Effectiveness of multidisciplinary therapy on symptomatology and quality of life in women with fibromyalgia

A. Carbonell-Baeza[1,2], V.A. Aparicio[3], P. Chillón[1], P. Femia[4], M. Delgado-Fernández[1], J.R. Ruiz[1,5]

[1]*Department of Physical Education and Sport, University of Granada, Granada, Spain;*
[2]*Department of Physical Education, University of Cádiz, Cádiz, Spain;*
[3]*Department of Physiology, University of Granada, Granada, Spain;*
[4]*Department of Statistics and Operative Research, University of Granada, Granada, Spain;*
[5]*Department of Biosciences and Nutrition at NOVUM, Unit for Preventive Nutrition Karolinska Institutet, Huddinge, Sweden.*

Ana Carbonell-Baeza, PhD
Virginia A. Aparicio, PhD
Palma Chillón, PhD
Pedro Femia, PhD
Manuel Delgado-Fernández, PhD
Jonatan R. Ruiz, PhD.

Please address correspondence to:
Ana Carbonell Baeza, PhD,
Departamento de Educación Física y Deportiva,
Universidad de Granada,
Carretera de Alfacar, s/n,
18011 Granada, Spain.
E-mail: anellba@ugr.es

Received on June 20, 2011; accepted in revised form on November 28, 2011.

Clin Exp Rheumatol 2011; 29 (Suppl. 69): S97-S103.

Key words: fibromyalgia, quality of life, exercise, acceptance and commitment therapy.

Funding: The study was supported by the Center of Initiatives and Cooperation to the Development (CICODE, University of Granada), Instituto Andaluz del Deporte (IAD) (Spain), Foundation MAPFRE and grants supported by Ministry of Education (AP-2006-03676), the Ministry of Science and Innovation (BES-2009-013442 and RYC-2010-05957).

Competing interests: none declared.

ABSTRACT

Objective. *To study the effects of a 3-month multidisciplinary intervention based on exercise and psychological therapy on symptomatology and quality of life in women with fibromyalgia.*

Methods. *Seventy-five women with fibromyalgia volunteered to participate and were allocated to a 3-month (3-times/week) multidisciplinary (pool, land-based and psychological session based on the Acceptance and Commitment Therapy) intervention (n=41), or to a usual care group (n=34). Sixty-five women with fibromyalgia completed the study protocol (n=33 multidisciplinary intervention, aged 51.4±7.4 years and n=32 usual care group, aged 50.0±7.3 years). The outcomes variables were Fibromyalgia Impact Questionnaire (FIQ), Short Form Health Survey 36 (SF-36), Hospital Anxiety and Depression Scale, Vanderbilt Pain Management Inventory and Rosenberg Self-Esteem Scale.*

Results. *We observed a significant interaction effect (group*time) for the FIQ total score, the subscales fatigue, stiffness, anxiety and depression, and the subscales of SF-36 physical role, bodily pain, vitality and social functioning. Post-hoc analysis revealed significant improvements in total score of FIQ ($p<0.001$), fatigue ($p=0.001$), stiffness ($p<0.001$), anxiety ($p=0.011$), depression ($p=0.008$), physical role ($p=0.002$), bodily pain ($p<0.001$), vitality ($p<0.001$) and social functioning ($p<0.001$) in the intervention group, whereas in the control group, there was a significant worsening in the subscale depression ($p=0.006$) and social functioning ($p=0.019$).*

Conclusions. *A 3-month low-moderate intensity multidisciplinary intervention improved fibromyalgia symptomatology and quality of life in women with fibromyalgia.*

Introduction

Fibromyalgia is a chronic disease that affects the person in different vital areas, such as physical condition, emotional state, working status, daily functioning and social relationships (1-2). Fibromyalgia is a condition characterised for chronic and widespread musculoskeletal pain; and symptoms, such as fatigue, stiffness, sleep disturbance, anxiety, depression and cognitive difficulties are frequently associated (3). The clinical manifestation of fibromyalgia appears between the 40s and 50s, and is more common in women (~4.2%) than in men (~0.2%) (4).

Fibromyalgia patients usually decrease their activity level because of the fear of pain involved in each movement. The consequences of a prolonged inactivity pattern are more depression, functional incapacity and worse physical performance (5). A possible alternative is the acceptance of pain, defined as a willingness to remain in contact with the chronic pain, without reaction, disapproval or attempts to reduce or avoid it together with an engagement in positive daily activities (6). The acceptance of chronic pain has been associated with better quality of life and emotional, social and physical functioning (6-8), better positive affect (9), decrease of depression and anxiety (7) and adaptive coping (8).

The Acceptance and Commitment Therapy (ACT) developed by Hayes *et al.* (10), promotes engaging the person in a life goal and the acceptance of the negative experiences like chronic pain, distress and fatigue in contrast to reduction or controlling them as proposed by the Cognitive and Behavioural Therapy (CBT) (11-12).

There is strong evidence that the multidisciplinary treatment (educational or psychological therapy and exercise therapy) has beneficial short-term effects

on key symptoms of fibromyalgia and health-related quality of life (13). Fibromyalgia patients seem to attain symptom relief, particularly decreased pain and fatigue as well as improved sleep and mood, with low to moderate intensity exercise of any type (14). On the other hand, ACT has shown to be an effective intervention in the management of chronic pain (15-16). Several studies investigated the effect of combining both exercise and ACT in chronic pain patients and reported significant improvements in emotional, social and physical functioning after treatment (17-18). The effectiveness of a multidisciplinary intervention based on exercise and ACT in women with fibromyalgia remains to be known. In a previous study we analysed the effects of a multidisciplinary intervention on pain (measured by tender points count), body composition and physical fitness (19), and observed a positive effect on pain threshold in several tender points in women with fibromyalgia.

The aim of the present controlled trial was to study the effects of a 3-month multidisciplinary intervention based on exercise (pool and land-based) and ACT on symptomatology and quality of life in women with fibromyalgia.

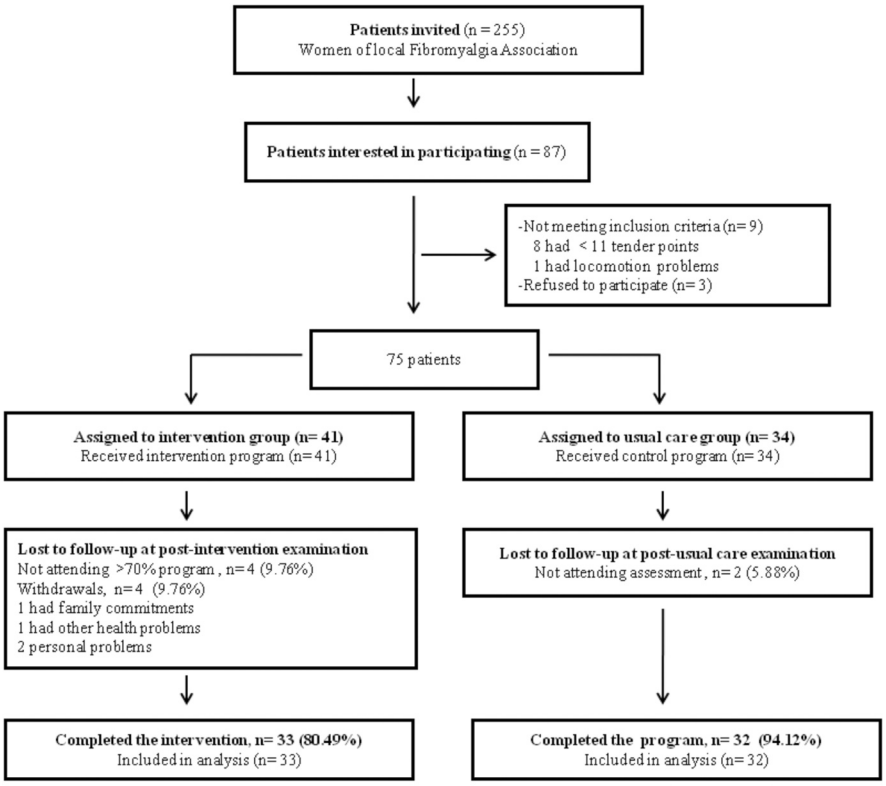

Fig. 1. Flow of patients throughout the trial.

Method

Study participants

We contacted a total of 255 Spanish female members of a fibromyalgia association (Granada, Spain). Eighty-seven potentially eligible patients responded and gave their written informed consent after receiving detailed information about the aims and study procedures. The inclusion criteria were: (i) meeting the American College of Rheumatology criteria – widespread pain for more than 3 months, and pain with 4 kg/cm of pressure reported for 11 or more of 18 tender points (3), (ii) not to have other severe somatic or psychiatric disorders, such as stroke or schizophrenia, allergy to chlorine, or other diseases that prevent physical loading, and (iii) not to be attending another type of physical or psychological therapy at the same time.

A total of 9 patients were not included in the study (8 did not have 11 of the 18 tender points, and 1 presented locomotor problems). After the first day of the baseline measurements, 3 patients refused to participate. Therefore, a final sample of 75 women with fibromyalgia participated in the study. Patients were not engaged in regular physical activity >20 minutes on >3 days/week. The study flow of patients is presented in Figure 1.

Study design

We had an ethical obligation with the Association of Fibromyalgia Patients (Granada, Spain) to provide treatment to all patients willing to participate in the study, but due to limitation of resources, we only could offer the intervention in a particular schedule. Those patients that could attend the intervention in that schedule were allocated to the intervention group (n=41) and the other patients who, due to work or family commitment, could not attend were allocated to the control group (n=34).

The research protocol was reviewed and approved by the Ethics Committee of the *Virgen de las Nieves Hospital* (Granada, Spain). The study was carried out between January 2008 and June 2009, following the ethical guidelines of the Declaration of Helsinki, last modified in 2000.

Intervention

The multidisciplinary intervention comprised 3 sessions per week for 12 weeks. The first two sessions of each week (Monday and Wednesday) were performed in a chest-high warm pool for 45 minutes, and the third session (Friday) included 45 minutes of activity in the exercise room and 90 minutes of psychological-educational therapy. The exercise sessions were carefully supervised by a fitness specialist and by a physical therapist that worked with groups of 10-12 women. The psychological-educational sessions were conducted by a psychologist with experience treating fibromyalgia patients.

Participants in the control group were asked not to change their activity levels and medication during the 12-week intervention period.

Exercise sessions

Each exercise session included a 10 minute warm-up period with slow walk, mobility and stretching exer-

cises, followed by 25 minute of exercise, and finished with a 10 minute cool-down period of stretching and relaxation exercises. Monday sessions involved strength exercises. Wednesday sessions included balance-oriented activities and dancing aerobic exercises. Fridays included aerobic-type exercises and coordination using a circuit with diverse exercises.

Training intensity was controlled by the rate of perceived exertion (RPE) based on Borg's conventional (6-20 point) scale. The medium values of RPE were 12±2 on Monday, 12±2 on Wednesday and 13±3 on Friday. These RPE values correspond to a subjective perceived exertion of 'fairly light exertion and somewhat hard exertion', that is, low-moderate intensity.

Psychological therapy

Psychological therapy was based on the ACT developed by Hayes *et al*. (10) adapted for chronic pain (11) and group format (20). This intervention included components of the CBT for chronic pain (21) like role of the complaint, regulations of activity levels and social abilities (assertivities). To note is that it was always based in patients' goals and not to cognitive restructuring or control and elimination of symptoms strategies.

The therapy consisted of: (i) Sessions 1, 2 and 3: General information of the disease from a bio-psycho-social perspective, enhancing the role of physical activity and expectative of intervention; (ii) Sessions 4-6: To clarify individual's life values and goals as well as to encourage commitment in actions which are directed towards the achievement of such goals. Encouragement of acceptance of those thoughts, feelings and emotions related to pain which act as barriers to life goals achievement: (iii) Sessions 7-8: Being aware about to what extent the patient is focused on her symptoms and moved away from her values as well as the consequences of it on her life; (iv) Sessions 9-10: To distinguish different interpersonal communication styles (passive, aggressive and assertive) and to encourage the expression of needs in a direct way. On the other hand, analysing the role of complaints in communication is highlighted; (v) Session 11-12: Exercises aiming to improve body awareness and solving doubts, problems, etc. and general conclusions of the intervention. The pedagogical approach was based on the active participation of the patients through discussions, practical exercises, self-registration, metaphors, exposition and role-playing. Educational materials were provided to improve understanding of fibromyalgia by the patients.

Outcome measures

Fibromyalgia Impact Questionnaire (FIQ) to assess the fibromyalgia-related symptoms. It is a self-administered questionnaire designed to assess the components of health status that are believed to be most affected by fibromyalgia and has been validated for Spanish population with fibromyalgia (22). This questionnaire is composed of three subscales rated on Likert-type scale and seven subscales rated on a visual analogue scale (VAS). All the subscales ranged from 0 to 10 where high scores indicated a higher negative impact and/or a greater severity of symptoms. A total score may be obtained after normalisation of some subscales and summing the subscales. The FIQ total score range from 0 to 100, and a higher score indicates a greater impact of the syndrome (22). The FIQ total score and the subscales for physical function, feel good, pain, fatigue, morning tiredness, stiffness, anxiety, and depression were used in the study.

The Short-Form Health Survey 36 (SF-36) is a generic instrument assessing health related quality of life. In this study we used the Spanish version of the SF-36 (23). It contains 36 items grouped into 8 subscales: physical functioning, physical role, bodily pain, general health, vitality, social functioning, emotional role, and mental health. The range of scores is between 0 and 100 in every subscale, where higher scores indicate better health.

We used the Spanish version of the Hospital Anxiety and Depression Scale (HADS) (24). The HADS contains 14 statements, ranging from 0 to 3, in which a higher score indicates a higher degree of distress. The scores build 2 subscales: anxiety (0–21) and depression (0–21) (25). Zigmond and Snaith (25) suggested subscale cut-offs equal or greater than 8 to indicate the likely presence of clinically significant levels of depression or anxiety at mild intensity and cut-offs equal or greater than 11 to indicate moderate to severe intensity.

The Vanderbilt Pain Management Inventory (VPMI) (26) adapted into Spanish (27) was used to assess coping strategies. The scale has 18 items divided into two subscales designed to assess how often chronic pain sufferers use active and passive coping. Active coping: where patients attempt to function in spite of their pain; and passive coping: where patients relinquish control of their pain to others, or allow other areas of their life to be adversely affected by pain.

The Spanish version of the Rosenberg Self-Esteem Scale (RSES) (28) was used to analyse the self-esteem of the fibromyalgia patients . RSES is a self-report measure designed to assess the concept of global self-esteem (29) and comprises 10 items scored on a 4-point scale that are summed to produce a single index of self-esteem. A higher score indicates a greater self-esteem.

Data analysis

Independent t test and chi-square test were used to compare demographic variables between groups. We used a two-factor (group and time) analysis of covariance (ANCOVA) with repeated measures to assess the intervention effects on the outcome variables after adjusting for age. For each variable we reported the *p*-value corresponding to the group (between-subjects), time (within-subjects) and interaction (group*time) effects. We calculated the *p*-value for within-group differences by group when a significant interaction effect was present. Multiple comparisons were adjusted for mass significance (30).

We performed a per-protocol analysis to study the participants who complied with the study protocol, which was defined as attendance at least 70% of the sessions. Moreover, we also performed an intention to treat analysis with all the

participants (regardless of attendance) and when post-test data were missing, baseline scores were considered post-test scores.

Analyses were performed using the Statistical Package for Social Sciences (SPSS, v. 16.0 for WINDOWS; SPSS Inc, Chicago).

Results

Four women from the intervention group discontinued the intervention due to family commitments, personal and health problems, and another four were excluded for attending less than 70% of the intervention (attendance: 32.4%, 53.1%, 55.9%, and 59.4%). Adherence to the intervention was 84.4% (range 70–96.9%). Two patients from the control group did not return to the post-test assessment. A total of 33 (80.5%) women from the intervention group and 32 (94.1%) from the usual care group completed both pre-and post-intervention assessments and were included in the final analysis. Compliers (n=33) and non-compliers (n=8) were similar in all the studied variables except the FIQ subscale of pain (7.4±1.5 *vs*. 9.0±0.8, respectively, $p<0.05$).

During the study period, no participant reported an exacerbation of fibromyalgia symptoms beyond normal flares, and there were no serious adverse events. No women changed from the control group to the intervention group or *vice versa*, and there were no protocol deviations from the study, as planned.

Sociodemographic characteristics of women with fibromyalgia by group are shown in Table I. We observed no significant differences between or within-groups in all the variables analysed except for the subscale FIQ fatigue. After adjusting for multiple comparisons (30), we observed a significant interaction effect (group*time) for the FIQ total score, and the subscales fatigue, stiffness, anxiety and depression (Table II). Post hoc analysis revealed significant improvement in FIQ total score ($p<0.001$), fatigue ($p=0.001$), stiffness ($p<0.001$), anxiety ($p=0.011$) and depression ($p=0.008$) in the intervention group, whereas, in the control group there was a significant worsening in the

Table I. Sociodemographic characteristics of women with fibromyalgia by group.

Variable	Usual care group (n=32)	Training group (n=33)	*p*-value
Age, years	51.4 (7.4)	50.0 (7.3)	0.423
Weight (kg)	67.2 (12.5)	71.1 (12.4)	0.211
Height (cm)	157.0 (6.2)	158.4 (5.1)	0.320
BMI (kg/m^2)	27.3 (5.9)	28.4 (4.7)	0.443
Total number points	16.3 (2.4)	17.1 (1.5)	0.077
Years since clinical diagnosis, n (%)			0.903
≤ 5 years	16 (50.0)	17 (51.5)	
> 5 years	16 (50.0)	16 (48.5)	
Marital status, n (%)			0.318
Married	24 (75.0)	25 (75.8)	
Unmarried	5 (15.6)	2 (6.1)	
Separated /Divorced/ Widowed	3 (9.4)	6 (18.2)	
Educational status, n (%)			0.543
Unfinished studies	2 (6.2)	1 (3.0)	
Primary school	11 (34.4)	17 (51.5)	
Secondary school	8 (25.0)	7 (21.2)	
University degree	11 (34.4)	8 (24.3)	
Occupational status, n (%)*			0.669
Housewife	14 (46.7)	18 (54.5)	
Student	0 (0)	1 (3.0)	
Working	11 (36.7)	11 (33.4)	
Unemployed	2 (6.6)	2 (6.1)	
Retired	3 (10.0)	1 (3.0)	
Income, n (%)			0.601
< 1200,00 €	15 (46.9)	14 (42.4)	
1201,00 – 1800,00 €	7 (21.9)	5 (15.2)	
> 1800,00 €	10 (31.2)	14 (42.4)	

Values are the mean (standard deviation) unless otherwise indicated.
*Two missing data by usual care group.

Table II. Effects of intervention on symptomatology in women with fibromyalgia.

	Group	Pre	Post	*p*-value Group effect	*p*-value Time effect	*p*-value Interaction effect
FIQ						
Total score	Control	70.5 (2.3)	74.7 (2.6)	0.122	0.435	<0.001
	Training***	72.5 (2.2)	63.3 (2.5)			
Physical function	Control	4.4 (0.3)	4.9 (0.4)	0.451	0.800	0.014
	Training	4.7 (0.3)	4.0 (0.3)			
Feel good	Control	8.5 (0.4)	8.8 (0.4)	0.133	0.035	0.072
	Training	8.3 (0.4)	7.4 (0.4)			
Pain	Control	7.3 (0.3)	8.0 (0.3)	0.179	0.514	0.015
	Training	7.4 (0.3)	7.0 (0.3)			
Fatigue	Control	8.3 (0.3)	8.7 (0.3)	0.032	0.892	0.001
	Training**	8.5 (0.3)	7.2 (0.3)			
Sleep	Control	8.1 (0.3)	8.2 (0.3)	0.989	0.763	0.010
	Training	8.7 (0.3)	7.6 (0.3)			
Stiffness	Control	7.7 (0.4)	8.0 (0.3)	0.463	0.317	0.001
	Training***	8.0 (0.3)	7.0 (0.3)			
Anxiety	Control	7.4 (0.4)	8.0 (0.4)	0.116	0.360	0.001
	Training*	7.4 (0.4)	6.3 (0.4)			
Depression	Control**	6.1 (0.5)	7.0 (0.5)	0.233	0.251	<0.001
	Training**	5.7 (0.6)	4.9 (0.6)			

FIQ: Fibromyalgia Impact Questionnaire. Data are means (standard error of the mean). *p*-values before adjustment for multiple comparisons.
*$p<0.05$ **$p<0.01$ ***$p<0.001$, for post hoc analysis Pre *vs*. Post.

Table III. Effects of intervention on quality of life in women with fibromyalgia.

	Group	Pre	Post	*p*-value Group effect	*p*-value Time effect	*p*-value Interaction effect
SF-36						
Physical function	Control	38.4 (3.2)	37.5 (2.7)	0.756	0.153	0.068
	Training	36.0 (3.2)	42.3 (2.7)			
Physical role	Control	4.3 (2.0)	2.0 (3.9)	0.088	0.606	0.001
	Training**	1.9 (2.0)	17.0 (3.8)			
Bodily pain	Control	21.1 (2.2)	21.3 (3.0)	0.467	0.864	0.003
	Training***	17.5 (2.2)	29.6 (3.0)			
General health	Control	26.7 (2.7)	29.4 (3.0)	0.063	0.121	0.263
	Training	31.4 (2.7)	38.2 (3.0)			
Vitality	Control	17.7 (2.8)	18.0 (3.3)	0.133	0.740	0.003
	Training***	17.3 (2.7)	29.9 (3.2)			
Social functioning	Control**	42.9 (4.0)	35.0 (4.4)	0.487	0.925	<0.001
	Training***	33.5 (4.0)	52.1 (4.3)			
Emotional role	Control	33.3 (7.3)	37.5 (8.1)	0.792	0.726	0.108
	Training	26.3 (7.2)	49.5 (8.0)			
Mental health	Control	45.7 (3.6)	44.8 (4.1)	0.502	0.346	0.008
	Training	44.4 (3.5)	53.1 (4.1)			

SF-36: Short Form Health Survey questionnaire. Data are means (standard error of the mean). *p*-values before adjustment for multiple comparisons.
*$p<0.05$ **$p<0.01$ ***$p<0.001$, for post hoc analysis Pre *vs*. Post.

Table IV. Effects of intervention on pain coping strategies, anxiety, depression and self-esteem in women with fibromyalgia.

	Group	Pre	Post	*p*-value Group effect	*p*-value Time effect	*p*-value Interaction effect
VPMI						
Passive coping	Control	24.9 (0.8)	24.3 (0.8)	0.079	0.259	0.005
	Training	24.8 (0.8)	21.3 (0.8)			
Active coping	Control	15.9 (0.7)	15.9 (0.6)	0.556	0.827	0.044
	Training	15.2 (0.7)	17.4 (0.6)			
HADS						
Anxiety	Control	11.3 (0.7)	11.1 (0.7)	0.766	0.018	0.134
	Training	11.6 (0.7)	10.2 (0.7)			
Depression	Control	9.4 (0.8)	9.1 (0.8)	0.403	0.554	0.139
	Training	9.1 (0.8)	7.5 (0.8)			
RSES	Control	27.7 (1.1)	25.0 (1.2)	0.164	0.282	0.183
	Training	29.0 (1.0)	27.9 (1.2)			

VPMI: Vanderbilt Pain Management Inventory; HADS: Hospital Anxiety and Depression Scale; RSES: Rosenberg Self-Esteem Scale.
Data are means (standard error of the mean). *p*-values before adjustment for multiple comparisons.

subscale depression ($p=0.006$). There was also a significant interaction effect in the subscales of SF-36 physical role, bodily pain, vitality and social functioning, after adjustment for multiple comparisons (30) (Table III). Post hoc analysis revealed significant improvement in physical role ($p=0.002$), bodily pain ($p<0.001$), vitality ($p<0.001$) and social functioning ($p<0.001$) in the intervention group, whereas, in the control group, there was a significant decrease in social functioning ($p=0.019$). After adjusting for multiple comparisons (30), no significant improvement attributed to the intervention was observed in the rest of outcome measures (Table IV).

The intention to treat analysis showed similar results than those observed in the per protocol analysis, except for the subscales of SF-36 bodily pain and vitality, that did not remain significant after adjusting for multiple comparisons.

Discussion

The main finding of the present study is that a low-moderate intensity 3-month multidisciplinary intervention improves fatigue, stiffness, anxiety, depression and quality of life in women with fibromyalgia. The intervention was well tolerated and did not have any deleterious effects on patients' health.

Due to the lack of studies that applied a multidisciplinary intervention based on exercise and ACT in fibromyalgia patients, it is difficult to directly compare our results, yet, there are several studies performed in chronic pain patients. McCracken *et al*. (17) conducted an intensive multidisciplinary study for 3-4 weeks (5 days/week) based on physical exercise in group sessions twice a day and an ACT-based psychological intervention once per day. They found a 41.2% reduction in depression, 25.0% reduction in physical disability and 39.3% reduction in psychosocial disability. Likewise, Vowles and McCracken (18) obtained significant improvements in pain, depression, pain-related anxiety, disability, medical visits, work status, and physical performance in chronic pain patients who followed a similar intervention.

Recently, McCracken and Gutiérrez-Martínez (31) analysed the effect of an ACT-based treatment on chronic pain. Immediately following treatment and at 3-month follow-up, participants (n=168, 18.6% FM patients) reported significantly lower levels of depression, pain-related anxiety, physical and psychosocial disability, medical visits and pain intensity in comparison to the start of treatment. Similarly, Wetherell *et al*. (32) compared the effects of 8 weekly group sessions of ACT and CBT interventions in an adult sample with chronic non-malignant pain and they observed evidence of benefits on measures of pain interference and mood in both conditions compared to usual treatment. Although there were no differences in attrition between the groups, ACT participants who com-

pleted the treatment reported significantly higher levels of satisfaction than did the CBT participants. The authors concluded that ACT is an effective and acceptable adjunct intervention for patients with chronic pain.

Several studies have investigated the effects of the combination of exercise with other type of psychological interventions such as educational, CBT or self-management interventions in fibromyalgia patients. Suman *et al*. (33) observed that after a 3-week multidisciplinary non-pharmacological treatment program including CBT and individually prescribed and monitored aerobic exercise, the clinical symptoms (pain intensity, pain area and number of positive tender points) and aerobic fitness of the fibromyalgia patients remained significantly improved one year later. Similarly, Van Koulil *et al*. (34) observed that a 16 twice-weekly group sessions of CBT and exercise training (CBT, 2 h, followed by exercise training, 2 h) reduced pain, fatigue, functional disability, negative mood, anxiety, and effect on daily living more than a wait-list condition. Cedraski *et al*. (35) observed improvements in the FIQ total score and in the subscales pain, fatigue and depression after 6 weeks (2 times per week) of combined pool exercise and educational intervention compared with a control group, but not in SF-36. Rooks *et al*. (36) compared 2 interventions of exercise with 1 educational intervention and 1 intervention combining exercise and education. The combined intervention reported greater improvement in the FIQ total score than the other interventions, and concluded that the benefits of exercise are enhanced when combined with targeted self-management education. Mannerkorpi *et al*. (37) carried out 20 sessions of pool exercise (once a week) and 6 educational sessions focused on the strategies to cope with fibromyalgia symptoms and to encourage regular physical activity. They observed improvements in the FIQ total score and the pain subscale compared with only educational intervention (37), whereas they did not observe differences in HADS and some dimensions of SF-36. Hammond and Freeman (38) compared a 10 week of education-exercise (land-based, once a week 2 hours) intervention with a relaxation intervention (once a week, 1 hour) and found significant differences after treatment between groups in the FIQ total score and the subscales feel good, fatigue and morning tiredness. In contrast, King *et al*. (39) compared the effect of 12-week exercise intervention, education intervention and exercise with education intervention with a control group, and found no differences in FIQ score.

We also observed improvements in several FIQ subscales such as anxiety and depression symptoms, whereas no changes were observed in HADS, which concur with other studies (37). Overall, these findings could indicate that FIQ is more specific to measure changes after a multidisciplinary intervention than other instruments are (40). Moreover, we did not observed changes in self-esteem, which suggest that fibromyalgia patients can improve their quality of life and reduce the impact of the illness without changes in HADS scores or self-esteem. Indeed, this is in accordance with the ACT theory (10).

Variability in educational-psychological content, type of exercise, intervention duration and statistical analysis differ among studies, which makes comparisons difficult. Nevertheless, our results concur with the findings of a recent meta-analysis of randomised controlled trials of multidisciplinary treatment (at least 1 educational or other psychological therapy, and at least 1 exercise therapy) (13). It was concluded that there is a strong evidence that multidisciplinary treatment reduces pain, fatigue and depression (13).

A limitation of our study is that we were not able to randomise the participants into the intervention and usual care group. Despite this, there was no difference between groups in all the variables studied and we applied a correction for multiple statistical tests in order to avoid statistically significant effects by chance (30). The design applied in the present study do not allow to know whether the improvements achieved are due to the exercise sessions, ACT sessions or the combination of both.

In summary, a low-moderate intensity 3-month multidisciplinary intervention (exercise plus ACT-based psychological therapy) improved fatigue, stiffness, anxiety, depression and quality of life in women with fibromyalgia. Future research might determine whether longer interventions are necessary to induce significant improvements in self-esteem and to increase the use of active coping.

Acknowledgements

We gratefully acknowledge all participating patients for their collaboration and AGRAFIM.

References

1. AARON LA, BUCHWALD D: Chronic diffuse musculoskeletal pain, fibromyalgia and comorbid unexplained clinical conditions. *Best Pract Res Clin Rheumatol* 2003; 17: 563-74.
2. MASI AT, WHITE KP, PILCHER JJ: Person-centered approach to care, teaching, and research in fibromyalgia syndrome: justification from biopsychosocial perspectives in populations. *Semin Arthritis Rheum* 2002; 32: 71-93.
3. WOLFE F, SMYTHE HA, YUNUS MB *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.
4. MAS AJ, CARMONA L, VALVERDE M, RIBAS B: Prevalence and impact of fibromyalgia on function and quality of life in individuals from the general population: results from a nationwide study in Spain. *Clin Exp Rheumatol* 2008; 26: 519-26.
5. VLAEYEN JW, LINTON SJ: Fear-avoidance and its consequences in chronic musculoskeletal pain: a state of the art. *Pain* 2000; 85: 317-32.
6. MCCRACKEN LM, ECCLESTON C: Coping or acceptance: what to do about chronic pain? *Pain* 2003; 105: 197-204.
7. MCCRACKEN LM: Learning to live with the pain: acceptance of pain predicts adjustment in persons with chronic pain. *Pain* 1998; 74: 21-7.
8. MCCRACKEN LM, SPERTUS IL, JANECK AS, SINCLAIR D, WETZEL FT: Behavioral dimensions of adjustment in persons with chronic pain: pain-related anxiety and acceptance. *Pain* 1999; 80: 283-9.
9. KRATZ AL, DAVIS MC, ZAUTRA AJ: Pain acceptance moderates the relation between pain and negative affect in female osteoarthritis and fibromyalgia patients. *Ann Behav Med* 2007; 33: 291-301.
10. HAYES SC, STROSAHL K, WILSON KG: Acceptance and commitment therapy: An experimental approach to behavior change. New York: Guilford Press; 1999.
11. DAHL J, WILSON KG, LUCIANO C, HAYES SC, eds. *Acceptance and Commiment Therapy for Chonic Pain*. Reno: Context Press; 2005.
12. VOLWES K, WETHERELL J, SORRELL J: Targeting acceptance, mindfulness, and values-based action in chronic pain: finding of two

preliminary trials of an outpatient group-based intervention. *Cognitive and Behavioral Practice* 2009; 16: 49-58.
13. HAUSER W, BERNARDY K, ARNOLD B, OFFENBACHER M, SCHILTENWOLF M: Efficacy of multicomponent treatment in fibromyalgia syndrome: a meta-analysis of randomized controlled clinical trials. *Arthritis Rheum* 2009; 61: 216-24.
14. JONES KD, ADAMS D, WINTERS-STONE K, BURCKHARDT CS: A comprehensive review of 46 exercise treatment studies in fibromyalgia (1988-2005). *Health Qual Life Outcomes* 2006; 4: 67.
15. BAILEY KM, CARLETON RN, VLAEYEN JW, ASMUNDSON GJ: Treatments Addressing Pain-Related Fear and Anxiety in Patients with Chronic Musculoskeletal Pain: A Preliminary Review. *Cogn Behav Ther* 2009; 1.
16. PULL CB: Current empirical status of acceptance and commitment therapy. *Curr Opin Psychiatry* 2009; 22: 55-60.
17. MCCRACKEN LM, VOWLES KE, ECCLESTON C: Acceptance-based treatment for persons with complex, long standing chronic pain: a preliminary analysis of treatment outcome in comparison to a waiting phase. *Behav Res Ther* 2005; 43: 1335-46.
18. VOWLES KE, MCCRACKEN LM: Acceptance and values-based action in chronic pain: a study of treatment effectiveness and process. *J Consult Clin Psychol* 2008; 76: 397-407.
19. CARBONELL-BAEZA A, APARICIO VA, ORTEGA FB *et al*.: Does a 3-month multidisciplinary intervention improve pain, body composition and physical fitness in women with fibromyalgia? *Br J Sports Med* 2010; 45: 1189-95.
20. WALSER RD, PISTORELLO J: ACT in Group Format. *In*: HAYES SC, STROSAHL K, eds. *A practical guide to Acceptance and Commitment Therapy*. New York: Springer; 2004: 347-72.
21. PHILLIPS HC, ed El tratamiento psicológico del dolor crónico. Madrid: Piramide; 1991.
22. RIVERA J, GONZALEZ T: The Fibromyalgia Impact Questionnaire: a validated Spanish version to assess the health status in women with fibromyalgia. *Clin Exp Rheumatol* 2004; 22: 554-60.
23. ALONSO J, PRIETO L, ANTO JM: [The Spanish version of the SF-36 Health Survey (the SF-36 health questionnaire): an instrument for measuring clinical results]. *Med Clin* (Barc) 1995; 104: 771-6.
24. QUINTANA JM, PADIERNA A, ESTEBAN C, AROSTEGUI I, BILBAO A, RUIZ I: Evaluation of the psychometric characteristics of the Spanish version of the Hospital Anxiety and Depression Scale. *Acta Psychiatr Scand* 2003; 107: 216-21.
25. ZIGMOND AS, SNAITH RP: The Hospital Anxiety and Depression Scale. *Acta Psychiatrica Scandinavica* 1983; 67: 361-70.
26. BROWN GK, NICASSIO PM: Development of a questionnaire for the assessment of active and passive coping strategies in chronic pain patients. *Pain* 1987; 31: 53-64.
27. ESTEVE R, LOPEZ AE, RAMIREZ-MAESTRE C: Evaluación de estrategias de afrontamiento de dolor crónico. *Revista de Psicología de la Salud* 1999; 11: 77-102.
28. VAZQUEZ AJ, JIMENEZ R, VAZQUEZ-MOREJON R: Escala de autoestima de Rosenberg: fiabilidad y validez en población clínica española. *Apuntes de Psicología* 2004; 22: 247-55.
29. ROSENBERG M: Society and the adolescente self-image. Princeton: Princeton University Press; 1965.
30. HOLM S: A simple sequentially rejective multiple test procedure. *Scand J Statist* 1979; 6: 65-70.
31. MCCRACKEN LM, GUTIERREZ-MARTINEZ O: Processes of change in psychological flexibility in an interdisciplinary group-based treatment for chronic pain based on Acceptance and Commitment Therapy. *Behav Res Ther* 2011; 49: 267-74.
32. WETHERELL JL, AFARI N, RUTLEDGE T *et al*.: A randomized, controlled trial of acceptance and commitment therapy and cognitive-behavioral therapy for chronic pain. *Pain* 2011; 152: 2098-107.
33. SUMAN AL, BIAGI B, BIASI G *et al*.: One-year efficacy of a 3-week intensive multidisciplinary non-pharmacological treatment program for fibromyalgia patients. *Clin Exp Rheumatol* 2009; 27: 7-14.
34. VAN KOULIL S, VAN LANKVELD W, KRAAIMAAT FW *et al*.: Tailored cognitive-behavioral therapy and exercise training for high-risk patients with fibromyalgia. *Arthritis Care Res* (Hoboken) 2010; 62: 1377-85.
35. CEDRASCHI C, DESMEULES J, RAPITI E *et al*.: Fibromyalgia: a randomised, controlled trial of a treatment programme based on self management. *Ann Rheum Dis* 2004; 63: 290-6.
36. ROOKS DS, GAUTAM S, ROMELING M *et al*.: Group exercise, education, and combination self-management in women with fibromyalgia: a randomized trial. *Arch Intern Med* 2007; 167: 2192-200.
37. MANNERKORPI K, NORDEMAN L, ERICSSON A, ARNDORW M: Pool exercise for patients with fibromyalgia or chronic widespread pain: a randomized controlled trial and subgroup analyses. *J Rehabil Med* 2009; 41: 751-60.
38. HAMMOND A, FREEMAN K: Community patient education and exercise for people with fibromyalgia: a parallel group randomized controlled trial. *Clin Rehabil* 2006; 20: 835-46.
39. KING SJ, WESSEL J, BHAMBHANI Y, SHOLTER D, MAKSYMOWYCH W: The effects of exercise and education, individually or combined, in women with fibromyalgia. *J Rheumatol* 2002; 29: 2620-7.
40. BENNETT RM, BUSHMAKIN AG, CAPPELLERI JC, ZLATEVA G, SADOSKY AB: Minimal clinically important difference in the fibromyalgia impact questionnaire. *J Rheumatol* 2009; 36: 1304-11.