

Borja Sañudo Corrales¹
Moisés de Hoyo Lora¹
Inmaculada C Martínez Díaz¹
Luís Carrasco Páez¹
Gabriela Ochiana^{2*}

HEALTH RELATED QUALITY OF LIFE AND DEPRESSION IN WOMEN WITH FIBROMIALGIA SYNDROME: EFFECTS OF A LONG-TERM EXERCISE PROGRAM

Z ZDRAVJEM POVEZANA KAKOVOST ŽIVLJENJA IN DEPRESIJA PRI ŽENSKAH S SINDROMOM FIBROMIALGIJE: UČINKI DOLGOTRAJNEGA PROGRAMA VADBE

Abstract

This study aims to assess the effect of a program combined by aerobic, strengthening and flexibility exercises in patients with fibromyalgia (FM) in relation to health-related quality of life and psychological health status. Forty-two women with FM were randomly allocated to one of two groups: an experimental group that would conduct aerobic exercise, strength and flexibility exercises and a usual care control group, for 24 weeks. They were evaluated by using the Short-Form Health Survey (SF-36), and their psychological health status by using Beck Depression Inventory (BDI) for depression levels. Significant improvements were observed after the intervention for the combined exercise program in both quality of life (SF-36) and psychological health status (depression) and mainly in SF-36 mental health, physical function, body pain and vitality domains, while the control group patients even experienced a decrease in some of those variables such as body pain. These results confirm that a combination of aerobic exercise, strengthening and flexibility is beneficial to improving psychological health status in patients with FM. Therefore, this practice can be recommended to FM patients.

Keywords: fibromyalgia, exercise, depression, quality of life.

¹ *Department of Physical Education and Sport, University of Seville, Spain.*

² *Faculty of Sport, Movement and Health Science, University of Bacau, Romania*

**Corresponding author:*

University of Bacau, Faculty of Sport, Movement and Health Sciences

Calea Mărășești 157, Bacău 600115, Romania

E-mail: sochiana@yahoo.com

Izvleček

Cilj raziskave je oceniti učinke programa za bolnice s fibromialgijo (FM), sestavljenega iz aerobnih vaj ter vaj za moč in gibljivost. Namen študije je ugotoviti učinke tega programa na kakovost življenja, povezano z zdravjem in psihološkim zdravstvenim stanjem. Dvainštirideset žensk s FM smo naključno razporedili v eksperimentalno skupino, ki je 24 tednov izvajala aerobno vadbo ter vaje za moč in gibljivost oziroma v kontrolno skupino. Zdravstveno stanje smo ocenjevali z vprašalnikom Short-Form Health Survey (SF-36), njihovo psihično zdravje pa z Beckovim vprašalnikom depresivnosti (BVD). Po izvajanju programa kombinirane vadbe je bilo ugotovljeno precejšnje izboljšanje, tako v kakovosti življenja (SF-36) kot tudi v psihičnem zdravju (depresija). Izboljšanje smo ugotovili tudi z drugimi lestvicami SF-36, ki merijo mentalno zdravje, telesno funkcioniranje, telesno bolečino in vitalnost. Stanje pri kontrolni skupini se je v nekaterih spremenljivkah, kot je telesna bolečina, poslabšalo. Rezultati potrjujejo, da se bolnicam s FM priporoča izvajanje kombinirane aerobne vadbe z vajami za moč in gibljivost, saj takšna vadba pripomore k boljšemu psihičnemu zdravstvenemu stanju.

Ključne besede: fibromialgija, vadba, depresija, kakovost življenja

INTRODUCTION

Fibromyalgia (FM) is a common, multidimensional disorder with complex symptomatology and relatively poor treatment outcomes (Busch, Schachter, Overend, Peloso, & Barber, 2008). In most patients, fibromyalgia is associated with fatigue, sleep dysfunction, stiffness, depression, anxiety, cognitive disturbance, or exercise intolerance (Wolfe, Smythe, & Yunus, 1990). FM patients show a low health status compared with healthy subjects and even with patients suffering from other chronic diseases (Birtane, Uzunca, Tastekin and Tuna, 2007). Similar results were found by Gormsen, Rosenberg, Bach and Jensen (2010), who reported lower values in physical function, general health perception, vitality, social function and mental health, in FM patients than in subjects with neuropathic pain and healthy subjects of similar age. However, the relationship between FM and psychological disorders is controversial and, despite multiple studies, the results remain inconclusive (Fietta, Fietta, & Managanelli, 2007).

This complex symptomatic picture requires FM patients to seek medical care and also indicates the importance of an individualised treatment (Hoffman and Dukes, 2008). The management of this syndrome requires both pharmacological and non-pharmacological strategies. Many authors have demonstrated the utility of antidepressants (O'Malley, et al., 2000). However, many patients do not respond or cannot tolerate many of these medications. For this reason, several non-pharmacological therapies have been used, including cognitive behaviour therapy, education, biofeedback, and the implementation of different relaxation techniques (Rocha and Benito, 2006). However, physical exercise is a non-pharmacological therapy that has shown significant benefits, either by itself or applied in combination with other treatments (Busch et al., 2008).

Many studies have reported significant improvements in the perceived health status of FM patients after physical exercise programmes, mainly based on aerobic exercise. It was reported that regular exercise results in decreased levels of depression and stress contributing to improve mental health status. Following this line, numerous studies have attempted to establish basic guidelines or recommendations for the prescription of physical activity in women with FM, proving evidence of health related quality of life (HRQOL) benefits, including general functioning, psychological wellbeing, and other symptoms reliefs such as in anxiety or depression (Assis et al., 2006; Bircan, Karasel, Akgün, El, & Alper, 2008; Gusi, Tomas-Carus, Häkkinen, Häkkinen, & Ortega-Alonso, 2006; Tomas-Carus et al., 2008; Valim et al., 2003).

To date, we have evidence supporting the short-term benefits of aerobic exercise in FM patients, although evidence is limited regarding the benefits of other types of training, such as strength or flexibility. Since there is a lack of evidence-based models of physical exercise to recommend to these patients, the aim of this study is to assess the effects of a long-term program based on a combination of aerobic exercise, strengthening and flexibility on HRQOL and depression in women with FM.

METHODS

Participants

Forty-two postmenopausal women (mean age = 59 years, SD = 7.90 years) diagnosed with FM based on the American College of Rheumatology criteria (Wolfe et al., 1990) participated in the study. Patients were recruited from two sources: (i) from rheumatology clinics based in hospital or

the community and (ii) through different local FM patient support groups in Spain. After giving informed written consent, participants were randomised into one of two groups (randomization was done with a computer-generated random number table), one intervention group that would conduct physical exercise (GA, $n = 21$) and a control group (CG, $n = 21$). Randomisation was carried out by Luis Carrasco, who was not directly involved in the day-to-day running of the study. Exclusion criteria included the presence of inflammatory, rheumatic or psychiatric diseases, respiratory or cardiac abnormalities that could interfere with the exercise and the participation in some form of physical or psychological therapy in the previous six months.

Instruments

The Short Form 36 (SF-36)

The Spanish version of the SF-36 is a self-administered questionnaire for measuring quality of life through the perception of health by the patient (Alonso et al., 1995). It contains 36 items grouped into eight subscales: physical functioning, physical role, body pain, general health, vitality, social functioning, emotional role, and mental health. The range of scores is between 0 and 100 in every subscale; higher scores indicate better health. The SF-36 does not obtain a global score. One item in this questionnaire measures health change during the past year in a Likert-like scale in which 1 = 'much better,' 2 = 'better,' 3 = 'unchanged,' 4 = 'worse,' and 5 = 'much worse.'

The Beck Depression Inventory

This is a questionnaire developed and validated for patients with depression. Translated into Spanish and previously used in this population (Redondo et al., 2004), it contains 21 items that assess the cognitive, affective, and neuro-vegetative factors associated with depression. The range of score is 0–63, where values above 13 indicate presence of depression, and values above 21 indicate major depression (Beck, Ward, Mendelson, Mock, & Erbaugh, 1961).

Procedures

Assessment of all outcomes was undertaken at baseline and immediately after the 24-week intervention, and at the same time points in the usual care control group. Exercise group patients performed twice-weekly sessions of combined exercises with 1h duration, including 10 min warm up, 10–15 min of aerobic exercise at 65–70% HR_{max} (including walking, jogging or dancing), 15–20 min of muscle training with eight exercises of the major muscle groups (1 set of 8–10 reps with 1–3 kg) and finally 10 min of flexibility training with 8–9 exercises (1 set of 3 reps, keeping the stretched position for 30 s). The control group continued their normal daily activities during the period of the intervention.

Data analysis

The normality of the data distribution was initially tested using the Kolmogorov-Smirnov test. Differences between groups were tested using analyses of variance (ANOVA) for continuous variables, and the χ^2 test for categorical variables. The effects of the intervention programme were evaluated by age-adjusted analyses of covariance for repeated measures. For all tests, the significance level was set at $p < 0.05$. The analyses were performed using SPSS 15.0 (SPSS Inc. Chicago, USA).

RESULTS

No significant differences between GA and CG in any of the variables considered in the study were found at baseline (Tables 1 and 2). During the intervention, three participants of the experimental group (by an accident, family problems or without cause) and a subject of CG (did not attend the evaluation session at post-test) were excluded from the study, so that data from 18 women in GA and 20 in CG were included in the analysis.

Table 1: Baseline characteristics in FM patients in pre-test

Outcomes	GA (n=18) M (SD)	CG (n=20) M (SD)	p-value
Age (years)	55.88 (7.14)	56.55 (8.48)	.968 (*)
Body mass (Kg)	68.49 (12.32)	74.48 (14.97)	.316 (*)
Height (m)	1.57 (0.08)	1.58 (0.07)	.793 (*)
Medication (n)	2.2 (0.8)	2.5 (0.7)	.642 (†)

Legend: *p-value (ANOVA), †p-value (χ2 analysis)

Table 2 summarises the results of all outcomes in both groups before and after 24 weeks of intervention. Significant improvements can be observed for global score of SF-36 (22%) in GA patients. These improvements were also significant for physical function, general health, vitality and mental health. With regard to psychological dimension, significant improvements were achieved by over 20% in depression (BDI). Patients in the CG did not improved in any of these variables and some of them even experienced a decrease (body pain). Improvements obtained for body pain, social function (14%) and emotional role (25%), were also remarkable when compared with those obtained in CG, but without reaching statistical significance.

Table 2: Outcome measures before and after 24 weeks intervention

	Pretest			Posttest				
	GA M (SD)	CG M (SD)	p-value intergroup	GA M (SD)	p-value intragroup	CG M (SD)	p-value intragroup	p-value intergroup
Physical Function	50.0 (22.7)	44.6 (15.9)	0.402	57.1 (17.4)	0.027*	45.2 (13.7)	0.825	0.030*
Role Physical	13.5 (17.4)	19.8 (27.6)	0.424	21.6 (25.6)	0.321	19.4 (28.3)	0.821	0.817
Body pain	23.2 (17.4)	23.6 (17.7)	0.942	30.4 (16.2)	0.041*	19.5 (17.6)	0.084	0.068
General Health	39.8 (16.1)	33.4 (12.1)	0.175	43.1 (11.4)	0.406	33.6 (11.1)	0.803	0.019*
Vitality	29.4 (15.3)	27.7 (17.5)	0.762	41.8 (11.0)	0.009*	28.4 (17.3)	0.979	0.011*
Social Function	55.2 (22.9)	48.6 (16.5)	0.313	64.4 (23.7)	0.214	52.1 (20.5)	0.473	0.109
Role Emotional	53.3 (45.3)	45.6 (40.4)	0.588	71.5 (40.1)	0.273	51.8 (43.4)	0.454	0.176
Mental Health	51.3 (18.9)	44.0 (20.7)	0.274	60.1 (15.4)	0.035*	44.0 (23.6)	0.956	0.025*
BDI (0-63)	35.1 (14.1)	31.4 (12.8)	0.173	28.7 (13.6)	<0.001*	41.5 (11.3)	0.971	0.005*

Legend: GA: Exercise group, CG: Control group, *p < 0.05

DISCUSSION

This study, based on a long-term (24 weeks) exercise program combined with aerobic exercise, strengthening and flexibility, allowed FM patients to significantly increase their general health status, measured by the total score of the SF-36, and reduces levels of depression (BDI). These results are consistent with those reported in other studies in which exercise programs were participated in by women with FM, providing evidence of the effectiveness in reducing the impact of the syndrome on functional ability, but also improving health status and patients' psychological dimension. One of these studies compared a 12-week aerobic exercise therapy with another of flexibility, after the intervention the physical component improved in both groups, while the mental component was unchanged (Richards and Scott, 2002). Soon after, Valim et al. (2003) compared the positive effects of a program based on walking with one based on flexibility. After 20 weeks of treatment, the aerobic group reduced the impact of the syndrome on the patients' daily lives, mainly in mental health and depression. In another study, Assis et al. (2006) compared a water exercise program with a land-based exercise program, showing that both therapies were effective for improving pain and functional ability, although the pool exercises were more effective on the emotional component. Finally, Bircan et al. (2008) concluded that both aerobic exercise and strengthening exercises were equally effective in improving symptoms, physical and psychological components and HRQOL in women with FM.

In the current study, the emotional scale, which assesses the patient's QOL from the perceptions of their mental health improved significantly, was significantly reduced in GA patients at the beginning of the study; however, after 24 weeks it improved more than 14 points; however, probably due to the high standard deviation between subjects, the differences were not significant. Several authors have reflected that a higher level of emotional well-being at baseline would predict a better therapeutic response, since the presence of this syndrome could delay the benefits in personal satisfaction (Birtane et al., 2007). Significant improvements in anxiety and depression, based on interventions with aerobic or combined exercises can be expected (Assis et al., 2006; Gusi et al., 2006; Redondo et al., 2004; Tomas-Carus et al., 2008). Previous studies showed no changes in BDI values after eight weeks of mixed training (Redondo et al., 2004). However, longer periods of exercise results in reductions between 10 and 20% for depression (Assis et al., 2006; Gowans, DeHueck, Voss, Silaj, & Abbey, 2004; Häkkinen, Häkkinen, Hannonen, & Alen, 2001; Valim et al., 2003) which exceeds the 14% improvement achieved in this study.

In the light of these results, it seems that the positive effects of exercise on depression depend on the intensity, duration and frequency of training. In fact, correlations have been established between the amount of exercise and BDI at 12 months of exercise (Gowans et al., 2004). In this study, the exercise program was conducted in groups; improvements in depression, as well as in QOL, may be partially explained by interactions between the women in the training sessions (Mannerkorpi and Gard, 2003). A limitation of the current study is the limited frequency of the exercise program; whether higher durations could bring additional benefits could be considered. However, and based on the aforementioned data, the selected intensity, frequency and duration selected in the current study have showed to be safe and well tolerated by FM patients, and also effective for improving HRQOL and depression.

REFERENCES

- Alonso, J., Prieto, L., & Antó, J. (1995). La version española del SF-36 Health Survey (Cuestionario de Salud SF-36): Un instrumento para la medida de los resultados clínicos [The Spanish version of the SF-36 Health Survey: An instrument for measuring clinical results]. *Medicina Clínica*, 104, 111-116.
- Assis, M.R., Silva, L.E., Alves, A.M., Pessanha, A.P., Valim, V., & Feldman, D. (2006). A randomized controlled trial of deep water running: Clinical effectiveness of aquatic exercise to treat fibromyalgia. *Arthritis and Rheumatism*, 55, 57-65.
- Beck, A.T., Ward, C.H., Mendelson, M., Mock, J., & Erbaugh, J. (1961). An inventory for measuring depression. *Archives of General Psychiatry*, 4, 561-71.
- Bircan, C., Karasel, S.A., Akgün, B., El, O., & Alper, S. (2008). Effects of muscle strengthening versus aerobic exercise program in fibromyalgia. *Rheumatology International*, 28(6), 527-32.
- Birtane, M., Uzunca, K., Tastekin, N., & Tuna, H. (2007). The evaluation of quality of life in fibromyalgia syndrome: A comparison with rheumatoid arthritis by using SF-36 Health Survey. *Clinical Rheumatology*, 26(5), 679-84.
- Busch, A.J., Schachter, C.L., Overend, T.J., Peloso, P.M., & Barber, K.A. (2008). Exercise for fibromyalgia: A systematic review. *The Journal of Rheumatology*, 35(6), 1130-44.
- Fietta, P., Fietta, P., & Manganelli, P. (2007). Fibromyalgia and psychiatric disorders. *Acta Biomedica*, 78, 88-95.
- Gormsen, L., Rosenberg, R., Bach, F.W., & Jensen, T.S. (2010). Depression, anxiety, health-related quality of life and pain in patients with chronic fibromyalgia and neurotic pain. *European Journal of Pain*, 14, 127.e1-8. doi: 10.1016/j.ejpain.2009.03.010.
- Gowans, S., DeHueck, A., Voss, S., Silaj, A., & Abbey, S. E. (2004). Six-month and one-year followup of 23 weeks of aerobic exercise for individuals with fibromyalgia. *Arthritis Care Research*, 51, 890-898.
- Gusi, N., Tomas-Carus, P., Häkkinen, A., Häkkinen, K., & Ortega-Alonso, A. (2006). Exercise in waist-high warm water decreases pain and improves health-related quality of life and strength in the lower extremities in women with fibromyalgia. *Arthritis and Rheumatism*, 55(1), 66-73.
- Häkkinen, A., Häkkinen, K., Hannonen, P., & Alén, M. (2001). Strength training induced adaptations in neuromuscular function of premenopausal women with fibromyalgia: Comparison with healthy women. *Annals of Rheumatic Diseases*, 60, 21-26.
- Hoffman, D. L., & Dukes, E.M. (2008). The health status burden of people with fibromyalgia: A review of studies that assessed health status with the SF-36 or the SF-12. *International Journal of Clinical Practice*, 62(1), 115-126.
- Mannerkorpi, K., & Gard, G. (2003). Physiotherapy group treatment for patients with fibromyalgia: an embodied learning process. *Disability and Rehabilitation*, 25, 1372-1380.
- O'Malley, P.G., Baden, E., Tomkins, G., Santoro, J., Kroenke, K., & Jackson, J.L. (2000). Treatment of fibromyalgia with antidepressants: A meta-analysis. *Journal of General Internal Medicine*, 15, 659-666.
- Redondo, J.R., Justo, C.M., Moraleda, F.V., Velayos, Y.G., Puche, J.J., & Zubero, J. R. (2004). Long-term efficacy of therapy in patients with fibromyalgia: A physical exercise-based program and a cognitive-behavioral approach. *Arthritis and Rheumatism*, 51, 184-192.
- Richards, S.C., & Scott, D.L. (2002). Prescribed exercise in people with fibromyalgia: Parallel group randomized controlled trial. *British Medical Journal*, 325, 185.
- Rocha, M., & Benito, E. (2006). La fibromialgia: Fundamentos y tratamiento. *Biociencias*, 4, 1-18.
- Thieme, K., Turk, D.C., & Flor, H. (2007). Responder criteria for operant and cognitivebehavioral treatment of fibromyalgia syndrome. *Arthritis and Rheumatism*, 57(5), 830-836.

Tomas-Carus, P., Gusi, N., Häkkinen, A., Häkkinen, K., Leal, A., & Ortega-Alonso, A. (2008). Eight months of physical training in warm water improves physical and mental health in women with fibromyalgia: A randomized controlled trial. *Journal of Rehabilitation Medicine, 40*(4), 248-52.

Valim, V., Oliveira, L., Suda, A., Silva, L., de Assis, M., & Barros, T. (2003). Aerobic fitness effects in fibromyalgia. *The Journal of Rheumatology, 30*(5), 1060-1069.

Ware, J.E., & Sherbourne, C.D. (1992). The MOS-36 item short form health survey (SF-36). *Medical Care, 30*, 473-483.

Wolfe, F., Smythe, H.A., & Yunus, M.B. (1990). The American College of Rheumatology: Criteria for the Classification of Fibromyalgia. Report of the Multicenter Criteria Committee. *Arthritis and Rheumatism, 33*, 160-172.