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Relationship between aerobic fitness and quality of life in female fibromyalgia patients

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Objective: To determine whether there is a direct link between quality of life and aerobic capacity among female fibromyalgia patients.

Design: Cross-section study.

Setting: University of León.

Subjects: Twenty-nine women belonging to the León Fibromyalgia and Chronic Fatigue Association.

Main measurements: Aerobic capacity and quality of life were measured by means of the Six-Minute Walk Test and the Fibromyalgia Impact Questionnaire. Outcome measures included heart rate and rate of perceived fatigue and dyspnoea.

Results: The average distance walked was 432.8 (61.2) m and the total average Fibromyalgia Impact Questionnaire score was 47.5 (18.9). Only item 1 of the Fibromyalgia Impact Questionnaire, physical function, showed any statistically significant link with the distance walked, which had no statistically significant relationship with any of the variables studied.

Conclusion: The physical fitness of women with fibromyalgia, as determined by the Six-Minute Walk Test and the Fibromyalgia Impact Questionnaire, has no direct relation with quality of life as the patients perceive it.

Introduction

Fibromyalgia is an incurable syndrome of unknown aetiology whose main symptoms, such as muscle pain, fatigue and sleep disturbances, and associated ones, such as depression and anxiety, have a serious effect on patients' quality of life.¹ Quality of life has been defined as how people perceive their emotional, functional, physical and social states.² Although it is quite clear that fibromyalgia affects patients' emotional and

functional states,^{3,4} the extent to which their physical fitness is affected is a source of contradiction. Some studies have found no change in muscular strength,⁵ while others have found it clearly impaired,⁶ especially aerobic capacity,⁷ although the extent to which this affects quality of life is not known. We therefore set out to ascertain whether there was any direct link between the quality of life of women suffering from fibromyalgia and their fitness level.

Materials and methods

Twenty-nine women belonging to the León Fibromyalgia and Chronic Fatigue Association

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(ALEFAS) and meeting the criteria of the American College of Rheumatology¹ were included in a prospective cross-section study. Their average age was 53 (9) years and their body mass index 26 (4) kg/m². They all gave their informed written consent.

A number of tests were run. The Six-Minute Walk Test was carried out according to the protocol for populations of this type.⁶ Heart rate was measured at the start and finish of the test with a pulse oximeter, as was the level of dyspnoea and fatigue perceived according to the modified Borg Scale.⁸

Quality of life was assessed by means of the validated Spanish language version of the fibromyalgia impact questionnaire,⁹ answered 30 minutes before the Six-Minute Walk Test.

The database was analysed by means of the Epiinfo program for Windows. The bivariate analysis was carried out with ANOVA when Bartlett's test revealed normal distributions and otherwise with the Kuskal–Wallis non-parametric test. Multivariate analysis was carried out with linear regression models including the variables associated with a $P \leq 0.1$. Quantitative variables were subjected to linear regression analysis.

Results

The average distance walked was 432.8 (61.2) m and the total average Fibromyalgia Impact Questionnaire score was 47.5 (18.9). The results obtained for the different tests are shown in Table 1 together with scales.

No link was found between the Fibromyalgia Impact Questionnaire score and the distance walked, except regarding item 1 of the questionnaire, physical function, (Figure 1). Nor was any

relationship found between distance walked and age, height, weight or body mass index.

Table 2 shows the distribution of the Fibromyalgia Impact Questionnaire and Six-Minute Walk Test scores according to different variables. The distance walked is seen to have no statistically significant link with any of those variables, although it was greater for those women who showed no fatigue or dyspnoea at the start of the test and for those whose heart rate increased by 10% or more between the start and finish of the test. Significantly – or nearly so – higher Fibromyalgia Impact Questionnaire scores were obtained by those who showed some degree of fatigue at the end of the Six-Minute Walk Test, by those who showed an increase in fatigue or dyspnoea after the test and by those whose heart rate increased by less than 10%. After the multivariate analysis, statistical significance was retained, with a correlation coefficient of 0.34, only in the case of increased fatigue (coefficient = 15.389, $P = 0.01$) and an increase in heart rate of less than 10% (coefficient = 16.785, $P = 0.01$) after the Six-Minute Walk Test.

Discussion

As in other studies, our patients' scores for the Fibromyalgia Impact Questionnaire and Six-Minute Walk Test scores were consequent with a notable reduction in quality of life and aerobic capacity in comparison with the general population.³ Our patients, in comparison with others studied,^{10–12} gave similar results for the distance walked, but their quality of life was less affected, which may be explained by their participation in a physiotherapy programme with a positive effect on quality of life, but not on aerobic capacity.

Table 1 Mean values for all measures

Test	HR ₁	HR ₂	DYS ₁	DYS ₂	FAT ₁	FAT ₂	6MWT	FIQ
Mean (SD)	85.9 (12.7)	102.6 (12.1)	2.0 (2.0)	3.3 (2.2)	3.0 (2.6)	4.1 (3.2)	432.7 (61.2)	47.5 (18.9)
Median (range)	82 (66–113)	100 (82–131)	2 (0–7)	4 (0–8)	3 (0–8)	4 (0–10)	435 (282–568)	50 (0–73)

HR₁ and HR₂, Initial and final heart rate values (beats/minute); DYS₁ and DYS₂, Initial and final self-perceived dyspnoea values (Borg Scale); FAT₁ and FAT₂, Initial and final self-perceived fatigue values (Borg Scale); 6MWT, Six-Minute Walk Test (metres); FIQ, Fibromyalgia Impact Questionnaire.

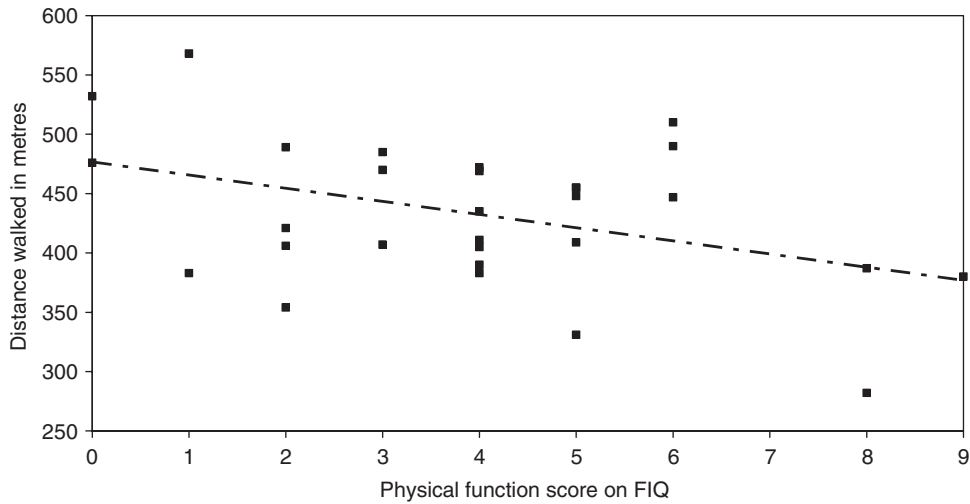


Figure 1 Correlation between the distance walked in the Six-Minute Walk Test and the score in the physical function item of the Fibromyalgia Impact Questionnaire. Coefficient: -11.095 , Constant: 476.757 ; Coefficient of correlation: 0.17 ; $P=0.0028$

Table 2 Distribution Fibromyalgia Impact Questionnaire (FIQ) and Six-Minute Walk Test (6MWT) results by variables

	N	FIQ		6MWT	
		Mean (SD)	P-value	Mean (SD)	P-value
Initial fatigue					
0	8	43.5 (29.1)	0.8	466.3 (45.6)	0.07
>0	21	49.0 (14.0)		420.0 (62.5)	
Final fatigue					
0	7	35.6 (25.9)	0.05	447.6 (53.4)	0.5
>0	22	51.3 (15.0)		420.0 (62.5)	
Difference in fatigue					
0	13	39.1 (20.6)	0.02	426.7 (61.4)	0.6
>0	16	54.4 (14.8)		437.7 (62.7)	
Initial dyspnoea					
0	10	48.7 (27.7)	0.18	457.7 (48.9)	0.11
>0	19	46.9 (13.2)		419.6 (64.2)	
Final dyspnoea					
0	5	34.0 (31.1)	0.35	446.4 (59.1)	0.6
>0	24	50.3 (14.9)		429.9 (62.5)	
Difference in dyspnoea					
0	8	37.6 (24.5)	0.08	453.3 (66.3)	0.27
>0	21	51.3 (15.5)		425.0 (59.0)	
Difference in heart rate					
$\geq 10\%$	9	36.0 (23.7)	0.02	460.2 (68.2)	0.1
<10%	20	52.7 (14.2)		420.4 (55.3)	

In our study, unlike that of King *et al.*,¹⁰ no correlation was found between the total Fibromyalgia Impact Questionnaire score and the Six-Minute Walk Test, so distance walked and quality of life are independent – in other words, physical fitness had no link with our patients' quality of life.

Although non-detection of a possible link between quality of life and physical fitness in our study could be due to the lack of interest or low level of participation of our patients in the Six-Minute Walk Test, the differences observed between initial and final heart rate or Borg Scale scores show that they put a great effort into the test. Furthermore, we did observe a link between item 1 on the Fibromyalgia Impact Questionnaire (physical fitness) and the distance walked, a point observed by other authors,¹³ which confirms our patients' interest in the test. Another possible explanation could be the administering of both tests on the same day, which can distort results in some cases.¹⁴

Another point to bear in mind regarding the lack of association observed is that the Six-Minute Walk Test is more sensitive in patients whose cardio-respiratory function is more affected, especially those with bronchopathy and/or cardiopathy,¹⁵ because it measures cardiovascular adaptation to effort. In addition, fibromyalgia patients have many mental symptoms and limitations, such as concentration difficulties, depressed mood and sleep problems, which are not directly influenced by aerobic fitness. Indeed, some fibromyalgia patients have recovery problems manifesting themselves as 'flu-like' symptoms, which would further complicate the relationship between perceived quality of life and an individual's real level of fitness.

On the other hand, it may be that the questionnaire used did not directly reflect our patients' quality of life, as there may have been a difference between an individual's perception of quality of life and reality. For this reason, the decision was made to use the validated Spanish translation of the Fibromyalgia Impact Questionnaire, which has been extensively used as an index of therapeutic efficacy. Overall, it has been shown to have a credible construct validity, reliable test–retest characteristics and good sensitivity in demonstrating therapeutic change.¹⁶ In any event, it should not be overlooked that

fibromyalgia is a syndrome characterized by symptoms with a great subjective component, like pain or fatigue, which may or may not limit a patient's functional aerobic capacity with regard to other factors such as willpower, role within the family, etc. In this regard, the multidimensional nature of quality of life should also be remembered, as should the fact that in fibromyalgia patients it is affected more by pain than by actual physical fitness.⁹

Most studies that have proposed treatment based on physical exercise and that have used both tests have achieved a significant improvement in both aerobic capacity and quality of life.¹⁷ Burkhardt *et al.*,¹² however, after putting a group of fibromyalgia patients through a 'self-management education' programme and comparing its effects with those in another group that had taken part in the same programme as well as doing an hour of physical exercise after each session, found that both groups had an improved quality of life, but neither progressed significantly in the Six-Minute Walk Test. These results agree with ours and bear out the idea that aerobic capacity does not have to be directly linked with quality of life, if we consider that the Six-Minute Walk Test gives an objective measurement while the Fibromyalgia Impact Questionnaire gives a subjective one, and that 'physical function is only partially determined by physical abilities'. This suggests that some female fibromyalgia patients, despite the physical limitations imposed by muscular weakness and the illness itself, are strong-willed and especially determined, which enables them to tackle their daily tasks effectively. Some of our patients may therefore have a low aerobic capacity while maintaining an acceptable quality of life. For instance, an increase in exercise capacity (or aerobic fitness) may not be a necessary condition for a significant improvement in health-related quality of life and psychosocial functioning in patients with chronic fatigue syndrome.¹⁸ This implies that reported improvements may be determined more by psychosocial changes such as a reduction in symptom focus and/or lifestyle adaptations such as avoiding stress-exacerbating activities.

Finally, the results are difficult to interpret because of the great variability observed in the two tests, a constant in such patients.

Furthermore, as seen in similar patients, an increase in exercise capacity measures is not a necessary condition for reported improvements, except for less fit patients, so the relationship between physical fitness and quality of life in fibromyalgia patients is not as clear as could be expected.

In the light of all this, although physical exercise is a useful tool in the rehabilitation of those affected by fibromyalgia, its effects may have no direct link with any improvement in their quality of life. It should therefore be combined with other kinds of treatment, such as training in strategies for living with the illness (copying strategies), stress management programmes or the use of a cognitive behavioural therapy approach for rehabilitation to be effective.

Clinical messages

- The physical fitness of women with fibromyalgia has no direct relationship with perceived quality of life, as measured by specific tests.
- It may be possible to assess the repercussions of patients' aerobic capacity on their quality of life by using only the physical section of the Fibromyalgia Impact Questionnaire.

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