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Original article

Pain, quality of life, self-perception of health, and depression in patients with fibromyalgia treated with hydrokinesiotherapy

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ABSTRACT

Objectives: The aim of this study was to analyze the effects of treatment by hydrotherapy on quality of life, perception of pain and the severity of depression in a group of patients with fibromyalgia.

Materials and methods: We evaluated 64 females divided into two groups: hydrocinesiotherapy (n = 33, 58.2 ± 10.6 years) and control group (n = 31 with 59.6 ± 9.4 years) with clinical diagnosis of fibromyalgia. Individuals were assessed by Visual Analog Scale of Pain (VAS), the Fibromyalgia Impact Questionnaire (FIQ) and the Beck Depression Inventory. Participants underwent a treatment in a hydrotherapy pool heated to 33°C over a period of 15 weeks, two sessions per week of 45 minutes, a total of 30 sessions. The exercises were underwater: cardiovascular conditioning, strength training, mobility, coordination, balance and still, stretching exercises and muscle relaxation. The ANOVA 2×2 and Kruskall-Wallis was used for statistical analysis Results: There were statistically significant improvements in the perception of pain intensity (Δ% = -28.2%, p < 0, 01), quality of life (Δ% = -32.4%, p < 0, 05) and depression symptoms (Δ% = -35.4%, p < 0, 05) in favor of the Hydrotherapy group compared to the control group.

Conclusions: The study suggests that hydrocinesiotherapy was effective as an alternative therapy for fibromyalgia, however further studies are recommended to test the associations between the variables and intervention programs and using the water activities, and the modifiability of the parameters of physical and mental health when these individuals undergo programs of short, medium and long duration.

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Dor, qualidade de vida, autopercepção de saúde e depressão de pacientes com fibromialgia, tratados com hidrocinesioterapia

Palavras-chave:
Fibromialgia
Hidroterapia
Dor
Qualidade de Vida
Depressão

RESUMO

Objetivos: Analisar os efeitos do tratamento hidrocinesioterapêutico na qualidade de vida, percepção de dor e gravidade de episódios depressivos em um grupo de pacientes com fibromialgia.

Materiais e métodos: Foram avaliados 64 indivíduos do sexo feminino, separados em dois grupos: hidrocinesioterapia (n = 33; 58,2 ± 10,6 anos) e grupo controle (n = 31; 59,6 ± 9,4 anos), com diagnóstico de fibromialgia. Os indivíduos foram avaliados através da Escala Analógica Visual de Dor (EVA), o Fibromyalgia Impact Questionnaire (FIQ), e o Inventário de Beck. Os participantes foram submetidos a um tratamento hidrocinesioterápico numa piscina aquecida a 33°C com duas sessões de 45 minutos por semana, ao longo 15 semanas, num total de 30 sessões. Os exercícios subaquáticos foram: de condicionamento cardiovascular, de força, de mobilidade, de coordenação, de equilíbrio, de alongamento e de relaxamento muscular. Utilizou-se a ANOVA 2×2 e Kruskal-Wallis para análise estatística.

Resultados: Foram observadas melhorias estatisticamente significativas na percepção da intensidade da dor (Δ% = -28,2%, $p < 0,01$), na qualidade de vida (Δ% = -32,4%, $p < 0,05$) e nos sintomas de depressão (Δ% = -35,4%, $p < 0,05$) favoráveis ao grupo hidrocinesioterapia comparado ao grupo controle.

Conclusões: O estudo sugere que a hidrocinesioterapia mostrou-se eficaz como terapia alternativa da fibromialgia. No entanto, recomenda novos estudos que testem as associações existentes entre as variáveis analisadas e os programas de intervenção, utilizando as atividades aquáticas, bem como a modificabilidade dos parâmetros de saúde física e psíquica quando estes indivíduos são submetidos a programas de curta, média e longa duração.

Introduction

Fibromyalgia (FM) is a rheumatic condition of little known etiology, characterized by chronic generalized pain and reduced pain threshold, with hyperalgesia and allodynia,[1] featuring some associated symptoms such as fatigue, sleep disorders,[2] impaired physical capacity and ability,[3,4,5] especially functional capacity,[6,7] and reduced muscle strength.[8,9,10] Moreover, there are peculiar psychological characteristics, such as high levels of anxiety, depression, and perceived stress.[11,12]

The prevalence of FM in the Brazilian population ranges from 2.5% to 4.4%.[13] Individuals diagnosed with the disease require permanent analgesic therapies, and their demand for medical services is higher when compared with that of the general population.[14]

The percentage of depressive symptoms is high in this population, ranging from 40% to 80%,[5,15] with an approximately five-fold higher chance of experiencing depression when compared to healthy subjects.[16] Thus, depression may trigger or worsen the symptoms of this disease.[5,17,18]

The complex symptomatology of FM involves three main areas: physical aspects of health (musculoskeletal system), pain regulatory mechanisms (neuroendocrine), and factors related to the individual's psychological well-being and mental health.[19,20] The most appropriate approach in the context of physical health is therapy aimed to assist the more usual types of therapies and interventions,[14,21,22] since FM is a chronic condition that triggers musculoskeletal pain and many other symptoms.

The treatment of FM is usually based on pharmacological techniques[23] in order to relieve pain, minimize depression, and improve quality of life.[24] However, this treatment has limitations and can result in unwanted side effects.[25,26,27] The modest effect of pharmacotherapy performed in isolation has led to the inclusion of other factors required for treatment.

In this sense, the practice of physical exercises has shown promising results for this population.[28] Among the interventions with physical exercises, hydrokinesiotherapy stands out for the treatment and prevention of musculoskeletal pain, and has shown beneficial results for patients with chronic pain,[29] specifically those with FM.[30]

Water therapy performed in heated water is recommended as a treatment for patients with FM due to the benefits provided by the environment,[31] as the water allows for body immersion and floating, facilitates the reproduction of compound movements safely and in several forms, and minimizes the impact (when compared to floor exercises), which can allow for body mobility and flexibility work in a safe and gradual manner.[32] Furthermore, individuals with FM report a sense of "global relaxation" caused by the water, combined with a "sense of relief" of symptoms after the intervention.[33]

According to Valim,[34] there have been few studies in the scientific literature using hydrokinesiotherapy in FM patients. However, the difference in these types of intervention is in the planning of a therapeutic program that involves, among other variables, the type of treatment and the effective control of

the duration, volume, and intensity of exercises, according to the guidelines for exercise prescription by the American College of Sports Medicine (ACSM).[35]

Therefore, this study aimed to analyze the effects of hydrokinesiotherapy treatment on pain perception, quality of life, and depressive symptoms in female individuals with a diagnosis of FM.

Material and methods

The present experimental study was conducted at the Clínica-Escola de Fisioterapia Maria de Almeida Santos of the Centro Universitário da Fundação Educacional Guaxupé (Unifeg), Guaxupé, Minas Gerais, Brazil, from December of 2010 to April of 2011.

The project was approved by the Research Ethics Committee of Unifeg (133/2010), and met the standards for the Research in Humans of the National Health Council, Resolution 196/96 of 1996 and the Declaration of Helsinki.[36] All participants were informed about the objectives of the study and signed an informed consent before the intervention procedures were conducted.

Participants

The study was widely publicized by the local media, in order to receive the highest number of volunteers. Therefore, it was possible to select participants with FM referred by physicians of different specialties. Thus, 64 women with a clinical diagnosis of FM confirmed by clinical rheumatologists from the Clínica-Escola de Fisioterapia Maria de Almeida Santos of the Unifeg according to the criteria of the American College of Rheumatology were selected to participate in the study.[37] The volunteers were randomly separated, by drawing lots, into two groups: the hydrokinesiotherapy group (n = 33 participants aged 58.2 ± 10.6 years), and the control group without exercise (n = 31 participants aged 59.6 ± 9.4 years).

Throughout the study, the participants used only muscle relaxant drugs and painkillers prescribed and monitored by their physicians. The hydrokinesiotherapy group participants were instructed to perform only the activities proposed by the study, whereas the control group did not have any other directed physical therapy during the study. None of the patients had undergone physical therapy within six months prior to the study. Inclusion criteria were female gender, age 50 years or older, and FM diagnosis confirmed by a rheumatologist.

The following exclusion criteria were used: uncontrolled hypertension, wounds, any type of infectious disease, and/or disabling chronic clinical picture or associated chronic pain. According to these criteria, two volunteers were excluded, as they met some of the above criteria and because they did not have FM diagnosis. None of the participants were undergoing any other type of physical treatment and remained so throughout the study. At the end of the study, the hydrokinesiotherapy group had a total of 33 participants, aged 58.2 ± 10.6 years; two volunteers from the control group did not attend the final evaluation, and thus this group had a final sample of 31 participants aged 59.6 ± 9.4 years. The entire process of sample selection is shown in Fig. 1.

Procedures

After the initial medical procedures, the following evaluations were performed: anthropometric measurements, quality of life, depressive symptoms, and pain scale. The participants underwent an evaluation before and after the hydrokinesiotherapy intervention.

Anthropometric assessment

Body mass was obtained using a platform scale with a 150 kg capacity and 50 g graduation manufactured by Kratos® (Embu, Brazil). Height was measured using the stadiometer attached to the same scale, to the nearest 0.1 cm. The body mass index (BMI) value was obtained in accordance with the Anthropometric Standardization Reference Manual.[38]

Pain intensity assessment

Pain intensity assessment was performed using the visual analog scale (VAS) for pain. This scale ranges from 0 to 10 cm, in which 0 represents no pain or discomfort, and 10 represents the worst possible pain experienced by the patient.[39]

Quality of life assessment

The tool used to assess the impact of FM on quality of life was the Fibromyalgia Impact Questionnaire (FIQ). This questionnaire takes into account the dimensions of an individual's life that may be affected by the syndrome, i.e., the physical dimension associated with the functional capacity, state of mental health, and feelings of well-being or pain. This tool has shown to be easy to understand and apply. It consists of 19 questions; the higher the final score, the greater the impact of FM on quality of life. The version used for this study was translated and validated by Marques et al.[40]

Evaluation of depressive symptoms

Beck's Depression Inventory was applied to assess depressive symptoms. This tool consists of 21 items, where each ques-

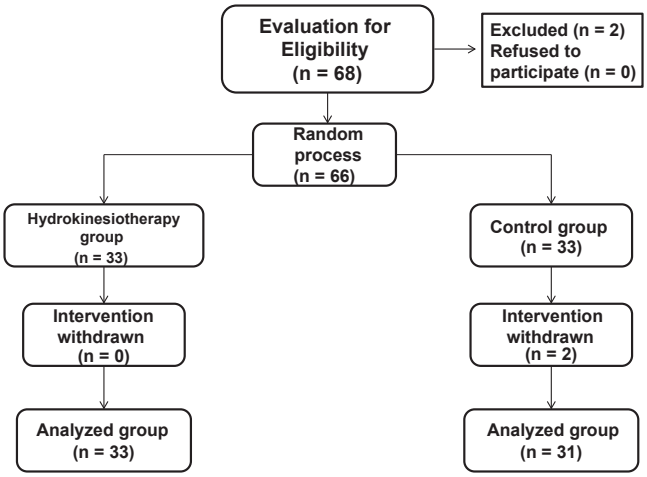

Fig. 1 – Sample selection process.

tion has four answer options with varying degrees of intensity from 0 to 3, and the sum of scores ranges 0 zero to 63.[41] According to the original authors, this tool has a high reliability (0.86) when their results were compared with diagnoses by other professionals. The version translated into Portuguese by Goreinstein and Andrade was used in this study.[42]

Characterization of hydrokinesiotherapy treatment

The intervention treatment with hydrokinesiotherapy was performed in a pool heated to 33º C, with a depth of 1.30 m.

The participants underwent 30 treatment sessions of 45 minutes each, twice a week, totaling 15 weeks of intervention. All sessions consisted of exercises in the water, divided into three parts and performed as follows: 1) five minutes of warm-up exercises and preparatory movements, 2) 35 minutes of exercises aimed to develop strength, mobility, balance, coordination, and agility, through the use of small aquatic equipment in order to increase exercise intensity (e.g. dumbbells, mini-arches, exercise balls, pool noodles); 3) Finally, five minutes of stretching and relaxation. Exercise intensity was measured constantly through an adapted subjective scale of exertion (PSE) developed by Cavassini and Matsuda.[43] The PSE was determined by an arbitrary scale 0 zero to 10, with identical intervals and reference to the quality of effort performed, i.e. (0-2) very light, (3-5) light, (6-7) moderate, (8-9) intense, and (10) very intense.

The objective was to control the exercise at a PSE of 6 and 7, because it was expected that the real exertion would be between 60% and 70% of the maximum heart rate, values recommended by the ACSM as adequate work intensity for individuals with FM undergoing exercise therapy, as demonstrated by some studies. [34,35,44] The participants in the control group were instructed to refrain from performing any type of intervention or physical therapy during the study period.

Statistical analysis

Statistical analysis was performed using PASW®, release 17.0 for Windows, with a P-value (α) < 0.05. Initially, a descriptive analysis was performed with mean and standard deviation values of the pre-test data from the study group variables. Subsequently, the Shapiro-Wilk normality test was performed. The ANOVA (2x2) test was used when there was normality; Levene's test confirmed the homogeneity of variance, and the Kruskal-Wallis test was used for nonparametric data. Finally, to calculate the difference in percentage, the formula Δ% = [(Post-test - test) * 100/Test] was used.

Results

Table 1 shows the descriptive statistics of both groups for all variables studied. There are no significant differences between the groups regarding the entry data for all variables, showing that the two groups had similar characteristics before the intervention.

The analysis results of the two moments of assessment for pain intensity, performed by intra- and intergroup comparison using the VAS protocol, demonstrated that after the intervention period there was a statistically significant improvement (P < 0.05) in the intra-group analysis for the following variables: cervical, trochanter, and total VAS. Moreover, there was a statistically significant difference (P < 0.05) in favor of the hydrokinesiotherapy group regarding the inter-group analysis for the following variables: occipital (Δ% = -24.7%, P = 0.001), cervical (Δ% = -38.8%, P = 0.003), trapezius (Δ% = -13%, P = 0.005), supraspinatus (Δ% = -20.1%, P = 0.01), gluteus (Δ% = -31.6%, P < 0.001), trochanter (Δ% = -46.8%, P < 0.001), and for the total score of the VAS protocol (Δ% = -28.2%, P <0.001), as shown in Fig. 2.

Fig. 3 shows the data on the impact of FM on quality of life, demonstrating that there was a statistically significant difference in both intra- and intergroup analysis (Δ% = -32.4%, F = 37.7, P < 0.001) .

Fig. 4 shows the results of the participants' depressive symptoms. Statistically significant intra- and intergroup differences (P < 0.05) were also observed for this variable, favorable to the hydrotherapy group (Δ% = -35.4%, F = 27.4, P <0.001) when compared with the control group.

Table 1 – Descriptive analysis of data from study groups.

	Hydrotherapy; n = 33		Control group; n = 31		
Variables	Mean	SD	Mean	SD	P-value
Age (years)	58.2	10.6	59.6	9.4	0.579
Mass (kg)	71.9	10.2	69.8	6.9	0.336
Height (cm)	159.8	4.6	161.2	5.4	0.251
BMI (kg/m²)	28.3	4.6	29.9	3.4	0.202
Beck (score)	25.6	5.6	24.06	5.1	0.258
Total VAS (score)	60.1	5.7	59.8	5.6	0.824
FIQ (score)	78.5	11.1	75.7	10.3	0.306

SD, standard Deviation; BMI, body mass index; VAS, visual analog scale for pain; FIQ, Fibromyalgia Impact Questionnaire.

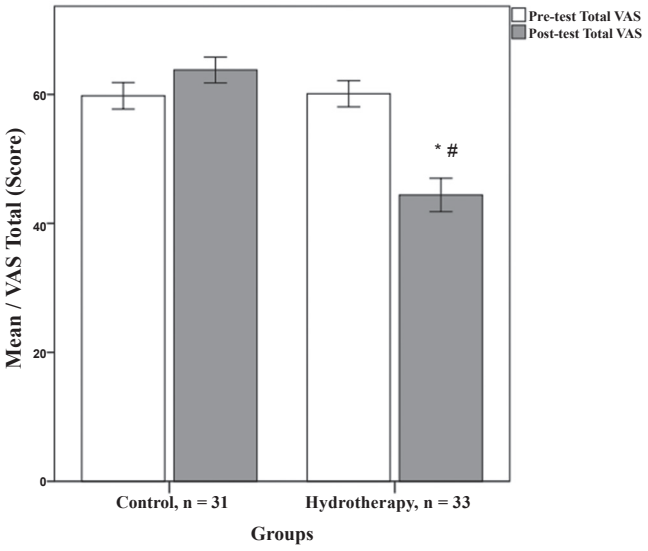

Fig. 2 – Analysis of pain using the visual analog scale (VAS) protocol. * P < 0.05 for the intergroup comparison. # P < 0.05 for the intragroup comparison.

Discussion

FM constitutes a severe health problem that has socioeconomic implications, with a negative individual, familial, and social impact.[45] Thus, programs and alternative therapies of proven effectiveness in alleviating its symptoms may represent an integrated low-cost solution for its treatment.[46] Studies using the FIQ that included in their experimental design an intervention model comprising physical exercise outside the aquatic environment are more frequent in the current literature.[47]

Perhaps due to the high cost related to the maintenance and treatment of the pool, models that used activities in the water combined with exercise therapies outside of the water are also more frequent.[48] The objectives of these trials, controlled by two types of activities, aim to test the evidence that the water is able to induce a state of relaxation along with the perception of pain symptom relief reported by the patients.

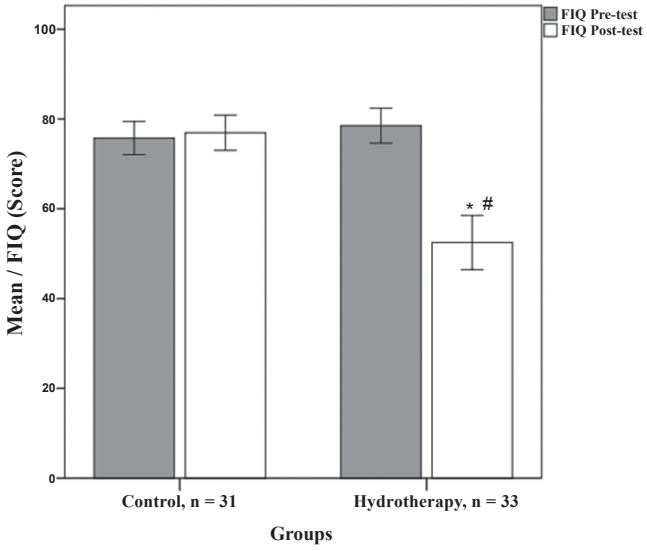

Fig. 3 – Fibromyalgia Impact Questionnaire (FIQ) protocol analysis. * P < 0.05 for the intergroup comparison. # P < 0.05 for the intragroup comparison.

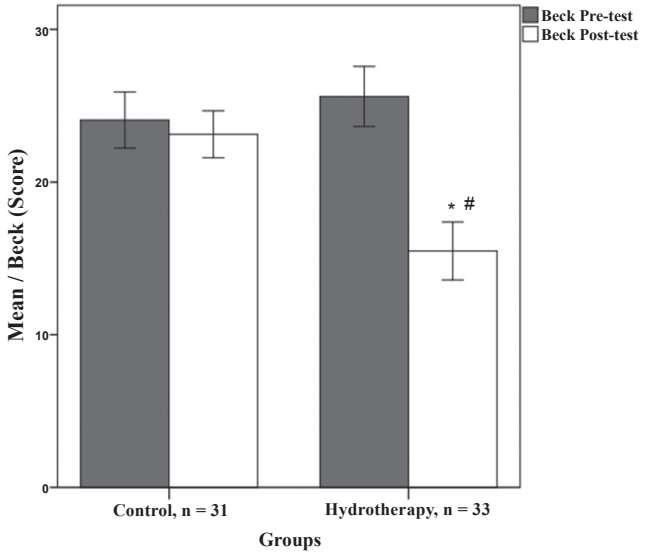

Fig. 4 – Beck protocol analysis. * P < 0.05 for the intergroup comparison. # P < 0.05 for the intragroup comparison.

The present study corroborates the literature,[32] as it observed a positive effect on the results of pain symptom intensity assessment performed through the VAS, which indicated a decreased perception of pain, with statistically significant differences. Bastos and Oliveira stated[32] that therapies in water are beneficial for patients with FM, as the movements in the water are slower due to its physical properties, thereby promoting overall muscle relaxation.

In this study, in addition to improvement in the perception of pain symptoms, there was a lower impact of FM on quality of life of those participating in the hydrokinesiotherapy group. Similarly, Tomas-Carus et al. (2007)[49] also reported improvement in the physical and psychological dimensions (FIQ) in a 12-week controlled clinical trial, whose protocol was performed three times a week and used the aquatic environment as a therapeutic resource.

Individuals with FM are usually affected by depressive symptoms.[5] In this study, high values in the Beck Depression Inventory were observed in both groups before the intervention (Table 1), which demonstrated elevated depressive symptoms in these patients. The hydrokinesiotherapy program of the present study was effective in decreasing depressive symptoms when compared to the control group (Fig. 4), which is in agreement with recent studies that used treatment programs with similar time and duration.[50] The same was observed in the study performed by Jorge et al.,[51] in which the authors emphasize the importance of continuity of care, since the results were not favorable after six months and there was no intervention program.

Considering that the objective of this study was to verify the effects of hydrokinesiotherapy on perception of pain, quality of life, and depressive symptoms in women diagnosed with FM, it is noteworthy that the proposed treatment was shown to be beneficial for all evaluated dimensions.

Control of factors such as treatment time, duration, frequency, and type of activities can be crucial for positive results in intervention studies.[52] It should be emphasized that all the participants of the present study successfully adhered to the program regarding the frequency, with no record of therapy interruption in the group that performed the hydrokinesiotherapy.

However, studies have demonstrated that interrupting the treatment also causes significant loss of results, and thus most programs should be continued and have a diversity of activities; the inclusion of other practices or physical activities are recommended in the program in order to motivate the participants and reduce intervention interruptions.[51]

Regarding the modifiability of the psychological state evaluations in this type of treatment, the literature states that medium and long-term studies whose interventions last between 12 and 24 weeks promote a positive change and have a longer-lasting effect.[33,53] An interesting fact is that the mere encouragement through a dialogue aimed to explain in details the importance of looking for alternative treatments for FM was effective for the enrollment of these individuals into an integrated treatment program, such as physical exercise-directed therapy.[54]

The authors of this study[54] also reported significant improvement in self-efficacy for exercise, psychological symptoms, and quality of life of patients; however, they make it clear that the motivational intervention strategy was decisive for treatment success. In fact, patients with FM significantly associate physical performance, quality of life, and cognitive performance, because these dimensions are shown as strong indicators of quality of life.[55]

Regarding drug treatment, there was no effective control for this variable by researchers; this can be an important study limitation, because the type and amount of administered medications may affect the results. According to Assis et al.[56] FM treatment using exercises in the water associated with drug treatment can bring beneficial effects, particularly regarding the psychological aspects. In the same study, the authors reported that throughout the intervention process an analgesic dose of only up to 3 mg/day was allowed. Therefore, further studies to evaluate this effect associated with hydrokinesiotherapy are recommended.

Conclusion

The study suggests that the hydrokinesiotherapy is effective as an alternative therapy in the treatment of FM. A statistically significant improvement was observed in all evaluated dimensions, including aspects related to physical health and also to the individual perceptions of the psychological state related to FM. Many authors state that the modifiability of these dimensions during treatments that use non-drug approaches is essential in order to encourage individuals to maintain continuous and uninterrupted therapy.

Regarding methods that include practice of exercises in water, control of variables such as volume, intensity, and duration of intervention time are crucial, as they can provide information about the quantity and quality of intervention time required to promote positive changes in the perceptions of individuals with FM and the duration of their effects.

Conflicts of interest

The authors declare no conflicts of interest.

REFERENCES

1. Henriksson KG. The fibromyalgia syndrome: translating science into clinical practice. J Musculoskelet Pain 2009; 17(2):189 – 194.
2. Bliddal H, Møller HJ, Schaadt ML, Danneskiold-Samsøe B. [Biochemical changes in fibromyalgia. Can serum hyaluronic acid be used diagnostically?]. Ugeskr Laeger 2001; 5; 163(45):6284-6. Danish PubMed PMID: 11723689.
3. Wolfe F, Michaud K. Severe rheumatoid arthritis (RA), worse outcomes, comorbid illness, and sociodemographic disadvantage characterize ra patients with fibromyalgia. J Rheumatol 2004; 31(4):695-700.
4. Panton LB, Kingsley JD, Toole T, Cress ME, Abboud G, Sirithienthad P et al. A comparison of physical functional performance and strength in women with fibromyalgia, age- and weight-matched controls, and older women who are healthy. Phys Ther 2006; 86(11):1479-88.
5. Homann D, Stefanello JMF, Góes SM, Breda CA, Paiva ES, Leite N. Percepção de estresse e sintomas depressivos: funcionalidade e impacto na qualidade de vida em mulheres com fibromialgia. Rev Bras Reumatol 2012; 52(3):319-330.
6. Mannerkorpi K, Svantesson U, Broberg C. Relationships between performance-based tests and patients' ratings of activity limitations, self-efficacy, and pain in fibromyalgia. Arch Phys Med Rehabil 2006; 87(2):259-64.
7. Bennett RM, Jones J, Turk DC, Russell IJ, Matallana L. An internet survey of 2,596 people with fibromyalgia. BMC Musculoskeletal Disord 2007; 9(8):27.
8. Nørregaard J, Bülow PM, Mehlsen J, Danneskiold-Samsøe B. Biochemical changes in relation to a maximal exercise test in patients with fibromyalgia. Clin Physiol 1994; 14(2):159-67.
9. Valkeinen H, Alén M, Häkkinen A, Hannonen P, Kukkonen-Harjula K, Häkkinen K. Effects of concurrent strength and endurance training on physical fitness and symptoms in postmenopausal women with fibromyalgia: a randomized controlled trial. Arch Phys Med Rehabil 2008; 89(9):1660-6.
10. Góes SM, Leite N, Shay BL, Homann D, Stefanello JM, Rodacki AL. Functional capacity, muscle strength and falls in women with fibromyalgia. Clin Biomech (Bristol, Avon) 2012; 27(6):578-83. Disponível em: <10.1016/j.clinbiomech.2011.12.009>. Acesso em 9 jan. 2012.
11. Riva R, Mork PJ, Westgaard RH, Rø M, Lundberg U. Fibromyalgia syndrome is associated with hypocortisolism. Int J Behav Med 2010; 17(3):223-33.
12. Stisi S, Venditti C, Sarracco I. [Distress influence in fibromyalgia]. Reumatismo 2008; 60(4):274-81.
13. Senna ER, De Barros AL, Silva EO, Costa IF, Pereira LV, Ciconelli RM et al. Prevalence of rheumatic diseases in Brazil: a study using the Copcord approach. J Rheumatol 2004; 31(3):594-7.
14. Heymann RE, Paiva Edos S, Helfenstein M Jr, Pollak DF, Martinez JE, Provenza JR et al. Brazilian consensus on the treatment of fibromyalgia. Rev Bras Reumatol 2010; 50(1):56-66.
15. Cavalcante AB, Sauer JF, Chalot SD, Assumpção A, Lage LV, Matsutani LA et al.Prevalência de fibromialgia: uma revisão de literatura. Rev Bras Reumatol 2006, 46(1):40-48.
16. Berger A, Dukes E, Martin S, Edelsberg J, Oster G. Characteristics and healthcare costs of patients with fi bromyalgia syndrome. Int J Clin Pract 2007; 61(9):1498–508.
17. Okifuji A, Turk DC, Sherman JJ. Evaluation of the relationship between depression and fi bromyalgia syndrome: Why aren't all patients depressed? J Rheumatol 2000; 27(1):212–9.
18. Berber JSS, Kupek E, Berber SC. Prevalência de depressão e sua relação com a qualidade de vida em pacientes com síndrome da fibromialgia. Rev Bras Reumatol 2005; 45(2):47-54.
19. Ferreira EAG, Marques AP, Matsutani LA, Vasconcellos EG, Mendonça LLF. Avaliação da dor e estresse em pacientes com fibromialgia. Rev Bras Reumatol 2002; 42(2):104-110
20. Ignachewski LER, Semeghini TA, Junior JRG. Aspectos fisiopatológicos e neuroendócrinos da síndrome da fibromialgia. Saúde Revista 2004; 6(12):55-58.
21. Suda AL, Jennings F, Bueno VC, Natour J. Development and validation of Fibromyalgia Knowledge Questionnaire: FKQ. Rheumatol Int 2012; 32(3):655-62.
22. Ricci NA, Dias CNK, Driusso PA. Utilização dos recursos eletrotermofototerapêuticos no tratamento da síndrome da fibromialgia: uma revisão sistemática. Rev Bras Fisio 2010; 14(1): 1-9.
23. Thieme K, Gracely RH. Are psychological treatments effective for fibromyalgia pain? Curr Rheumatol Rep 2009; 11: 443–450.
24. Menzies V, Taylor AG, Bourguignon C. Effects of guided imagery on outcomes of pain, functional status, and self-

efficacy in persons diagnosed with fibromyalgia. J Alt Comp Med 2006; 12(1):23–30.
25. Bernard AL, Prince A, Edsall P. Quality of life issues for fibromyalgia patients. Arthritis Care Res 2000; 1:42–50.
26. Panush RS. American College of Rheumatology position statement: Complementary and alternative therapies for rheumatic diseases. Rheum Dis Clin North Am 2000; 26:189-192.
27. Holdcraft LC, Assefi N, Buchwald D. Complementary and alternative medicine in fibromyalgia and related syndromes. Best Pract Res Clin Rheumatol 2003; 17:667–683.
28. Rossy LA, Buckelew SP, Dorr N, Hagglund KJ, Thayer JF, McIntosh MJ et al. A metaanalysis of fibromyalgia treatment interventions. Ann Behav Med 1999: 21: 180–191.
29. Rett MT, Mesquita PJ, Mendonça ARC, Moura DP, DeSantana JM. A cinesioterapia reduz a dor no membro superior de mulheres submetidas à mastectomia ou quadrantectomia. Rev Dor. São Paulo, 2012 jul-set;13(3):201-7.
30. Hecker CD, Melo C, Tomazoni SS, Martins RABL, Junior ECPL. Análise dos efeitos da cinesioterapia e da hidrocinesioterapia sobre a qualidade de vida de pacientes com fibromialgia – um ensaio clínico randomizado. Fisioter Mov 2011; 24(1):57-64.
31. Gimenes FO, Santos EC, Silva TJPV. Watsu no tratamento da fibromialgia: Estudo piloto. Rev Bras Reumatol 2006; 46(1):75-76.
32. Bastos CC, Oliveira EM. Síndrome da fibromialgia: Tratamento em piscina aquecida. Lato & Sensu 2003; 4(1):3-5.
33. Geytenbeek J. Evidence for effective hydrotherapy. Physiotherapy 2002; 88(9):514-529.
34. Valim V. Benefícios dos exercícios físicos na fibromialgia. Rev Bras Reumatol 2006; 46(1): 49-55.
35. American College of Sports Medicine (ACSM). Quantity and Quality of Exercise for Developing and Maintaining Cardiorespiratory, Musculoskeletal, and Neuromotor Fitness in Apparently Healthy Adults: Guidance for Prescribing Exercise – Position Stand. Med Sci Sports Exerc 2011; 1334-1359. DOI: 10.1249/MSS.0b013e318213fefb.
36. Garrafa V, Lorenzo C. Moral imperialism and multi-centric clinical trials in peripheral countries. Cad Saúde Pública 2008; 24(10):2219-2226.
37. Wolfe F, Smythe HA, Yunus MB, Bennet 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; 33: 160-72.
38. Lohman TG, Roche AF, Martorell R. Anthropometric standardization reference manual. Champaign, IL:Human Kinetics Books, 1988.
39. Gomes MB, Guimarães FC, Guimarães SM, Claro Neves, AC. Limiar de dor à pressão em pacientes com cefaleia tensional e disfunção temporomandibular. Ciência Odontol Bras 2006; 9(4):84-91.
40. Marques AP, Santos AMB, Assumpção A, Matsutani LA, Lage LV, Pereira CAB . Validação da versão brasileira do Fibromyalgia Impact Questionnaire. Rev Bras Reumatol 2006; 46(1):24-31.
41. Serna ECH, Sousa RMC. Depressão: uma possível consequência adversa do trauma crâncio-encefálico para o cuidador familiar. Acta Paulista de Enfermagem 2005; 18(2):131-135.
42. Gorenstein C, Andrade L. Validation of a portuguese version of the beck depression inventory and the state-trait anxiety inventory in brazilian subjects. Braz J Med Biol Res 1996; 29:453-457.
43. Cavasini SM, Matsudo VKR. Desenvolvimento de uma escala brasileira de percepção subjetiva de esforço. Anais do 3° Congresso Brasileiro de Ciências do Esporte, 1983; p.23.
44. Valim V, Oliveira LM, Suda AL, Silva LE, Faro M, Neto TL, Feldman D, Natour J. Peak oxygen uptake and ventilatory anaerobic threshold in fibromyalgia. J Rheumatol 2002; 29(2):353-7.
45. Martinez JE, Filho IB, Kubokawa K, Pedreira IS, Machado LA, Cevasco G. Análise crítica de parâmetros de qualidade de vida de pacientes com fibromialgia. Acta Fisiátrica 1998; 5(2):116-120.
46. Kingsley JD, McMillan V, Figueroa A. The effects of 12 weeks of resistance exercise training on disease severity and autonomic modulation at rest and after acute leg resistance exercise in women with fibromyalgia. Arch Phys Med Rehabil 2010; 91:1551-7.
47. Mannerkorpi K, Iversen M. Physical exercise in fibromyalgia and related syndromes. Best Practice & Research Clinical Rheumatology 2003; 17(4):629–647.
48. Wilson B, Spencer H, Kortebein P. Exercise Recommendations in Patients With Newly Diagnosed Fibromyalgia. Phys Med Rehab 2012; 4:252-255.
49. Tomás-Carús P, Gusi N, Leal A, García A, Ortega-Alonso A. The Fibromyalgia Treatment With Physical Exercise in Warm Water Reduces the Impact of the Disease on Female Patients Physical and Mental Health. Reumatol Clin 2007; 3(1):33-7
50. Gowans SE, Dehueck A, Voss S, Silaj A, Abbey SE. Six-month and one-year follow up of 23 weeks of aerobic exercise for individuals with fibromyalgia. Arthritis Rheum 2004; 51(6):890–898.
51. Jorge LL, Tomikawa LCO, Jucá SSH. Efeito de um programa de reabilitação multidisciplinar para homens portadores de fibromialgia: estudo aleatorizado controlado. Acta Fisiatr 2007; 14(4): 196 – 203.
52. Hall J, Swinkels A, Briddon J, McCabe CS. Does aquatic exercise relieve pain in adults with neurologic or musculoskeletal disease? A systematic review and meta-analysis of randomized controlled trials. Arch Phys Med Rehabil 2008; 89(5):873-83.
53. Evcik D, Yigit I, Pusak H, Kavuncu V. Effectiveness of aquatic therapy in the treatment of fibromyalgia syndrome: a randomized controlled open study. Rheumatol Int 2008; 28(9):885-890.
54. Ang DC, Kaleth AS, Bigatti S, Mazzuca S, Saha C, Hilligoss J et al. Research to encourage exercise for fibromyalgia (Reef): use of motivational interviewing design and method. Contemp Clin Trials 2011; 32(1):59-68.
55. Cherry BJ, Zettel-Watson L, Chang JC, Shimizu R, Rutledge DN, Jones CJ. Positive associations between physical and cognitive performance measures in fibromyalgia. Arch Phys Med Rehabil 2012; 93:62-71.
56. Assis MR, Silva LE, Alves AMB, Pessanha AP, Valim V, Feldman D et al. A randomized controlled trial of deep water running: clinical effectiveness of aquatic exercise to treat fibromyalgia. Arthritis Rheum 2006; 55(1):57-65.