influence of the disease on daily activities. It's composed of 19 questions that encompass the subjects of professional situation, physical symptoms, fatigue, morning stiffness, pain, quality of sleep, functional capacity, psychological disorders, anxiety, depression and well-being in general. According to the study[29], it's the most widely used method to evaluate FM studies, since it's validated and reliable.

Nevertheless, other studies[22,30] also used, besides FIQ, the Nottingham Health Profile (NHP), which consists in a questionnaire about subjective and autoaplicable health, with six variables: energy, pain, emotional reactions, sleep, social deprivement and physical mobility, totaling 38 items that are summed up, obtaining a total score of NHP, resulting in the perception of the individual's QL. In a study[31] evaluating the NHP's reliability after cerebrovascular accident, it was considered reliable, simple and consistent within its domains, making it a good alternative for the assessment of QL in adverse health conditions.

In addition to the variables already mentioned, a study[21] evaluated sleep through Pittsburg Sleep Quality Score (PSQS), which is a questionnaire with 19 items, divided into seven categories: subjective sleep quality, sleep latency, sleep duration, habitual sleep efficiency, use of sleeping drugs and daytime dysfunction. In two other studies[22,23], anxiety was evaluated through State--Trait Anxiety Inventory (STAI) and Beck Anxiety Inventory (BAI). The study[23] evaluated depression through the Beck Depression Inventory (BDI) and the study[24] evaluated the level of flexibility through Flexitest.

For the intervention methods, duration of protocols found ranged from 4 to 12 weeks, with two studies[22,24] for 4 weeks, two[21,23] for 8 weeks and only one for 12 weeks[30]. The weekly frequency of training was two[21,23,24] and three[22,30] times per week, with an average duration of 60 minutes for each session.

For prescription, two of the studies[21,30] present in this review used the ground PM, performing free exercises, with the use of balls and elastic bands. In the study[30] the protocol was divided into 9 modules: postural education, breathing education, neutral position search, sitting exercises, antalgic exercises, proprioception improvement exercises and stretching exercises. In the control group[30] stretching and relaxation exercises were performed at home with an exercise protocol that was already used by researchers in patients with FMS.

In two other studies[22,23] it was not possible to identify the mode of PM used, since the authors did not describe it in the articles. However, one of these studies[22] divided its volunteers into 2 groups, Pilates group (PG) and control group (CG). Both groups received interventions 3 times a week for 4 weeks. The PG performed the Pilates protocol, which was divided into 10 minutes of warm-up, 40 minutes of Pilates exercise and 10 minutes of cooling down. The activity level was gradually increased from 5 to 10 repetitions according to the progress of the group. The CG received a connective tissue massage (CTM) intervention of 5 to 20 minutes in each session, depending on the treated area.

In the case report[24] the evaluated patient performed the PM on the ground and with equipments, the training protocol was divided into 5 minutes of warm-up, 25 minutes of ground Pilates, 25 minutes of Pilates with equipments and 5 minutes of relaxation, twice a week for 4 weeks.

Pilates influence on pain

As a result, for the variable of pain, all studies presented improvement in the pain. Two studies have already verified these improvements shortly after 4 weeks of intervention[23,25], showing a short-term effect on the mitigation of pain in individuals that were treated with the PM. Still, it's worth noticing the importance of carrying on the practice. After 12 weeks without the intervention[30] pain begins to return to the initial levels reported in the research, as observed in another study[32], which assessed pain improvement after a 16 weeks protocol of aquatic physical activities in women with FM, but, after 16 weeks without training, observed the reduction of this improvement.

In another study[33], researchers sought to evaluate the effectiveness of the PM in reducing chronic pain associated with non-structural scoliosis; the result was a 66% decrease in pain. The same was verified with the use of PM in the treatment of lumbar pain, which, by strengthening the pelvic and central muscles of the body, provided an improvement in pain[34]. In this sense, it seems that the PM is an effective intervention for the improvement of different aspects of pain, and it can be an adequate alternative for those affected by FMS, a fact observed in the studies found.

The fact that the condition of pain improved may have been influenced by the physiological effects of exercise on the release of hormones such as endorphin and serotonin, which act as modulators of opioid receptors, resulting in a hormonal regulation of the pain sensation[12].

Pilates influence on quality of life

The results found in all studies of this review observed improvements related to QL made possible by the PM. One of the studies included[23] observed a 14% reduction in the FIQ score, highlighting positive effects in the areas of anxiety, depression, and pain.

However, there was an interesting finding in another study[30], whose CG performed stretching activities, but no decrease in pain control was observed, a fact that contradicts the study[25], which observed an improvement in pain with stretching training within the same 12 weeks of intervention.

Regarding other variables, such as anxiety and depression, which related to QL, it's important to point out that exercises trying to associate mind-body, for example, tai chi, yoga and Pilates, work not only on the physical body, but also encompass psychosocial, emotional, spiritual and behavioral characteristics of the individual, which can be especially beneficial for people with FM[9]. This statement embraces the results found in the articles analyzed in the present study, which showed improvement in depression and anxiety variables[22,23]. Some researchers[30] stated that the Pilates techniques were developed to train the body striving for a strong mind, allowing total control over the body. In another study[22], the authors found that pain and anxiety were also correlated.

As for quality of sleep, there was a strong correlation between the quality and results of the FM impact questionnaire, i.e., the lower the impact of FM on the individual, the better the quality of sleep[21]. According to some researchers[35], the practice of PM only for 4 weeks, 3 times a week, is already enough to improve the quality of sleep. In another study[36], which evaluated the effect of Pilates on the quality of sleep in elderly women, it was found that after 12 weeks of practice there were significant improvements in the quality of sleep, as well as in anxiety, depression and fatigue. All these symptoms are related to FM, which corroborates the idea that long-term practice of the PM can be of great applicability in the treatment of FMS.

Limitations

The present review has presented some limitations. The first is the limited number of studies that intervened with the PM in patients with FMS, as well as the quality of studies found. All of this may reflect the difficulty of feasibility of interventions in this population. In addition, the small sample size of the studies may make it harder to extrapolate the results found in this review to the entire population with FMS. Moreover, the absence of a prescription methodology in the studies makes it difficult to formalize a prescription recommendation, and further studies will need to expose the structuring of the prescription of the PM. Finally, the studies found here compared the PM with not intervened groups, therefore, randomized clinical trials are necessary to compare the PM with already recommended non-pharmacological interventions, such as aerobic training, strength training and/or combined training.

CONCLUSION

The Pilates method can be an alternative for the improvement of pain and QL for the FMS public, in which positive results after only 4 weeks of practice could be observed. However, for the permanence of the method's benefits, it's necessary to carry on with the practice.

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