

THE EFFICACY OF AQUATIC KINESIOTHERAPY IN PATIENTS WITH FIBROMYALGIA – A SYSTEMATIC REVIEW

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Abstract: Introduction: Fibromyalgia (FM) is a non-inflammatory, rheumatic and chronic syndrome of idiopathic origin, characterized by generalized pain, stiffness, headache, among others. The etiology of FM is unknown and there is no specific treatment, however, therapeutic proposals are being adopted and evaluated. Among them, we can mention aquatic kinesiotherapy, which consists of physical exercise programs with resistance conducted in a heated pool. **Objective:** The present study aimed to evaluate the effectiveness of aquatic kinesiotherapy as a therapeutic intervention for FM, using the Visual Analogue Scale (VAS) and the Fibromyalgia Impact Questionnaire (QIF). **Methodology:** Articles were selected from the following databases: PubMed, Bireme Medline, Chocrane Library, Sciece Direct and PEDro Base. After applying the exclusion criteria, 6 articles were included in the study. Results: After extracting data from these articles, it was observed that aquatic kinesiotherapy is an effective therapy in the treatment of fibromyalgia, as well as other treatments used in research. **Keywords:** Fibromyalgia, Aquatic Kinesiotherapy, EVA and QIF.

INTRODUCTION

Fibromyalgia (FM) is a chronic, multifactorial rheumatological syndrome, characterized by diffuse and generalized musculoskeletal pain associated with exacerbated painful points of sensitivity (1). Pain is a prominent component in rheumatological conditions and can be explained as the result of a complex interaction between the central and peripheral nervous systems. The pain condition manifests itself according to the influx of peripheral nociceptive *inputs*, consequently, some individuals may feel little or no pain, while others experience a pronounced painful sensation (2).

The clinical picture of FM consists of physical symptoms such as morning stiffness, fatigue, headache and gastrointestinal disorders, as well as psycho-emotional symptoms such as anxiety, depression, irritability, behavioral changes, sleep disorders, cognitive and memory dysfunctions (3). This pathology manifests between 45 and 64 years of age, with 90% of affected patients being female (4, 5)

The etiopathogenesis of Fibromyalgia is still controversial due to its association with genetic, environmental and neuromodulatory factors (6). Because of these factors, a specific treatment has not yet been developed (7). In addition to pharmacological treatment and education programs, some therapeutic proposals are being adopted and evaluated (7, 8).

Over the years, evidence has shown that treatment with supervised physical exercise is the gold standard for maintaining quality of life and controlling pain and fatigue in patients with FM (9, 10). Furthermore, exercises involving stretching, strength maintenance and aerobic conditioning have been accepted as the standard treatment protocol for this population (11, 12, 13, 14).

Several exercises can be recommended for patients with fibromyalgia (7). Among the variety of resources, there was a need to evaluate aquatic kinesiotherapy and study its effectiveness as a treatment for FM. This therapy consists of resistance physical exercise programs conducted in a heated pool as a form of treatment for these patients. Due to the properties of heated water, the aquatic environment becomes a suitable place to practice physical exercises with the least possible damage to the musculoskeletal system, in addition to providing a reduction in joint impact, improving microcirculation, facilitating relaxation, reducing the number of contractions and improve muscle strength

due to its natural resistance (15, 16, 17, 18).

Therefore, the present study aimed to evaluate the effectiveness of aquatic kinesiotherapy as a therapeutic intervention for FM, using the Visual Analogue Scale (VAS) and the Fibromyalgia Impact Questionnaire (QIF), to reduce pain and improve the quality of life.

MATERIALS AND METHODS

The present study was a systematic review, developed using the PRISMA method and registered in PROSPERO under code CRD42021283805. A search was carried out in the PubMed, Bireme Medline, Chocrane Library, Science Direct and Base PEDro databases without a start date filter until November 2021 in English and Portuguese.

In developing this research, synonyms were used for the words “Fibromyalgia” and “Hydrotherapy”. For Fibromyalgia the keywords used were: *Fibromyalgia Syndrome; Fibromyalgia, Primary; Fibromyalgia, Secondary; Fibromyalgias; Fibrositides; Fibrositis; Muscular Rheumatism; Primary Fibromyalgia; Primary Fibromyalgias; Rheumatism, Muscular; Secondary Fibromyalgia; Secondary Fibromyalgias.* Para Hidroterapia, foram utilizadas: *Bath, Whirlpool; Baths, Whirlpool; Hydrotherapies; Hydrotherapy; Whirlpool Bath; Whirlpool Baths; Balneotherapy; Aqua Therapy; Aquatic Rehabilitation; Pool Therapy; Water Therapy; Aquatic Physical Therapy; Swimming Therapy.*

The search was carried out by two researchers independently, filtering the articles by analyzing the title and abstract. Then, the existence of duplicates was checked and they were removed. Subsequently, criteria were used to exclude selected articles, such as: articles that are not in Portuguese or English, systematic review articles, meta-analysis or journal publications, articles that do not address aquatic kinesiotherapy and

fibromyalgia and articles that address another modality concomitantly with hydrotherapy.

A total of 10,183 records were initially identified from the sum of the databases. Prior to screening, 8549 articles were removed by automatic tools and 111 duplicates were excluded. After screening and applying the eligibility criteria, 1498 articles were removed, resulting in a total of 25 articles to be read in full.

In the final selection, 25 articles were analyzed in full where two researchers carried out data extraction from them. At the end of this process, three more exclusion criteria were used: Articles that did not use the Visual Analogue Scale (VAS) or the Fibromyalgia Impact Questionnaire (QIF), articles that used different scores for the VAS and QIF scales and articles that did not present numerical data for analysis. After these processes, 6 articles were included in the review as shown in Figure 1.

The sample distribution characteristics were analyzed by the Shapiro-Wilk Test, in non-parametric analyzes the Mann-Whitney Test and Paired Sample Wilcoxon Signed Rank Test were used, and parametric analyzes were analyzed by the PairSample t-Test and the Two-Sample t-Test. The results were demonstrated by mean / standard deviation (SD).

RESULTS

The studies included in the research presented a total of 289 female patients and, regarding themes, one study compared aquatic kinesiotherapy with balneotherapy, two with land-based activities (*Land-Based Exercises - LBE*), one with *Mat Pilates*, one with daily life activities and, finally, one compared aquatic kinesiotherapy carried out in the pool and in the sea.

Patients were divided into Experimental Group (EG) and Control Group (CG), with a mean age for EG of 48.16 ± 3.47 and CG of

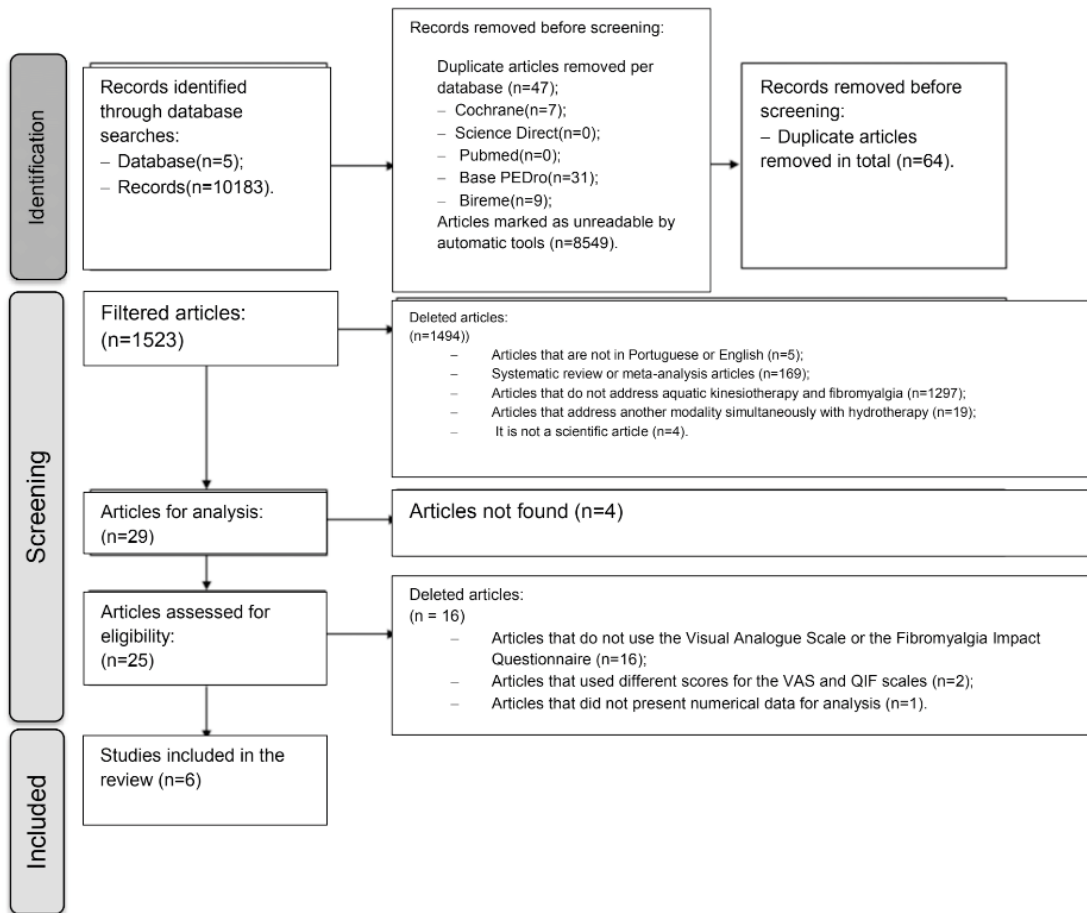
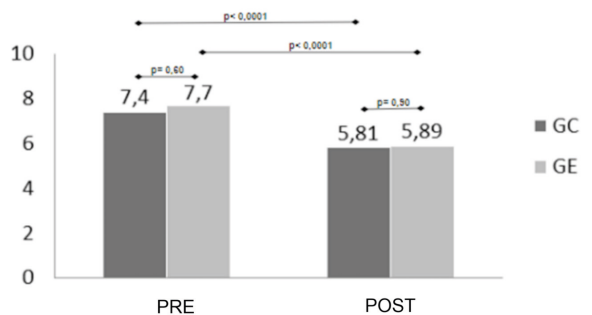


Figure 1- Flowchart

46.88±3.27. Both were evaluated in the pre- and post-intervention periods.

In the VAS, patients in the EG had 7.70 initial points and 5.89 points post-intervention ($p < 0.0001$), while in the CG, the initial score was 7.40 points and the final score was 5.81 points ($p < 0.0001$), as can be seen in Graph 1.

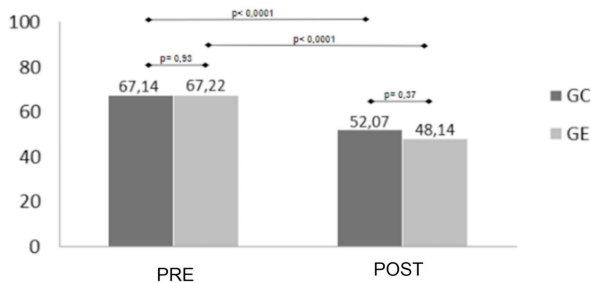
These results indicate that there was a decrease in the pain of patients pre- and post-intervention, however there was no significant difference between the intervention with aquatic kinesiotherapy compared to the others therapies used. Suggesting that physiotherapy plays an important role in reducing the pain of patients diagnosed with FM according to the variables analyzed.



Graphic 1: Mean Visual Analogue Scale results between the Experimental Group x Control Group. Source: Altan et al, 2004; Assis et al, 2006; Andrade et al, 2018; de Medeiros et al, 2020; de Andrade, 2008; Swar, 2020.

In the QIF, GE patients presented, in the pre-intervention period, a result of 67.22 points and, in the post-intervention period,

48.14 points ($p < 0.0001$). The CG initially obtained 67.14 points and, post-intervention, 52.07 points ($p < 0.0001$), as can be seen in Graph 2. With these data, it can be suggested that the therapies studied are effective in improvement in the quality of life of patients with fibromyalgia comparing pre- and post-intervention results, but there is no significant difference between the therapeutic parameters used.



Graph 2: Average results of the Fibromyalgia Impact Questionnaire between the Experimental Group x Control Group.

Source: Altan et al, 2004; Assis et al, 2006; Andrade et al, 2018; de Medeiros et al, 2020; de Andrade, 2008; Swar, 2020.

DISCUSSION

Recent studies present the thesis that the occurrence of Fibromyalgia results from the association of biological factors, where there is a dysfunction of increased sensitivity in the central nervous system and a decrease in the modulation of pain inhibitors, to environmental, social and emotional factors, which function as a trigger for FM to develop, impacting patients' quality of life in different aspects depending on the symptoms they experience, generating a wide variety of therapeutic proposals being studied to treat FM symptoms (2, 19, 20, 21, 22).

Authors from Turkey compared the benefits of pool exercise and balneotherapy. For this, 50 women diagnosed with FM were randomly divided into two groups: group 1 with pool exercises and group 2 with balneotherapy. The

patients underwent therapies for 12 weeks and were evaluated pre- and post-treatment at weeks 0, 12 and 24. The immediate post-treatment results did not show significant superiority in relation to the treatment carried out in the pool and balneotherapy without exercise. However, as the evaluation after 6 months demonstrated improvements in sleep parameters and morning stiffness in the experimental group, the authors suggest that pool exercises have a more lasting effect on some of the symptoms of Fibromyalgia (23).

A randomized clinical trial compared the effectiveness of *Deep Water Running* (DWR) and *Land-Based Exercises* (LBE) techniques in treating FM, where 60 sedentary women were randomly assigned to the DWR or LBE groups and received 15 weeks of therapy. The patients were evaluated at weeks 0, 8 and 15 and, after analysis, the authors concluded that both treatments are effective in reducing pain in patients with FM. They also analyzed that DWR may have advantages in terms of emotional aspects as it is a pleasant stimulus for carrying out exercises. Although the study followed patients for three months, Assis et al. highlight the importance of studying the long-term benefits of exercise, given that FM is a chronic disease (24).

A blind clinical study evaluated the effectiveness of the Mat Pilates method in improving the symptoms of patients with fibromyalgia, where 42 women diagnosed with FM were divided into two groups: Mat Pilates and water aerobic exercises. Both groups underwent 12 weeks of treatment and were evaluated at weeks 0 and 12. Medeiros and collaborators concluded that the two techniques were effective in reducing pain in patients with Fibromyalgia. However, although the results obtained were positive, the authors emphasize the need to carry out new studies with a larger sample size and a longer execution time (25).

Brazilian researchers compared the effects of aquatic kinesiotherapy carried out in a heated pool and in the sea (thalassotherapy). In this work, 46 female patients were selected and divided into groups: pool group and sea group, and underwent treatments for 12 weeks. They were evaluated at weeks 0 and 12. The researchers concluded that, although both groups showed significant improvement after treatment, the thalassotherapy group demonstrated a greater improvement within all parameters observed in the study. The authors claim that this is probably due to the effects of thalassotherapy, which can provide some advantages due to the effects of biophysical properties of immersion, salts and trace elements of seawater and well-being benefits resulting from contact with nature (26).

A research group at *Horus University* in Egypt studied the effectiveness of LBEs and aquatic therapy in treating postmenopausal FM symptoms. In this article, 60 women diagnosed with Fibromyalgia were randomly divided into two groups: LBE and aquatic kinesiotherapy, and received the therapy for 8 weeks. After the intervention, the author noted that water exercises are more effective in the following parameters: sleep, balance and flexibility than LBEs (27).

A randomized controlled clinical study proposed training and “detraining” of water exercises (APT), of 16 weeks each, for patients with Fibromyalgia. In this work, 54 women were selected, divided into a control group (CG) and an experimental group (EG) and evaluated in weeks 0 and 16. The main results of the study showed that women who underwent APTs showed improvements in aerobic functional capacity, in pain and quality of life. However, other authors noted that these improvements were not maintained

after the “detraining” period (28).

Based on the work of the various researchers mentioned above indicating the relevance of aquatic therapy in the face of FM, the objective of this review is to evaluate the effectiveness of aquatic kinesiotherapy as a therapy for cases of patients with FM. And for this purpose, two evaluation instruments present in the six articles were chosen, the VAS and the QIF, where both demonstrated a decrease in post-intervention scores, suggesting an improvement in the reduction of pain perception and relative quality of life of patients, however this improvement can be observed in both groups, control and experimental, comparing the pre and post intervention moments. However, it is worth highlighting that although the means of the control and experimental groups show an improvement after the interventions, the articles analyzed have different methodologies and objectives in the approach to aquatic kinesiotherapy, where they present control groups with different therapeutic plans and techniques in each one, which corresponds to a variable therapeutic benefit between them and in comparison with aquatic kinesiotherapy. Thus suggesting the need for new studies with aligned intervention parameters.

CONCLUSION

In conclusion, it can be suggested that aquatic kinesiotherapy, as well as other treatments, are an effective therapeutic choice in improving pain and quality of life in patients with Fibromyalgia. However, in order to have a more assertive analysis of the effectiveness of aquatic kinesiotherapy, more studies are needed that present homogeneous control groups in relation to the therapies used as comparative parameters.

REFERENCES

1. WOLFE F, SMYTHE HA, YUNUS MB, BENNETT RM, BOMBARDIER C, GOLDENBERG DL, et al. The American College of Rheumatology 1990. Criteria for the Classification of Fibromyalgia. Report of the Multicenter Criteria Committee. *Arthritis Rheum.* 1990.
2. PHILLIPS, K, CLAUW, D.J. (2013), Review: Central pain mechanisms in the rheumatic diseases: Future directions. *Arthritis & Rheumatism*, 65: 291-302. <https://doi.org/10.1002/art.37739>
3. WOLFE, F, CLAUW DJ., FITZCHARLES M. A., Et al. Revisões de 2016 para os critérios diagnósticos de fibromialgia de 2010/2011. *Semin Arthr Rheum.* 2016.
4. CLAUW AND DANIEL J.: "Fibromyalgia". *JAMA.* 311 (15): 1547-55 (16 de Abril de 2014).
5. 2 CLAUW DJ, ARNOLD LM e MCCARBERG BH: "The science of fibromyalgia". *Mayo Clinic Proc.* 86 (9): 907-11 (Setembro 2011).
6. HÄUSER W, FITZCHARLES MA, Facts and myths pertraining to fibromyalgia. *Dialogue Clin Neurosci.* 2018;20(1)53-62.
7. DE ANDRADE S; DE CARVALHO R; SOARES A; FREITAS R; GUERRA L; VILAR M. Thalassotherapy for fibromyalgia: a randomized controlled trial comparing aquatic exercises in sea water and water pool. *Rheumatol Int.* 2008 Dez;29(2):147-152. DOI: 10.1007/s00296-008-0644-2.
8. ROGER-SILVA D, NATOUR J, MOREIRA E, et al. A resistance exercise program improves functional capacity of patients with psoriatic arthritis: a randomized controlled trial. *Clin Rheumatol.* 2018;37:389–95
9. VALIM V, OLIVEIRA LM, SUDA AL, SILVA LE, FARO M, NETO TL, et al. Peak oxygen uptake and ventilatory anaerobic threshold in fibromyalgia. *J Rheumatol* 2002;29:353–7
10. BUSCH A, SCHACHTER CL, PELOSO PM, BOMBARDIER C. Exercise for treating fibromyalgia syndrome. *Cochrane Database Syst Rev* 2002;3:CD003786
11. MEIWORM L, JAKOP E, WALKER UA, PETER HH, KEUL J (2000) Patients with fibromyalgia benefit from aerobic endurance exercise. *Clin Rheumatol* 19:253–257
12. MARTIN L, NUTTING A, MACINTOSH BR, EDWORTHY SM, BUTTERWICK D, COOK J (1996) An exercise program in the treatment of fibromyalgia. *J Rheumatol* 23:1050–1053
13. CLARK SR, JONES KD, BURCKHARDT CS, BENNET R (2001) Exercise for patient with fibromyalgia: risks versus benefits. *Curr Rheumatol Rep* 3:135–146
14. GOWANS SE, deHUECK A, VOSS S, RICHARDSON M (1999) A randomized, controlled trial of exercise and education for individuals with fibromyalgia. *Arthritis Care Res* 12:120–128
15. ZAMUNÉR AR, ANDRADE CP, FORTI M, MARCHI A, MILAN J, AVILA MA, CATAI AM, PORTA A, SILVA E Effects of a hydrotherapy programme on symbolic and complexity dynamics of heart rate variability and aerobic capacity in fibromyalgia patients. *Clin Exp Rheumatol.* 2015 Jan-Feb;33(1 Suppl 88):S73-81. Epub 2015 Mar 18.
16. RIVAS NEIRA S, PASQUAL MARQUES A, PEGITO PÉREZ I, et al. Effectiveness of aquatic therapy vs land-based therapy for balance and pain in women with fibromyalgia: a study protocol for a randomised controlled trial. *BMC Musculoskelet Disord.* 2017;18:22
17. FERNANDES G, JENNINGS F, NERY CABRAL MV, et al. Swimming improves pain and functional capacity of patients with fibromyalgia: a randomized controlled trial. *Arch Phys Med Rehabil.* 2016;97:1269–75.
18. LÓPEZ-RODRÍGUEZ MDM, CASTRO-SÁNCHEZ AM, FEERNANDÉZ-MARTÍNEZ M, et al. Comparación entre biodanza en medio acuático y stretching en la mejora de la calidad de vida y dolor en los pacientes con fibromialgia. *Aten Primaria.* 2012;44:641–50.

19. SARZI-PUTTINI P, ATZENI F, DI FRANCO M., BUSKILA D., ALCIATI A., GIACOMELLI C.,ROSSI A.,BAZZICHI L.. Dysfunctional syndromes and fibromyalgia: a 2012 critical digest. *Clin Exp Rheumatol* 2012; 30 (Suppl. 74): S143-S151
20. KIM SE, CHANG L. Overlap between functional GI disorders and other functional syndromes: what are the underlying mechanisms? *Neurogastroenterol Motil.* 2012 Oct;24(10):895-913. doi: 10.1111/j.1365-2982.2012.01993.x. Epub 2012 Aug 2. PMID: 22863120; PMCID: PMC3812246.
21. WILBARGER JL, COOK DB. Multisensory hypersensitivity in women with fibromyalgia: implications for well being and intervention. *Arch Phys Med Rehabil.* 2011 Apr;92(4):653-6. doi: 10.1016/j.apmr.2010.10.029. PMID: 21440712; PMCID: PMC3272297
22. GRACEY RH, PETZKE F, WOLF JM, CLAUW DJ. Functional magnetic resonance imaging evidence of augmented pain processing in fibromyalgia. *Arthritis Rheum.* 2002 May;46(5):1333-43. doi: 10.1002/art.10225. PMID: 12115241.
23. ALTAN L; BINGÖL U; AYKAÇ M; KOÇ Z; YURTKURAN M. Investigation of the effects of pool-based exercise on fibromyalgia syndrome. *Rheumatol Int.* 2004 Set;24(5):272-277. DOI: 10.1007/s00296-003-0371-7
24. ASSIS M; SILVA L; ALVES A; PESSANHA A; VALIM V; FELDMAN D; NETO T; NATOUR J. A randomized controlled trial of deep water running: clinical effectiveness of aquatic exercise to treat fibromyalgia. *Arthritis Care & Research.* 2006 Fev;55(1):57-65. DOI: 10.1002/art.21693
25. DE MEDEIROS S; SILVA H; DO NASCIMENTO R; MAIA J; LINS C; DE SOUZA M. Mat Pilates is as effective as aquatic aerobic exercise in treating women with fibromyalgia: a clinical, randomized and blind trial. *Advances in Rheumatology.* 2020 Abr;60(1):21. DOI: 10.1186/s42358-020-0124-2
26. SWAR W. Effect of underwater exercises on treating postmenopausal fibromyalgia symptoms. *European Journal of Molecular & Clinical Medicine* 2020;07(9):661-672.
27. ANDRADE C; ZAMUNÉR A; FORTI M; TAMBURUS N; SILVA E. Effects of aquatic training and detraining on women with fibromyalgia: controlled randomized clinical trial. *European Journal of Physical and Rehabilitation Medicine.* 2018, Fev;55(1):79-88. DOI: 10.23736/S1973-9087.18.05041-4