Review of Contemporary Philosophy
ISSN: 1841-5261, e-ISSN: 2471-089X
Vol 22 (1), 2023
Pp 3569 - 3582

Fibromyalgia: A Chronic Pain Condition and The Role of Physical Therapy Management

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Abstract:

Background: Fibromyalgia (FM) is a chronic condition that involves widespread musculoskeletal pain, fatigue, sleep disturbances, and cognitive difficulties, significantly reducing quality of life. It affects a substantial portion of the population, predominantly women, and its etiology is poorly understood, involving a complex interplay of genetic, biochemical, and environmental factors. Managing FM requires a multifaceted approach, including medication, physical therapy, and lifestyle modifications. Among physical therapy interventions, aquatic exercise has gained attention due to its potential benefits in reducing pain and improving overall well-being.

Aim: This systematic review aims to evaluate the effectiveness of aquatic exercise as a physical therapy intervention for individuals with fibromyalgia, comparing it to other physical therapy modalities in terms of pain reduction and quality of life improvement.

Methods: The review adhered to PRISMA guidelines and included randomized controlled trials (RCTs) published between 2019 and 2024, evaluating aquatic exercise interventions for fibromyalgia. Databases such as PubMed, Cochrane Library, and Web of Science were searched. Studies included in the review were required to have a minimum PEDro score of 7, ensuring methodological rigor. Key outcomes included pain (measured by Visual Analog Scale, VAS) and quality of life (measured by Fibromyalgia Impact Questionnaire, FIQ).

Results: The review included four RCTs with a total of 157 participants (all women). Aquatic exercise significantly improved pain levels, quality of life, and sleep quality. These improvements were comparable to or better than other physical therapies, such as land-based exercises and Pilates. The interventions varied

in duration (6-16 weeks), frequency (2-3 sessions per week), and intensity, but all showed positive outcomes.

Conclusion: Aquatic exercise is a promising intervention for managing fibromyalgia, providing significant relief from pain and improving quality of life. Its low-impact nature makes it an accessible option for patients with FM, particularly those who may struggle with higher-impact exercises. Further research is needed to refine treatment protocols and investigate long-term effects.

Keywords: fibromyalgia, aquatic exercise, physical therapy, pain management, quality of life, systematic review.

Received: 07 october 2023 **Revised:** 22 November 2023 **Accepted:** 06 December 2023

Introduction:

Fibromyalgia is a chronic condition characterized by extensive musculoskeletal pain, exhaustion, sleep difficulties, and various cognitive and physical symptoms, including hyperalgesia at designated tender spots and headaches [1,2]. The constellation of symptoms substantially hinders individuals' functional autonomy, consequently reducing their overall quality of life. This illness impacts around 0.2% to 6.6% of the worldwide population, notably more prevalent in women over 50 years of age [2,3]. The pathophysiological underpinnings of fibromyalgia are not well comprehended, complicating its diagnosis and treatment strategies. The onset is believed to arise from a complex interaction of genetic, biochemical, psychological, and environmental variables. The management of fibromyalgia often requires a multidisciplinary strategy that integrates pharmaceutical interventions, physical therapies, stress alleviation techniques, and lifestyle adjustments. The persistent nature of the condition and its significant effects on the lives of those affected result in large economic difficulties related to the disorder [9]. These considerations highlight the essential requirement for ongoing research to discover more effective treatment alternatives, focusing on customizing therapies to the individual's unique needs and abilities [10].

Active exercise is a fundamental element in the physiotherapeutic treatment of fibromyalgia [11]. Although regular physical activity poses problems for those with this illness, an organized and supervised exercise regimen has shown significant benefits in relieving symptoms. Targeted workouts aimed at augmenting strength, flexibility, and cardiovascular fitness not only promote enhanced physical health but also alleviate pain, improve sleep quality, and bolster mental well-being in individuals with fibromyalgia [11,12,13]. Moreover, regular exercise is crucial in promoting independence and enhancing the overall quality of life for individuals impacted, equipping them with vital strategies to manage the condition efficiently over time [14]. The incorporation of water exercise into an active exercise regimen has been proposed as a viable intervention, necessitating additional examination of its specific effects [11,15]. The water environment provides a low-impact, adaptable setting that can promote joint movement and exercise while concurrently increasing patient motivation. This systematic review was performed in accordance with the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) standards and registered with the International Prospective Register of Systematic Reviews (PROSPERO) under the code: CRD42024510219. Two separate reviewers conducted a search for pertinent papers using prominent health sciences databases, including the Cochrane Library, PEDro, PubMed, SCOPUS, and Web of Science. The research topic was formulated utilizing the PICOS model: P = population (fibromyalgia patients); I = intervention (aquatic exercise); C = comparison (other physical therapy treatments); O = outcomes (pain and quality of life); S = study design (randomized controlled trials). To perform an accurate search across the referenced databases, the DeCS/MeSH platform was utilized to find relevant descriptors, namely “aquatic exercise” and “fibromyalgia.” The terms were connected with the Boolean operator “AND,” yielding the search term “aquatic exercise AND fibromyalgia,” a structure that guarantees reproducibility and aids in further search revisions.

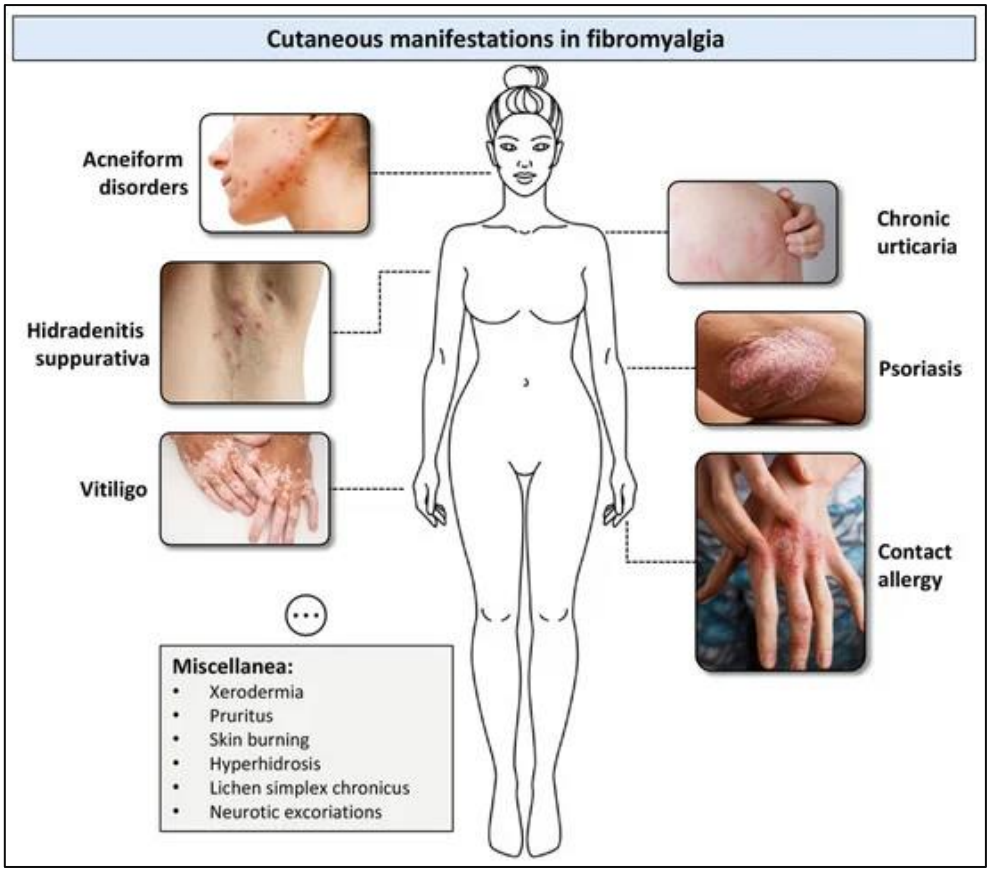

Figure 1: Clinical Presentation of Fibromyalgia.

This review defined particular inclusion criteria, concentrating on randomized controlled trials (RCTs) published in the recent five years (2019 to 2024) and available in English or Spanish. The selected studies focused on persons diagnosed with fibromyalgia who had physical treatment that included vigorous activities in an aquatic setting. Following the removal of duplicate references and the application of pertinent filters, the selection process advanced to the screening of titles and abstracts. The screening was conducted by two independent reviewers (J.G.-R. and C.A.-M.), and in instances of dispute, a third reviewer (M.R.-H.) from the study team was consulted. The reviewers verified that the chosen publications conformed to the established criteria, including confirming that pain and quality of life were prioritized outcomes. Only studies achieving a minimum score of 7 on the PEDro scale were included to uphold rigorous methodological requirements. This scale, a prominent instrument in physiotherapy, evaluates several methodological components, including allocation concealment, participant and evaluator blinding, and the tracking of lost patients [16]. Although the scale consists of 11 criteria, the final score for each article is calculated by excluding the first item, resulting in a score between 0 and 10. Only articles that satisfied the minimum criterion of 7 were deemed eligible for inclusion in this review. The PEDro scale also aids in evaluating potential bias issues in investigations. The scale assesses distinct types of bias, such as selection bias (items 2 and 3), performance bias (items 5 and 6), and detection bias (item 7). A higher PEDro score is associated with enhanced methodological rigor and reduced bias risk, while a lower score suggests an increased probability of bias and diminished methodological quality.

Studies:

The cumulative sample size from the chosen studies comprised 157 participants, with an average age of 48.53 years [17,18,19,20]. All participants were women; in the majority of the research, female sex was a designated inclusion criterion [17,19,20]. Despite the recruitment efforts aimed at both genders, the resultant sample comprised exclusively women [18]. The sample was chosen based on a verified diagnosis of fibromyalgia syndrome in accordance with the diagnostic criteria established by the American College of

Rheumatology. Participants with any concomitant comorbidities were eliminated from the trials [17,18,19,20].

The pertinent data from each selected study, encompassing participant numbers, group allocations, clinical characteristics, and intervention follow-up durations. The research conducted by Andrade et al. (2019) [17] involved a participant cohort of 54 individuals, evenly split into two groups (27/27). The evaluated clinical variables were the Visual Analog Scale (VAS), Fibromyalgia Impact Questionnaire (FIQ), Short Form 36 (SF-36), Beck Anxiety Inventory (BAI), Beck Depression Inventory (BDI), Pressure Pain Threshold (PPT), and Pittsburgh Sleep Quality Index (PSQI). Evaluations were performed at baseline, post-intervention, and after 32 weeks. Participants completed 32 treatment sessions over a duration of 16 weeks. Britto et al. (2020) [18] had 33 participants, with 16 assigned to one group and 17 to the other. The evaluated clinical factors included the Visual Analog Scale (VAS), Fibromyalgia Impact Questionnaire (FIQ), Tender Points (TP), and flexibility. Measurements were obtained at baseline and following treatment, after 24 sessions conducted over an 8-week duration. De Medeiros et al. (2020) [19] executed their investigation with 42 volunteers, evenly divided into two groups (21/21). They evaluated the Visual Analog Scale (VAS), Fibromyalgia Impact Questionnaire (FIQ), Short Form Health Survey (SF-36), Fear Avoidance Beliefs Questionnaire (FABQ), Pain Rating of Chronic Treatment Sites (PRCTS), and Pittsburgh Sleep Quality Index (PSQI). Evaluations were conducted at baseline and during therapy after 24 sessions over a duration of 12 weeks. Salm et al. (2019) [20] examined 28 participants, evenly divided into two groups of 14 each. The evaluated clinical variables comprised the Visual Analog Scale (VAS), Fibromyalgia Impact Questionnaire (FIQ), and the Short Form McGill Pain Questionnaire (SF-MPQ). Measurements were conducted at baseline and following treatment after 18 sessions over a 6-week duration.

The specific intervention characteristics and statistical results from each trial are explained in the subsequent sections. The cumulative PEDro score for each study, accompanied by the specific evaluation for each criterion. This data appraises the methodological quality and examines the danger of bias, with each publication attaining a score of 8 out of 10 on the PEDro scale [17,18,19,20]. This signifies that the clinical studies were methodologically robust, and the danger of bias was deemed minimal. The principal constraint identified was the blinding of patients and therapists, which poses significant difficulties in this sort of intervention. The PEDro scores for the respective articles are as follows: Andrade et al. (2019) [17] attained a score of 8/10, affirmatively responding to items 1, 2, 3, 4, 7, 8, 9, 10, and 11, while negatively responding to items 5 and 6. Britto et al. (2020) [18] attained a score of 8/10, following the identical evaluation criteria as Andrade et al. (2019), with the exception of both receiving a "No" for items 5 and 6. De Medeiros et al. (2020) [19] likewise attained a score of 8/10, yielding results consistent with the preceding two research. Salm et al. (2019) [20] obtained a score of 8/10, receiving "No" for items 1 and 5, indicating a somewhat distinct methodological approach.

Outcomes, Measurements, and Assessment Time

The research examined documented diverse alterations in the clinical symptoms of fibromyalgia syndrome (FM) and other related factors. Pain was uniformly evaluated in all chosen studies utilizing the Visual Analog Scale (VAS) [17,18,19,20]. Salm et al. (2019) [20] also included pain assessment utilizing the Short Form McGill Pain Questionnaire (SF-MPQ). Andrade et al. (2019) [17] employed the VAS to evaluate pain, exhaustion, and overall well-being.
Moreover, the quality of life and the influence of fibromyalgia on health-related quality of life were prevalent assessment variables. The Short Form-36 Health Survey (SF-36) was utilized in two research projects [17,19], whereas the Fibromyalgia Impact Questionnaire (FIQ) was applied in all investigations to assess the influence of fibromyalgia on participants' quality of life [17,18,19,20]. De Medeiros et al. (2020) [19] evaluated beliefs, fear, and catastrophizing through the Fear Avoidance Beliefs Questionnaire (FABQ) and the Pain-Related Catastrophizing Thoughts Scale (PRCTS), while also assessing sleep quality using the Pittsburgh Sleep Quality Index (PSQI), which was utilized in another study [17]. Additionally, Britto et al. (2020) [18] conducted an evaluation of tender point digital palpation in accordance with defined protocols and examined flexibility using the Well's bench sit and reach test. Salm et al. (2019) [20] utilized infrared

thermography and examined biochemical indicators, particularly the serum concentrations of cytokines. Andrade et al. (2019) [17] evaluated the Pressure Pain Threshold (PPT), Beck's Anxiety Inventory (BAI), Beck's Depression Inventory (BDI), and additional variables associated with exercise intensity and reactions, including oxygen uptake (VO2) and the submaximal cardiopulmonary exercise test (CPET). Concerning the follow-up period, three studies performed evaluations solely at baseline and post-treatment [18,19,20], whereas one study incorporated a long-term follow-up, assessing participants 32 weeks after initiation and 16 weeks post-treatment completion [17].

Interventions, Protocols, and Effects of Treatments

The therapy strategies examined in the research comprised individualized sessions or small group interventions overseen by a physiotherapist specializing in water exercise [17,18,19,20]. Britto et al. (2020) [18] and De Medeiros et al. (2020) [19] conducted a comparison of aquatic exercise therapy with several terrestrial exercise modalities, including floor-based Pilates [19] and a regimen comprising warm-up, active stretching, strengthening, and relaxation activities on land [18]. Salm et al. (2019) [20] used aquatic therapy in both groups, with one group undergoing vigorous exercise combined with a temperature-increasing therapeutic intervention, while the other group got placebo T-shirt therapy. Andrade et al. (2019) [17] elaborated on the comprehensive protocol design in a previous paper [21], which incorporated a control group directed to sustain their baseline physical activity levels. The aquatic setting for the workouts in these investigations utilized pools measuring between 8 to 12 meters in length, 4 to 6 meters in width, and a depth of 1.20 to 1.65 meters [18,20]. The water temperature for all procedures varied from 30°C to 33°C [17,18,19,20]. The frequency and duration of treatments differed throughout the trials, with two or three exercise sessions weekly on alternate days, spanning 6 to 16 weeks [17,18,19,20]. The duration of each session varied, lasting 40 minutes [19], 45 minutes [17], 50 minutes [20], or 60 minutes [18]. All treatment regimens encompassed a warm-up phase consisting of mobility exercises conducted in either the aquatic setting or on land [17,18,19,20], and also included cool-down exercises or relaxation techniques through floating [17,18].

Andrade et al. (2019) [17], elaborating on their earlier work in Andrade et al. (2017) [21], outlined a treatment protocol that commenced with a warm-up comprising stretching exercises for the limbs and neck, alongside lateral displacement walking exercises (15 minutes), succeeded by aerobic exercises at three intensity levels (30 minutes). The aerobic workouts comprised lower limb activities on floats, trampoline jumping, aquatic cycling, and resistance training for the upper limbs. This protocol recorded the highest sum of sessions [22]. A separate trial [18] included stretching activities targeting the entire posterior and anterior muscle chains, comprising three repeats of 15 to 25 seconds each, in conjunction with strength exercises executed in three sets of 15 repetitions, utilizing shin guards for the lower limbs and floats for the upper limbs. Additionally, another study [19] employed an aerobic training regimen comprising six aquatic mobility exercises, in contrast to a total of 12 mat Pilates exercises aimed at trunk control and limb mobility, utilizing a Pilates ball for relaxation at the conclusion of the session. The aquatic exercise intervention in Salm et al. (2019) [20] incorporated far-infrared (FIR) therapy to elevate water temperature, in contrast to a placebo method where participants donned T-shirts embedded with FIR-emitting ceramic microparticles, while the placebo group wore T-shirts composed of alternative materials. This exercise regimen encompassed stretching, aquatic warm-up with ambulation, aerobic and resistance training (e.g., walking, running, cycling, water kicking, relay races, and alternate jumps), in addition to a cool-down phase [20]. The intervention outlined by Andrade et al. (2019) [17], derived from the research conducted by Andrade et al. (2017) [21], modulated exercise intensity using heart rate, ventilatory anaerobic threshold, and VO2 metrics. Participants advanced through three tiers of aerobic activity throughout the primary training phase. Salm et al. (2019) [20] assessed and modified exercise intensity according to heart rate, whereas De Medeiros et al. (2020) [19] calibrated aerobic exercise intensity utilizing the Borg Rating of Perceived Exertion (RPE) scale.

Effects of Interventions on Fibromyalgia Health and Well-being

The therapies utilized in the research examined had positive benefits on the health status and well-being of patients diagnosed with fibromyalgia [17,18,19,20]. Clinical complaints, largely evaluated through pain analysis, shown improvement after the aquatic exercise intervention. Andrade et al. (2019) [17] documented a statistically significant decrease in pain, as assessed by the Visual Analog Scale (VAS) ($p = 0.05$), alongside enhancements in quality of life as measured by the Fibromyalgia Impact Questionnaire (FIQ) ($p < 0.01$), and an elevation in the Pressure Pain Threshold (PPT) ($p = 0.05$) following the intervention. Nonetheless, no statistically significant link was detected between the enhancements in clinical manifestations of fibromyalgia and the alterations in indices of exercise intensity or body composition. The aquatic exercise group demonstrated significantly elevated PPT ($p < 0.01$), improved well-being ($p = 0.03$), and reduced scores on the FIQ ($p < 0.01$) and VAS pain scale ($p = 0.02$) relative to the control group. However, the intergroup analysis demonstrated no significant differences following the detraining phase ($p > 0.05$). Consequently, when analyzing mean differences and group interactions over time, statistically significant enhancements were noted in the training group compared to the control group. Furthermore, the overall score on the SF-36 health survey improved in the aquatic therapy groups following the intervention; however, additional examination of each individual item is necessary to ascertain particular impacts [17,19].

De Medeiros et al. (2020) [19] exhibited favorable results in pain alleviation in both treatment cohorts, water exercise ($p = 0.001$) and mat Pilates ($p = 0.01$). Moreover, both cohorts demonstrated enhancements in the FIQ scores, with the aquatic exercise group revealing a mean difference of 0.91 ($p = 0.002$) and the mat Pilates group indicating a mean difference of 1.6 ($p = 0.001$). [19]. Britto et al. (2020) [18] identified a notable decrease in pain, as assessed by the VAS, in both the aquatic and land-based exercise cohorts, with no significant differences seen between the groups. The water exercise group had a statistically significant intra-group mean difference ($p < 0.001$), with pain decreasing from a mean of 7.11 ± 2.40 to 5.79 ± 2.62. The research indicated a significant decrease in tender points within the aquatic exercise cohort ($p = 0.008$) and noted alterations in the influence of fibromyalgia on quality of life, as assessed by the FIQ, for both the aquatic ($p = 0.005$) and terrestrial groups ($p = 0.006$). Finally, Salm et al. (2019) [20] suggested that the integration of temperature-enhancing methods with aquatic exercise seemed to enhance the advantages of the intervention. Both treatment cohorts had substantial enhancements in pain evaluation, as indicated by the Short Form McGill Pain Questionnaire (SF-MPQ) ($p < 0.05$). A significant decrease in pain was observed on the VAS ($p < 0.0007$) in the cohort undergoing aquatic exercise in conjunction with Far-Infrared Radiation (FIR) therapy.

Fibromyalgia and the Role of Aquatic Therapy

According to available data, fibromyalgia is a syndrome that is typified by widespread, chronic musculoskeletal pain that frequently coexists with other illnesses and lowers the quality of life for those who experience it [1,4,13,23]. Aquatic therapy is one of the many potential treatment modalities, and physical activity has emerged as a particularly important therapeutic choice [24, 25]. Exercise in water is perfect since it allows you to mobilize your joints with less effort. It is particularly helpful for those with fibromyalgia because it enables low-impact workouts that put less strain on the joints and muscles [26]. The therapeutic potential of aquatic therapy is further highlighted by the fact that different activities and motions that could be more difficult in dry conditions can be carried out because of the special qualities of water [26, 27]. Therefore, water therapy is regarded as a successful treatment to address the psychological and physical components of fibromyalgia.

The analysis of the chosen papers backs up the inclusion of water exercise as a practical fibromyalgia treatment option. Overall, the results of these studies show that exercise programs in both aquatic and land contexts can reduce pain and enhance patients' quality of life, with statistically significant differences seen in both circumstances [17,18,19,20]. This is in line with the worldwide movement to actively manage fibromyalgia syndrome, promote patient participation in therapy, and give patients the resources they need to successfully manage their symptoms. The sample population's sociodemographic traits were similar in

all four of the research examined [17, 18, 19, 20]. Women in their fourth decade of life made up the majority of the study population, which is consistent with the age and sex distribution of fibromyalgia [3,10,28]. Furthermore, there is consensus on the application of defined diagnostic criteria and standardized methods for evaluating fibromyalgia and choosing clinical trial participants; the American College of Rheumatology recommendations are frequently followed [10,17,18,19,20,29].

Notably, each of the chosen studies received a confirmed score of 8/10 on the PEDro scale, indicating excellent methodological quality [17, 18, 19, 20]. This grade reduces the possibility of bias and guarantees the accuracy of the findings. In order to enable baseline comparability, all four clinical trials used a suitable randomization procedure, followed up with precise outcome analysis, and made sure that the starting group distributions were uniform. With the exception of Salm et al. (2019) [20], who used blinding for the patients because aquatic exercise was a part of both therapy groups, the nature of the interventions made it impossible to blind both patients and therapists. The most often studied variables were pain (as measured by the VAS and SF-MPQ) and the effect of fibromyalgia on quality of life (as judged by the SF-36 or FIQ) [17,18,19,20]. This review's main focus is on these measures, which are very relevant in clinical practice and make it easier to apply the findings in practical contexts. Additionally, even if the most recent standards [10,30] no longer contain this evaluation, it is still worth considering the inclusion of other characteristics, like tender points [18].

Across the examined trials, the duration of the interventions, including the number of sessions, the effective exercise time per session, and their weekly distribution, was comparatively similar. But although Andrade et al. (2019) [17] chose a lengthier duration of 16 weeks, Salm et al. (2019) [20] focused the sessions over a period of 6 weeks. A long-term follow-up after a detraining interval was only carried out by Andrade et al. (2019) [17]. An aquatic exercise group and a control group that engaged in no physical activity were compared in the study by Andrade et al. (2019) [17], which showed advantages for the exercise group. Following detraining, the exercise group's clinical symptoms and physical performance showed values comparable to baseline data. The addition of exercise, whether it be on land or in water, is further supported by research done by Britto et al. (2020) [18] and De Medeiros et al. (2020) [19]. Exercise is a basic and efficient treatment option that is both inexpensive and very effective, as these findings imply that fibromyalgia symptoms may be linked to physical inactivity. Exercise may also have an impact on body composition [31], a theory that was further investigated by Salm et al. (2019) [20], who looked at the patients' biochemical indicators. Furthermore, parallel studies have indicated that the combination of temperature-altering techniques and exercise may lead to changes in body composition [32, 33].

With the findings of several studies indicating that the benefits seen may be related to the ease of movement in the aquatic environment, water training has been a popular therapy choice for people with fibromyalgia [34, 35]. Water exercise offers a low-impact setting that promotes cardiovascular endurance, muscle strength, and flexibility while allowing the intensity of the workout to be customized to each patient's needs. The comfort that patients feel when exercising in the water may also contribute to the benefits noted, especially because water's buoyant qualities make movement easier. Given that a large number of fibromyalgia patients reject conventional types of exercise, this setting may be more appealing. As part of a complete treatment plan that is customized to each patient's specific needs and preferences within the framework of physical therapy, therapeutic physical activity is essential to controlling fibromyalgia [14,36]. As long as the required facilities and professional knowledge are present, aquatic exercise is acknowledged as a safe and simple modality. The use of this exercise regimen may encourage adherence to treatment, which is crucial when managing fibromyalgia [14]. However, the availability of appropriate pool facilities for aquatic training and the skill of therapists are prerequisites for the success of such programs. Alternative types of exercise that can offer comparable therapeutic advantages must be taken into consideration in certain situations where socioeconomic considerations restrict patients' access to water exercise [36].

Furthermore, the water's suitable temperature, the exercises' customization to each patient's demands, and individualized supervision are additional important elements that may improve patient motivation [26,27]. Additionally, as water therapy has been demonstrated to enhance mood and incorporates activities like

cool-down routines and floating methods, its effects on overall well-being, relaxation, and emotional health should be highlighted [18]. Virtual reality and exergame therapies, which encourage movement and exercise adherence [40,41,42], or transcranial direct current stimulation [37,38,39] may also be used in conjunction with aquatic exercise. Although further study is required to examine the benefits of these therapies separately and in combination, they can be used into a holistic therapy approach. This review's main strength is its analysis of papers with excellent methodological quality, which improves the findings' relevance in clinical settings. Another noteworthy strength is the incorporation of multiple aquatic exercise modalities, including both strength and aerobic training. It is necessary to recognize a number of limitations, such as the studies' short follow-up periods, the lack of blinding for the majority of interventions, the absence of placebo controls in several trials, and the variations in aquatic exercise regimens employed in conjunction with other treatments. It's also critical to remember that every study that was considered was carried out on women in a comparable age range, which corresponds with the demographic of fibromyalgia patients. However, because the severity of symptoms and responsiveness to treatment may vary by gender, particularly in the context of chronic pain, this focus on a particular demographic may limit the findings' generalizability.

The simplicity of the search approach used in this review may be a drawback, but it is nonetheless repeatable, enabling future replication and revisions by academics and doctors. In order to ensure that the results were consistent throughout the databases examined, the search strategy was created to produce the most pertinent results about aquatic exercise and fibromyalgia. Even though there weren't many articles chosen, the search was thorough and only high-quality methodological research were included. Going forward, more research is necessary that includes comparative statistical analysis of aquatic exercise and other therapeutic modalities, considers characteristics like electromyographic activity and strength levels, and has long follow-up periods. It is advised that water exercise regimens run six to sixteen weeks, with training sessions lasting at least forty minutes on alternate days, according to the studies evaluated. Ideally, these programs should incorporate strength and aerobic activities that target both the upper and lower limbs. The Borg scale for perceived effort and heart rate should be used to track the intensity of the exercises. Subsequent studies ought to concentrate on improving these ideas, making sure that the program is tailored to the unique requirements of every patient while integrating broad suggestions at the clinical level.

Challenges of Aquatic Physical Therapy:

Fibromyalgia (FM) is a chronic disorder characterized by widespread musculoskeletal pain, fatigue, sleep disturbances, and cognitive difficulties. This condition not only affects the physical well-being of individuals but also significantly impacts their quality of life. Given the multifactorial nature of fibromyalgia, its management requires a comprehensive, interdisciplinary approach that incorporates medication, lifestyle modifications, and physical therapy. Among physical therapy interventions, aquatic physical therapy has gained considerable attention due to its potential benefits in pain reduction, improving functional mobility, and enhancing the overall quality of life for individuals with fibromyalgia. However, despite its promising effects, the application of aquatic therapy for fibromyalgia management is fraught with several challenges. This article aims to explore the various challenges associated with the use of aquatic physical therapy for managing fibromyalgia.

1. Accessibility and Availability of Facilities

One of the primary challenges of aquatic physical therapy is the accessibility and availability of suitable aquatic facilities. Not all patients with fibromyalgia have access to swimming pools or hydrotherapy centers equipped with the necessary amenities for conducting therapeutic exercises. Many healthcare settings may not offer specialized aquatic therapy pools with temperature-controlled water, non-slip surfaces, or wheelchair accessibility, which are essential for safely conducting therapy for individuals with fibromyalgia. For individuals living in rural or underserved areas, traveling to specialized aquatic therapy centers may be difficult due to geographical limitations, transportation issues, or financial constraints. Even in urban

settings where such facilities may be available, long wait times, high costs, and limited availability of trained aquatic therapists can be barriers to accessing care.

2. Water Temperature Sensitivity

Fibromyalgia patients often experience heightened sensitivity to environmental changes, including temperature fluctuations. The temperature of the water in an aquatic physical therapy setting is a critical factor for its effectiveness. Cold water can aggravate muscle stiffness and pain, while excessively hot water may exacerbate fatigue or lead to discomfort. Therefore, it is essential to maintain water temperatures within a therapeutic range to ensure the comfort and safety of patients. However, achieving this balance is not always easy. Facilities may not have the means to maintain ideal temperatures consistently, which can undermine the potential benefits of aquatic therapy. Additionally, fibromyalgia patients may have varying temperature preferences, making it challenging to provide a one-size-fits-all solution.

3. Patient Adherence and Engagement

A key challenge in any therapeutic intervention is ensuring patient adherence and engagement. Aquatic physical therapy, while beneficial for some, may not appeal to all individuals with fibromyalgia. For example, some patients may feel self-conscious about participating in group therapy sessions or may have a fear of water, which can deter them from fully engaging in the therapy. Moreover, fibromyalgia patients often experience extreme fatigue and muscle pain, which can make attending regular therapy sessions demanding. The physical exertion required during water-based exercises may overwhelm some individuals, particularly those with severe fatigue or pain. These challenges can lead to inconsistent participation and hinder the long-term benefits of aquatic therapy.

4. Individual Variability in Response to Therapy

Another challenge in using aquatic physical therapy for fibromyalgia is the variability in individual responses to the intervention. Fibromyalgia is a heterogeneous condition, and its symptoms vary significantly between patients. Factors such as the severity of pain, comorbidities, and the presence of psychological issues like anxiety or depression can influence how an individual responds to therapy. While aquatic therapy may be highly beneficial for some individuals with fibromyalgia, others may experience minimal improvement or may even experience worsening symptoms due to the physical activity involved. It is important to tailor aquatic therapy programs to the specific needs of each patient, but this can be difficult without a standardized, evidence-based approach to treatment. Additionally, some patients may not perceive the benefits of aquatic therapy immediately. This delay in noticing improvements can reduce motivation and may result in patients discontinuing therapy before they can experience its full potential.

5. Physical Limitations and Safety Concerns

Despite the low-impact nature of aquatic therapy, patients with fibromyalgia may still face physical limitations that affect their ability to participate fully. Many fibromyalgia patients have reduced joint mobility, muscle weakness, and balance issues, which can make navigating the water and performing certain exercises difficult. Aquatic therapy requires patients to move and maintain certain postures in the water, which may be challenging for individuals with severe musculoskeletal dysfunction. Some patients may struggle with floating or maintaining stability in the water, leading to an increased risk of falls or injury, especially if the water level is not well-maintained or if they lack proper support from a qualified therapist. Moreover, certain conditions like arthritis or other comorbid musculoskeletal disorders commonly co-occur with fibromyalgia, further complicating the physical demands of aquatic therapy. This is particularly true for patients who have severe pain or other chronic conditions that limit their range of motion and strength, making the therapy potentially ineffective or even harmful without careful consideration and modification of exercises.

6. Lack of Standardized Protocols

There is a lack of standardized protocols or guidelines for the implementation of aquatic physical therapy for fibromyalgia. While some studies show positive effects of aquatic therapy, the variability in exercise

regimens, duration, frequency, and intensity makes it difficult to determine the optimal approach for treating fibromyalgia. Without universally accepted protocols, the quality of care can vary significantly from one facility to another. This inconsistency may result in suboptimal treatment outcomes and confusion among both healthcare providers and patients. Developing and adhering to evidence-based guidelines for aquatic physical therapy specifically for fibromyalgia would help ensure more consistent and reliable outcomes, but the absence of such protocols remains a challenge.

7. Cost and Financial Barriers

Aquatic physical therapy can be costly, especially when it is provided at specialized therapy centers. For individuals with fibromyalgia, who may already be burdened by the cost of other medical treatments and medications, the financial burden of regular aquatic therapy sessions can be prohibitive. Health insurance coverage for aquatic therapy is inconsistent, and in many cases, it is not reimbursed or is only partially covered. As a result, many patients may forgo aquatic therapy due to its high cost, limiting its accessibility as a treatment option. Furthermore, the need for frequent sessions to achieve optimal results can exacerbate this financial barrier, leading to decreased patient participation and reduced treatment efficacy.

8. Psychological Barriers

Fibromyalgia often coexists with psychological issues, including anxiety, depression, and mood disturbances, which can negatively affect the efficacy of aquatic therapy. The pain and fatigue associated with fibromyalgia can result in a lack of motivation to participate in therapy, particularly in a group setting. Patients may also feel frustrated or discouraged if they do not perceive immediate results, leading to negative attitudes toward the therapy. This psychological component can interfere with treatment adherence and may require additional interventions, such as counseling or cognitive-behavioral therapy, to address the underlying emotional issues and improve patient engagement. Aquatic physical therapy holds significant promise as a treatment for fibromyalgia, offering potential benefits in terms of pain reduction, improving mobility, and enhancing quality of life. However, several challenges must be addressed for it to become an effective, widely accessible option for fibromyalgia management. Overcoming barriers such as accessibility, patient adherence, individual variability, physical limitations, and financial constraints is essential for maximizing the therapeutic potential of aquatic therapy for fibromyalgia patients. By addressing these challenges through further research, standardization of protocols, and increased accessibility to facilities, aquatic physical therapy can become a more effective and widely used modality for managing fibromyalgia.

Conclusion:

Fibromyalgia remains a challenging condition to manage, with its complex pathophysiology complicating treatment. This systematic review evaluated the effects of aquatic exercise on pain and quality of life in individuals with fibromyalgia. The findings suggest that aquatic exercise is an effective intervention, leading to significant improvements in pain levels, sleep quality, and overall well-being. The evidence from the reviewed studies supports the integration of aquatic exercise into the broader physiotherapy management of fibromyalgia. The low-impact nature of aquatic therapy makes it particularly suitable for individuals who experience exacerbated pain during high-impact activities, providing a safer environment to improve strength, flexibility, and cardiovascular fitness. The consistency of positive outcomes across studies, despite variations in intervention protocols, indicates that aquatic exercise can be tailored to individual needs, which is crucial given the diverse symptomatology of fibromyalgia. Moreover, the comparison between aquatic exercise and other forms of physical therapy highlighted that aquatic exercise may offer unique benefits in alleviating fibromyalgia symptoms. Although land-based exercises like Pilates and strengthening regimens are beneficial, the water environment provides additional support for joint movement and offers resistance without the risk of strain. The combination of buoyancy, resistance, and the therapeutic effects of water on muscle relaxation may account for the effectiveness of aquatic exercise in improving the clinical manifestations of fibromyalgia. The studies reviewed also demonstrated that the inclusion of aquatic exercise within a multidisciplinary treatment plan can significantly enhance quality of life, an essential

aspect of managing chronic conditions. Given the positive impact on both physical and psychological well-being, aquatic exercise should be considered a valuable component of fibromyalgia care. However, there are several limitations in the current evidence, including the small sample sizes and short follow-up periods. Future research with larger, more diverse populations and longer-term follow-ups is needed to further validate these findings and refine treatment protocols. Additionally, studies exploring the mechanisms underlying the benefits of aquatic exercise in fibromyalgia would enhance understanding and guide clinical practice. In conclusion, aquatic exercise presents a promising, effective intervention for fibromyalgia, offering a low-impact, versatile approach to managing chronic pain and improving overall function. With continued research and refinement of therapeutic protocols, it can become a key component in the management of this debilitating condition.

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الملخص:

الخلفية: التصلب العصبي الليفي (FM) هو حالة مزمنة تتميز بألم عضلي هيكلي منتشر، تعب، اضطرابات في النوم، وصعوبات في الإدراك، مما يقلل بشكل كبير من جودة الحياة. تؤثر هذه الحالة على جزء كبير من السكان، وخاصة النساء، ولها مسببات غير مفهومة بشكل جيد، حيث تنطوي على تفاعل معقد بين العوامل الوراثية، الكيميائية الحيوية، والبيئية. يتطلب إدارة التصلب العصبي الليفي نهجًا متعدد الجوانب، يشمل الأدوية والعلاج الطبيعي وتعديلات نمط الحياة. من بين التدخلات العلاجية الطبيعية، اكتسب التمرين المائي اهتمامًا بسبب فوائده المحتملة في تقليل الألم وتحسين الرفاهية العامة .

الهدف: تهدف هذه المراجعة المنهجية إلى تقييم فعالية التمرين المائي كعلاج طبيعي للأفراد المصابين بالتصلب العصبي الليفي، مع مقارنته بأساليب العلاج الطبيعي الأخرى من حيث تقليل الألم وتحسين جودة الحياة .الطرق: تمت المراجعة وفقًا لإرشادات PRISMA وشملت التجارب العشوائية المحكومة (RCTs) المنشورة بين عامي 2019 و2024، التي تقيم تدخلات التمرين المائي للتصلب العصبي الليفي. تم البحث في قواعد بيانات مثلPubMed ، و .Web of Scienceكانت الدراسات المشمولة في المراجعة مطالبة بالحصول على درجة PEDro لا تقل عن 7، لضمان الصرامة المنهجية. شملت النتائج الرئيسية الألم) المقاس بمقياس الفروق البصرية، (VASوجودة الحياة) المقاسة باستبيان تأثير التصلب العصبي الليفي .

النتائج: شملت المراجعة أربع تجارب عشوائية محكومة مع 157 مشاركًا (جميعهن نساء). أظهر التمرين المائي تحسنًا كبيرًا في مستويات الألم، وجودة الحياة، وجودة النوم. كانت هذه التحسينات قابلة للمقارنة أو أفضل من العلاجات الطبيعية الأخرى، مثل التمرينات الأرضية واليوغا. تراوحت مدة التدخلات من 6 إلى 16 أسبوعًا، وتكرار الجلسات من 2 إلى 3 جلسات أسبوعيًا، وشدة التمرين، ولكن جميعها أظهرت نتائج إيجابية.

الخاتمة: يعد التمرين المائي تدخلاً واعدًا في إدارة التصلب العصبي الليفي، حيث يوفر تخفيفًا كبيرًا للألم ويحسن جودة الحياة. إن طبيعته ذات التأثير المنخفض تجعله خيارًا مناسبًا للمرضى الذين يعانون من التصلب العصبي الليفي، لا سيما لأولئك الذين قد يواجهون صعوبة في ممارسة التمارين ذات التأثير المرتفع. هناك حاجة إلى مزيد من البحث لتحديد بروتوكولات العلاج بشكل أكثر دقة ودراسة التأثيرات على المدى الطويل.

الكلمات المفتاحية: التصلب العصبي الليفي، التمرين المائي، العلاج الطبيعي، إدارة الألم، جودة الحياة، المراجعة المنهجية.