applied sciences

MDPI

Article

Influence of the Fear of Movement and Fatigue on Self-Efficacy for Physical Activity in Women with Fibromyalgia

Ana Myriam Lavín-Pérez [1,2], Daniel Collado-Mateo [1], Alexander Gil Arias [1], Lorena Gutiérrez [3], Carmen Écija [3], Patricia Catalá [3] and Cecilia Peñacoba [3,*]

[1] Sport Sciences Research Centre, Rey Juan Carlos University, 28943 Fuenlabrada, Spain; am.lavin.2018@alumnos.urjc.es (A.M.L.-P.); daniel.collado@urjc.es (D.C.-M.); alexander.gil@urjc.es (A.G.A.)
[2] GO fitLAB, Ingesport, 28003 Madrid, Spain
[3] Department of Psychology, Rey Juan Carlos University, 28922 Alcorcón, Spain; lorena.gutierrezh@urjc.es (L.G.); carmen.ecija@urjc.es (C.É.); patricia.catala@urjc.es (P.C.)
* Correspondence: cecilia.penacoba@urjc.es

Abstract: Introduction and purpose: Self-efficacy is considered an antecedent for physical activity levels in fibromyalgia patients. However, the influence of the fear of movement and fatigue on the self-efficacy to reduce physical inactivity is still not clear and could be critical in improving the biopsychosocial benefits of therapeutic exercise. In this way, the present study aims to assess the relationship between self-efficacy, fatigue, fibromyalgia impact, the fear of movement, and physical activity. Additionally, it aims to explore differences among patients based on self-reported physical activity levels. Material and methods: A sample of 115 women diagnosed with fibromyalgia were evaluated in this prospective study. The variables were the impact of fibromyalgia, the fear of movement, fatigue, self-efficacy, and physical activity levels. Results: Patients with high and moderate physical activity levels had higher self-efficacy for physical function ($p < 0.05$), which is in line with the previously known model. Furthermore, a model was developed where the significant relationship between the fear of movement and self-efficacy for physical activity was significantly mediated by general fatigue and the impact of fibromyalgia on physical function. Conclusions: The fear of movement may influence self-efficacy, affecting physical activity levels; therapeutic exercises targeting the fear of movement can enhance self-efficacy and activity levels, while fatigue and fibromyalgia may mediate this relationship.

Keywords: self-efficacy for physical function; fatigue; physical activity levels; fear of movement; chronic pain

Citation: Lavín-Pérez, A.M.; Collado-Mateo, D.; Gil Arias, A.; Gutiérrez, L.; Écija, C.; Catalá, P.; Peñacoba, C. Influence of the Fear of Movement and Fatigue on Self-Efficacy for Physical Activity in Women with Fibromyalgia. *Appl. Sci.* **2024**, *14*, 1834. https://doi.org/10.3390/app14051834

Academic Editor: Stefano Masiero

Received: 23 January 2024
Revised: 21 February 2024
Accepted: 22 February 2024
Published: 23 February 2024

1. Introduction

Fibromyalgia, a chronic condition characterized by pervasive and persistent pain of unknown etiology, affects approximately 2.64% in Europe [1] and 2.4% of the Spanish population, with a notably higher prevalence in women (4.2%) compared to men (0.2%) [2]. Beyond the symptom of pain that seems to be associated with some characteristic biomarkers [3], fibromyalgia is related to biopsychosocial symptoms, including fatigue, stiffness, sleep disturbance, or cognitive problems [4]. Additionally, anxious or depressive symptoms are usual in fibromyalgia patients, with recent research indicating that a substantial proportion may experience severe undiagnosed depression (30%) and anxiety (60%) [5].

The impact of fibromyalgia can also affect patients' physical function, causing severe alterations [6] that are usually treated in therapeutic therapies [7]. Emphasizing this objective manifestation is crucial, given that its decline is closely associated with pain levels, quality of life as it pertains to health, depression, and anxiety [8]. Within therapeutic modalities, the integration of therapeutic exercise becomes particularly relevant to enhance physical function because of the low levels of physical activity and high sedentary behavior of this population [9]. Furthermore, the perceived physical function may be even worse

than the objective physical function among women with fibromyalgia [10], thus the impact on the self-confidence about what they are and are not able to do is largely affected, which is related to the concept of self-efficacy.

Moreover, self-efficacy has been recognized as a key variable to explain physical activity levels [11]. A previous study has identified the influence of self-efficacy on physical activity, as well as the mediating role of activity avoidance behavior and goal preferences in women with fibromyalgia [12], regarding the intensity of the physical activity performed. These authors determined that physical activity levels are partially and directly explained by self-efficacy levels, with or without the mediation role of other variables. One of these variables that could be related to self-efficacy and physical activity levels is fatigue, which may have a negative impact on physical and mental health variables [13], and is associated with pain levels, the impact of the disease, or anxiety [14]. Similarly, the fear of movement, known as kinesiophobia, is common among these patients [15,16], and can be defined as an aversion to carrying out a physical action due to either pain or a perceived threat. It is associated with the severity of pain, quality of life, body mass index, or disability in people experiencing chronic pain [15,16].

Self-efficacy has consistently emerged as a precursor to physical activity in prior research [10,12,17]. Pastor-Mira et al. [11] specifically highlighted the predictive role of self-efficacy for physical activity, demonstrating its influence on actual physical activity levels, mediated by factors such as pain and activity avoidance patterns. Despite this, a notable gap exists in the literature concerning studies aimed at elucidating the variables that could expound upon the genesis of self-efficacy and, consequently, impact physical activity levels.

Conducting such an analysis could have potential importance and utility, particularly in enhancing therapeutic exercise adherence, a fact that currently lacks optimal levels [18]. This analysis is also in line with the known low levels of self-efficacy [19], and the need to improve the quality of therapeutic exercise, focusing more on the perspective of the patient. This is pertinent not only due to its efficacy in ameliorating symptoms, but also because it stands out with superior evidence in comparison to pharmacological approaches [20]. Thus, the current study aimed to complement previous investigations by considering self-efficacy as a consequence of other variables, not just an antecedent. Therefore, we aimed to explore the differences between patients, according to their self-reported physical activity levels, and, based on previous research, we hypothesized that those patients who reported higher levels of physical activity would also report higher levels of self-efficacy. Furthermore, this study evaluates the relationship among self-efficacy, fatigue, the impact of fibromyalgia, the fear of movement, and physical activity, with the aim to develop a model that considers self-efficacy as a predicted variable, rather than a predictive variable.

2. Materials and Methods

2.1. Participants

The study was composed of 115 women with diagnosed fibromyalgia. The diagnosis was made on the basis of American Rheumatology Criteria [21]. These factors were as follows: (a) pain present in at least 4 of 5 regions, (b) similar levels of symptoms for 3 or more months, (c) a widespread pain index (WPI) $\geq$ 7 and a symptom severity scale (SSS) score $\geq$ 5 OR WPI of 4–6 and a SSS score $\geq$ 9, (d) the presence, or lack thereof, of other clinically important diseases [21]. Besides receiving a fibromyalgia diagnosis, participants met the following conditions: female adults aged 18 and above, and has been prescribed with medical advice to engage in walking. Moreover, the participants incapable of comprehending and signing the informed consent form and with physical limitations that might restrict their level of physical activity were excluded. Patients belonged to different Spanish fibromyalgia associations.

2.2. Design and Procedure

This is a prospective study with the following two evaluation moments: the first one involved the evaluation of all variables except for physical activity, while in the second time, participants answered the short version of the International Physical Activity Questionnaire (IPAQ). The study design followed the ethical principles for research with human participants, and followed the Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) Statement guidelines [22]. Likewise, before its performance, the study had the positive approval from the Rey Juan Carlos Ethics' Committee (ID: PI17/00858).

2.3. Variables and Instruments

Before answering the main variables of the study, participants were asked to respond to sociodemographic and clinical questions with an ad hoc questionnaire. The collected variables were age, civil status, educational level, and years since diagnosis. The instruments used are detailed below.

2.3.1. Fibromyalgia Impact

To assess the impact of fibromyalgia disease, participants completed the FIQ-R [23] in the first assessment time. This questionnaire measures how the disease affects patients' living capacity and functional ability [23]. In the current study, the version selected was the Spanish translation (2) of the revised questionnaire [23], a modified version of the original FIQ [24]. The FIQ-R is currently considered the gold standard in research and clinical practice, where it is mainly used as a parameter of response to treatments concerning symptom intensity and functionality [25]. The FIQ-R, composed of 21 items, includes the measurement of the following three domains: functionality (scored from 0 to 30), overall impact (scored from 0 to 20), and symptoms (scored from 0 to 50). Higher scores denote a higher impact of the disease.

The original FIQ-R version was conducted with the American population, demonstrating an internal consistency of 0.95, as well as convergent and discriminant validity. The Spanish version employed has a total Cronbach's alpha value of 0.95, above 0.80 in each of the dimensions above, and an intraclass correlation coefficient > 0.70 [25,26]. In our sample, functionality had a Cronbach's alpha of 0.85, 0.83 in overall impact, 0.77 in symptoms, and 0.90 in the FIQ-R total score.

2.3.2. Modified Fatigue Impact Scale

To assess the perceived fatigue levels, the MFIS was used, since it is the most commonly used fatigue questionnaire in Europe [27]. It is comprised of five dimensions, each of them evaluated by four items with a score ranging from 4 to 20, where higher MFIS scores reveal a high fatigue level. The internal consistency showed a Cronbach's alpha of 0.83 in general fatigue, 0.85 in physical fatigue, 0.79 in reduced activity, 0.82 in reduced motivation, and 0.91 in mental fatigue. In the original MFIS questionnaire, which showed good (>0.80) internal consistency, patients had to indicate on a 7-point scale [28], whereas in the Spanish version employed in this study, the Likert Scale went from 1 to 5, 1 being "yes, it is true" and 5 being "no, it is not true" [29]. The Spanish version of the questionnaire had intra-class correlation coefficients from 0.64 to 0.91 [29].

2.3.3. Chronic Pain Self-Efficacy Scale

The original 22-item chronic pain self efficacy scale (CPSES), also employed in the first assessment time, was designed to evaluate the self-efficacy perceptions of chronic pain patients in coping with the ramifications of their condition [30]. This instrument encompasses the following three main facets: self-efficacy for pain management, self-efficacy for symptom coping, and self-efficacy for physical functionality [30]. In the Spanish version developed by Martín-Aragón et al. [31], as utilized in the current study, the items were reduced to nineteen: four to assess self-efficacy for pain management, seven for measuring self-efficacy for physical function, and eight to evaluate self-efficacy for coping

with symptoms. Patients could select their perception on a 10-point scale, where a score of 0 represents "I believe myself to be totally incapable", 5 signifies "I believe myself to be moderately capable", and 10 expresses "I believe myself fully capable" [31]. Concerning the questionnaire reliability, the Cronbach's alpha of each of the dimensions are 0.85, 0.72, and 0.98 for self-efficacy for coping with symptoms (0.86 in our sample size), self-efficacy for physical function (0.85 in our sample size), and self-efficacy for pain management (0.82 in our sample), respectively, and 0.91 for the total score [31]. Moreover, it has a significant test–retest correlation with the original scale, reaching p-values < 0.01 in all the factors [31].

2.3.4. Tampa Scale of Kinesiophobia

The Tampa Scale for Kinesiophobia selected for the current study was the version containing 11 items [32]. The scale was designed to evaluate the participants' level of fear of movement or injury. In this way, patients were asked to respond to their perception on a Likert scale, ranging from 1, meaning "strongly disagree", to 4, if they "strongly agree" with the premise stated [32]. So, the maximum achievable total score was 44. The TSK-11 scales demonstrated acceptable levels of internal consistency with a Cronbach's alpha of 0.80, (0.824 in our sample) as well as evidence of discriminant, concurrent criterion-related and incremental validity [32]. The Spanish validation tool demonstrated strong reliability, evidenced by both internal consistency and stability, as well as validity, confirmed through convergent and predictive measures [33].

2.3.5. Physical Activity

In the second assessment time, to evaluate the patients' physical activity levels, the Spanish version of the IPAQ was administered [34,35]. The questionnaire refers to different activities performed in the preceding 7 days to identify the intensity of the activity carried out, the duration, and the frequency. Consequently, each participant's level of physical activity was calculated according to the guidelines for data processing and the analysis of the IPAQ-short and long forms [36]. High levels were reached when performing ≥3 days of vigorously intense activity, achieving ≥1500 metabolic equivalents of task (MET) minutes a week, or completing ≥7 days of walking and/or moderate-intensity activities and/or vigorous-intensity activities, realizing ≥3000 MET minutes a week. Moderate physical activity levels were accomplished by patients involved in ≥3 days of vigorous-intensity activities and/or walking ≥30 min per day or carrying out ≥5 days of moderate-intensity activities and/or walking ≥30 min per day, making a combination of walking and moderate-intensity or vigorous-intensity activities ≥ 5 days, reaching ≥600 MET minutes a week. Lastly, participants with low levels are those who did not meet the criteria for the other two levels [34,36]. The version utilized in this study underwent validation within the Spanish population by Roman-Viñas, Serra-Majem, Hagströmer, Ribas-Barba, Sjöström, and Segura-Cardona [35]. It exhibited a commendable reliability coefficient across various metrics, including total physical activity (r = 0.82, p < 0.05), vigorous activity (r = 0.79, p < 0.05), moderate activity (r = 0.83, p < 0.05), and time devoted to walking (r = 0.73, p < 0.05). As for the internal consistency in our sample, the Cronbach's alpha was 0.871 in vigorous activity, 0.721 in moderate activity, and 0.753 in walking activity. Moreover, the questionnaire asked how much time the patient spent sitting down on a working day to analyze the sedentary behavior.

2.4. Statistical Analysis

For the analysis of the present study, the Statistical Package for the Social Sciences (SPSS) version 23 (IBM, New York, NY, USA) was utilized. The level of significance for all the analyses was set at $p \leq 0.05$. The first step followed was to analyze the normality of the sample size in the analyzed variables. In this process, significant differences were obtained in the Kolmogorov–Smirnov and the Shapiro–Wilk tests. Thus, the non-parametric tests were selected for the following analysis.

First, to confirm how self-efficacy may influence physical activity levels, the investigators conducted a Kruskal–Wallis one-way analysis to compare the differences in self-efficacy among patients performing high, moderate, and low physical activity levels, according to the IPAQ classification explained before. Moreover, we performed pairwise comparisons through the Mann–Whitney U test when significant differences were obtained.

Second, to examine the relationships among the fear of movement, the impact of fibromyalgia, fatigue dimensions, and self-efficacy dimensions, the investigators conducted the Spearman's rank correlation coefficient test.

Finally, given that the relationship between self-efficacy and physical activity is already well-known, we explored the relationship between the fear of movement and self-efficacy, as well as the potential mediating role of the impact of fibromyalgia and fatigue. To do that, the investigators conducted multiple variable mediation analyses, using the macro package of PROCESS version 4, designed by Hayes [37] for IBM SPSS Statistics. To calculate the unstandardized regression coefficients, model 6 with an interval confidence of 95 and 10,000 bootstrap samples was utilized. Moreover, the total effect was calculated to quantify the influence of the fear of movement on self-efficacy for coping with physical function without the influence of the mediators. For establishing the mediation role of the variables, the following criteria stated by Baron and Kenny [38] were considered: (a) the relationship between the independent and the dependent variables must be statistically significant; (b) the independent variable and each of the mediator variables must be significantly related; (c) the dependent variable and each of the mediator variables must be significantly related; and (d) the relation between the independent variable and the dependent variable is reduced when each of the mediator variables is introduced in the analysis.

3. Results

3.1. Participants' Characteristics

The age of the participants varied between 32 and 79 years, with an average age of 57.2 years and a standard deviation (SD) of 10.26. Overall, patients had been diagnosed with fibromyalgia an average of 11.98 years ago (SD of 9.38), while their fatigue symptoms started 19.67 years ago (SD of 15.15). The impact of the disease assessed with FIQR [27] was 71.21, with an SD of 15.29 for the whole sample. More information about the participant characteristics can be found in Table 1.

Table 1. Total participants' main characteristics.

	Mean	Standard Deviation		Mean	Standard Deviation
Age	57.09	10.26	Min of vigorous activity/week	38.85	290.14
Time Since Fibromyalgia Diagnosis	11.98	9.38	Min of moderate activity/week	126.22	390.84
Weight	72.29	16.282	Min of walking time/week	356.35	516.83
Time Since Fatigue Problems	19.67	15.15	Min of sedentarism/day	250.24	201.72
CSE	4.95	1.95	Min of sedentarism /week	1694.54	1376.04
FSE	4.66	2.31	Fear of movement	25.03	6.63
PSE	3.56	2.25	General Fatigue	16.88	3.12
FIQ overall impact	13.87	5.24	Physical Fatigue	15.84	2.99
FIQ symptoms	36.35	6.81	Mental Fatigue	15.76	3.34
FIQ function	20.82	5.72	Activity Reduction	13.02	3.83
FIQR total	71.21	15.29	Motivation reduction	12.61	3.39

CSE: self-efficacy for coping with symptoms; FSE: self-efficacy for physical function; PSE: self-efficacy for pain management; FIQ: Fibromyalgia impact questionnaire.

3.2. Self-Efficacy Differences Regarding Physical Activity Levels

Concerning the relationship between physical activity and self-efficacy, the results showed between-group differences only in patients' self-efficacy for physical functions ($p = 0.003$). Concretely, these differences were found between patients with low physical activity levels and those with moderate ($p = 0.014$) or high physical activity levels ($p = 0.014$) (see Tables 2 and 3). However, no significant between-group differences were reached in the other two dimensions of self-efficacy, i.e., self-efficacy for coping with symptoms and pain management.

Table 2. Participants' characteristics regarding their physical activity level, assessed by IPAQ.

Physical Activity Level	Low (n = 39)		Moderate (n = 54)		High (n = 12)	
	Mean ± SD	Median (IQR)	Mean ± SD	Median (IQR)	Mean ± SD	Median (IQR)
Age	55.93 ± 9.96	49 (15)	56.95 ± 10.76	55.50 (13)	57.00 ± 8.58	56 (10)
Time Since Fibromyalgia Diagnosis	10.51± 13.63	6.50 (11)	11.94 ± 9.32	12 (7)	11.08 ± 9.06	9.50 (8)
Weight	70.40 ± 15.13	63 (20)	72.32 ± 17.23	70 (29)	75.64 ± 15.02	9 (3)
Time Since Fatigue Problems	5.33 ± 3.33	10.50 (23)	5.31 ± 1.79	14.50 (34)	10.50 ± 4.80	10 (28)
CSE	4.33 ± 2.06	4.62 (2.45)	5.35 ± 1.79	5.31 (2.13)	5.52 ± 1.98	5.5 (3.53)
FSE	3.93 ± 2.31	3.71 (2.28)	5.19 ± 2.12	5.28 (2.57)	5.90 ± 2.24	6.28 (2.96)
PSE	3.01 ± 2.05	3 (3.17)	3.92 ± 2.30	3.87 (3.56)	3.52 ± 2.59	4.12 (4.81)
FIQ overall impact	15.48 ± 3.93	17 (4)	13.02± 5.58	15 (8.25)	13 ± 6.09	12.5 (10.75)
FIQ symptoms	38.03 ± 6.52	7 (5)	35.10 ± 6.48	34.5 (9)	36.04± 8.62	37.75 (15)
FIQ funtion	23.37 ± 4.73	24.33 (5)	19.66 ± 5.31	20.66 (8.43)	17.41 ± 7.30	18.16 (12.91)
FIQ total	76.90 ± 13.28	80.5 (19.33)	67.78 ± 14.85	70.41 (21.75)	66.45 ± 20.08	67.83 (34.12)
Fear of movement	25.79 ± 7.53	26 (11)	23.98 ± 6.11	25 (9.25)	25.33 ± 6.59	25 (10.75)
General Fatigue	18.35 ± 1.94	19 (4)	16.31± 3.27	17 (5)	15.08 ± 4.16	16 (7)
Physical Fatigue	16.56 ± 2.82	17 (4)	15.76 ± 2.99	16 (4)	14.25 ± 3.02	13.50 (4)
Mental Fatigue	16.48 ± 2.98	17 (4)	15.22 ± 3.59	16 (6)	15.75 ± 3.36	15.5 (7)
Activity Reduction	14.28 ± 4.15	15 (7)	12.20 ± 3.29	12 (5)	12.33 ± 4.92	12.5(6)
Motivation reduction	13.13 ± 3.08	13 (5)	12.31 ± 3.61	12 (5)	12.25± 3.77	12 (5)

CSE: self-efficacy for coping with symptoms; FSE: self-efficacy for physical function; PSE: self-efficacy for pain management; FIQ: Fibromyalgia impact questionnaire.

Table 3. Differences between patients with low, moderate, and high physical activity levels, measured with IPAQ.

Physical Activity Measured with IPAQ		CSE	FSE	PSE
Total sample size	Median (IQR)	5 (2.19)	4.43 (3.14)	3.5 (3.88)
Low physical activity level (n = 39)	Median (IQR)	4.62 (2.45)	3.71 (2.28)	3 (3.17)
Moderate physical activity level (n = 54)	Median (IQR)	5.31 (2.13)	5.28 (2.57)	3.87 (3.56)
High physical activity level (n = 12)	Median (IQR)	5.5 (3.53)	6.28 (2.96)	4.12 (4.81)
Kruskal–Wallis	p-value	0.168	0.003	0.284
Pairwise Comparisons (sig.ady)	Low vs. moderate	-	0.014	-
	Low vs. high	-	0.014	-
	Moderate vs. High	-	0.812	-

CSE: self-efficacy for coping with symptoms; FSE: self-efficacy for physical function; PSE: self-efficacy for pain management; IPAQ: International physical activity questionary; IQR: Interquartile range.

3.3. Associations among the Fear of Movement, Fatigue, Self-Efficacy, and the Impact of Fibromyalgia

As shown in Table 4, the fear of movement and most of the dimensions of fatigue (general fatigue, physical fatigue, mental fatigue, reduced activity, and reduced motivation) are directly related to the overall impact of fibromyalgia, the severity of the symptoms,

functionality, and the total score of the FIQR. In this way, the only non-significant correlation was between mental fatigue and the overall fibromyalgia impact ($p = 0.203$). In addition, the fear of movement is directly correlated with all fatigue dimensions.

Table 4. Correlations among the fear of movement, fatigue dimensions, fibromyalgia impact, and self-efficacy.

	Fear of Movement	General Fatigue	Physical Fatigue	Mental Fatigue	Activity Reduction	Motivation Reduction
FIQ overall impact	0.309 **	0.202 *	0.216 *	0.119	0.432 **	0.222 *
FIQ symptoms	0.346 **	0.262 **	0.192 *	0.255 **	0.330 **	0.296 **
FIQ function	0.385 **	0.268 **	0.226 *	0.265 **	0.340 **	0.272 **
FIQR total	0.388 **	0.276 **	0.239 **	0.257 **	0.400 **	0.314 **
CSE	−0.259 **	−0.178	−0.265 **	−0.186 *	−0.385 **	−0.368 **
FSE	−0.311 **	−0.221 *	−0.324 **	−0.014	−0.411 **	−0.170
PSE	−0.289 **	−0.305 **	−0.289 **	−0.289 **	−0.434 **	0.285 **
Fear of movement	-	0.277 **	0.251 **	0.211 **	0.224 **	0.242 **

FIQ: Fibromyalgia impact questionnaire; CSE: self-efficacy for coping with symptoms; FSE: self-efficacy for physical function; PSE: self-efficacy for pain management; **: p-value < 0.001; *: p-value < 0.05.

Self-efficacy, composed of the three dimensions (for coping with symptoms, for physical function, and for pain management) showed more heterogenous results. Only self-efficacy for pain management was observed to have a negative correlation with all fatigue dimensions and with the fear of movement. On the other hand, self-efficacy for coping with symptoms and for physical function negatively correlated with all the variables, except with general fatigue in the case of self-efficacy for coping with symptoms ($p = 0.055$) and with mental fatigue ($p = 0.879$) and motivation reduction ($p = 0.071$), in the case of the self-efficacy for physical function.

3.4. Mediation Analysis

Four regression analyses were performed with model 6 of PROCESS (Figure 1). In the first one, utilizing general fatigue (M1—the influence of the fear of movement in general fatigue) as the outcome variable, a significant effect was found with a coefficient of 0.122 and a p-value of 0.005. In the second regression model, with the FIQR function as mediator 2 (M2—the influence of fear of movement and general fatigue for explaining the effect on FIQR function), a significant effect was found in both variables with a coefficient of 0.221 and a p-value of 0.005 for the fear of movement, and a coefficient of 0.443 and a p-value of 0.008 for general fatigue The third regression analysis which took self-efficacy for physical function as the outcome variable (estimating its effect through general fatigue, the FIQR function, and the direct effect of fear of movement) obtained a significant influence of the FIQR function (with a coefficient of −0.176 and a p-value < 0.001) and the fear of movement (with a coefficient of −0.073 and a p-value of 0.018) in self-efficacy for physical function. On the other hand, the effect of general fatigue was not significant (with a coefficient of 0.040 and a p-value of 0.529). The last regression analysis which included the total effect model of the fear of movement on self-efficacy for physical function had a coefficient of −0.116 and a p-value of 0.0003.

As for the indirect effects of the mediation analysis, significant mediations were obtained in the relation between the fear of movement, the FIQR function, and self-efficacy for physical function (effect of −0.039, SE of 0.014, and a 95% interval coefficient from −0.066 to −0.011), and between the fear of movement, general fatigue, the FIQR function, and self-efficacy for physical function (effect of −0.009, SE of 0.006 and a 95% interval coefficient from −0.023 to −0.0003). Significant observations were not observed in the relationship among the fear of movement, general fatigue, and self-efficacy for physical function (effect of 0.005, SE of 0.008, and a 95% interval coefficient from −0.011 to 0.021).

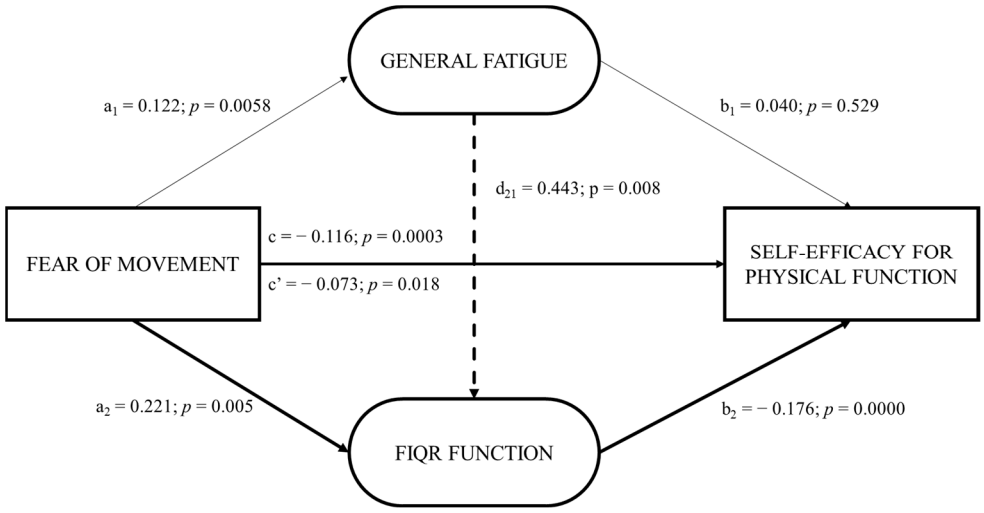

Figure 1. Multivariable mediation results.

4. Discussion

The current investigation proposed to assess the effect of fatigue, the impact of fibromyalgia, and the fear of movement on self-efficacy (specifically on that for physical function). Based on findings from the current study and previous research [10,12,17], self-efficacy largely affects physical activity levels. Thus, given the relationship between self-efficacy and physical activity, the variables able to predict self-efficacy would also have a relevant influence on physical activity levels. However, the results showed that only the self-efficacy for physical function was significantly different according to the physical activity levels, while the self-efficacy for coping with symptoms and for pain management was not. This finding supports the model developed by Pastor-Mira, López-Roig, Martínez-Zaragoza, Toribio, Nardi-Rodríguez, and Peñacoba [12], where the self-efficacy for physical activity was a predictor for the actual physical activity levels, with the mediation role of pain avoidance and activity avoidance patterns in the case of light physical activity.

The association between self-efficacy and physical activity levels has been previously suggested in the framework of the social cognitive theory [39]. This is because self-efficacy is a motivational determinant of behavior that affects the perception of a goal as feasible or not, and when physical activity is the desired behavior, self-efficacy is the key factor as a predictor of achievement among chronic pain patients [11]. In other populations like, for example, children or fragile older adults, this relationship has also been observed by finding that children who had better physical conditions and less fragile older adults showed higher levels of perceived self-efficacy [40,41]. The current study supports the well-known relationship between self-efficacy and desired behavior by finding differences in the self-efficacy for physical function according to the physical activity levels evaluated using the IPAQ tool. Interestingly, differences were only found between patients with low levels of physical activity and the rest of the participants, with no differences between those with medium and high levels. This could be due to the low number of participants with high levels of physical activity, which is in line with the usual low proportion previously reported [42]. This achievement could provide important information for exercise professionals, attempting to promote greater self-efficacy in patients during the sessions, thus making it easier to increase their levels of physical activity.

Based on the well-known relationship between self-efficacy and physical activity and the previously mentioned model developed by Pastor-Mira, López-Roig, Martínez-Zaragoza, Toribio, Nardi-Rodríguez, and Peñacoba [12], the current study aimed to identify which variables could affect self-efficacy for physical activity among women with fibromyalgia. Among all fibromyalgia symptoms, pain is still considered the main one, but fatigue has emerged as a relevant "forgotten symptom" [43]. Accordingly, a prior investigation indicated that fatigue and physical function may be more closely related to an active lifestyle

than pain in women with fibromyalgia [44]. The current study supports the observed relevance of fatigue by identifying direct and significant correlations with the total impact of the disease and the function evaluated using FIQ-R, as well as with the self-efficacy for symptoms, pain, and physical activity. Therefore, perceived fatigue levels should not be omitted when trying to explain why people with fibromyalgia achieve the desired levels of physical exercise or not.

Apart from fatigue, another variable that can influence the perception of the capacity of patients with fibromyalgia to conduct physical activity is the fear of movement. This variable is often related to functional capacity, a fear of falling, and the impact of fibromyalgia [45]. Thus, it seems plausible that those patients who are afraid of performing exercise because it will be uncomfortable or dangerous, are those who perceive they have a low capacity to achieve a desired goal related to physical exercise. This is supported by the relationship between the fear of movement and fatigue, disability, interference, and dissatisfaction with life [46]. In this way, if the therapist were to employ tools to make patients feel more secure in the practice of exercise, such as providing more detailed explanations of the exercises and offering corrective feedback to enhance the perception of security, the fear of movement could be reduced, along with their functional capacity.

The avoidance of activity due to pain or other symptoms was explored as a mediator in the relationship between self-efficacy and physical activity [12]. In this regard, women with higher self-efficacy will show higher levels of physical activity, despite the usual fibromyalgia-related barriers, by preferring the achievement of the desired goals rather than pain avoidance goals. In other words, people who suffer from chronic pain must choose between pain avoidance goals and achievement goals, and this decision will be conditioned by self-efficacy. When the desired goal is physical activity, patients could prioritize doing exercise instead of choosing pain avoidance goals when they have higher levels of self-efficacy, and they know that it is going to be beneficial for them. Participants' adequate knowledge about the risks and benefits of physical exercise has been previously identified as a key determinant of adherence to exercise [47]. However, what happens when patients consider that physical exercise can be harmful to them? This is the case for patients with high levels of fear of movement, who may perceive that exercising is dangerous and could exacerbate their pain levels. In the framework of the fear-avoidance model, which links pain and cognitive-emotional factors, the fear of suffering pain during exercise may lead patients to focus their attention on potential somatic threat signals [48,49]. Thus, these feelings may affect their self-efficacy, since a fear of movement would lead to unpleasant experiences while doing exercise, causing more pain and avoidance and, as a consequence, a vicious circle increasing both fear and avoidance [50].

The current study found that the fear of movement may be a variable to be considered in theoretical models explaining the levels of physical activity of women diagnosed with fibromyalgia. Therefore, interventions aimed at reducing this fear must be recommended. Although there are some examples of successful interventions based on tailored cognitive behavioral therapy, physical exercise, or multicomponent programs [51], involving professionals from different disciplines, including physicians, nurses, psychologists, physiotherapists, or physical exercise professionals, is recommended [47]. Furthermore, according to the health belief model, the involvement in a specific activity will be conditioned by the expected consequences [52]. Thus, patients must be informed about what exercise can do for them. However, patients must know more than only the benefits; the potential risks must also be explained, as well as the possibility of normal unpleasant and undangerous feelings, such as acute low levels of pain, fatigue, or frustration [53]. This information about risks and benefits may lead to larger engagement in exercise programs when it is provided by a physician or a nurse, rather than other non-healthcare professionals, such as physical trainers [47]. Therefore, it is recommended for healthcare professionals to be part of a multidisciplinary team, which includes exercise professionals, and also to effectively communicate to the patient the benefits of practicing regular exercise.

Limitations

Some limitations may be disclosed. First, the number of participants has limited the comparison between groups. For instance, there were only 12 patients with high levels of physical activity, according to the IPAQ. Second, although IPAQ is commonly used in people with fibromyalgia, the reliability of this tool in this population is controversial [54]. However, in the current study, the results from the IPAQ were only used to confirm the well-known relationship between self-efficacy and physical activity, and the findings were in line with the scientific literature. The third limitation is the inclusion being limited to women from associations, therefore, the findings may not be extrapolated to men or to women who are not part of associations. The last limitation that needs to be mentioned is the lack of inclusion of other potentially interesting variables in the mediation analysis, or the possibility of creating subgroups based on participant characteristics, such as age, time since fibromyalgia diagnosis, or time since the onset of fatigue problems, due to insufficient sample size.

5. Conclusions

The fear of movement may be an antecedent for self-efficacy, which, in turn, based on previous research [12], is an antecedent of physical activity levels. Thus, therapeutic exercise interventions aimed to reduce the fear of movement may increase self-efficacy and, consequently, physical activity levels. Furthermore, the fatigue and impact on function levels associated with the fibromyalgia may be mediators in the relationship between fear of movement and self-efficacy. Self-efficacy for physical function may be different according to the physical activity levels, since it was significantly different between patients with high/moderate physical activity levels and those with low physical activity levels, which is a very important aspect to be considered when delivering therapeutic exercise programs. On the other hand, self-efficacy for coping with symptoms and for pain management could have a minor role in determining the level of physical activity.

Author Contributions: A.M.L.-P., D.C.-M., C.P. and A.G.A. contributed to conceptualization, methodology, and investigation; P.C., L.G. and C.É. contributed to data curation and visualization; D.C.-M. and A.M.L.-P. conducted formal analysis and software implementation; C.P. acquired funding for the project; P.C., C.É., L.G. and C.P. provided resources; C.P. supervised the study; D.C.-M., A.G.A. and A.M.L.-P. contributed to original draft preparation; A.M.L.-P., D.C.-M. and C.P. participated in reviewing and editing the manuscript. All authors have read and agreed to the published version of the manuscript.

Funding: The research described in this work was supported by grant number PI17/00858 from the Health Research Fund (Fondo de Investigación en Salud), Instituto de Salud Carlos III (Spain), which is co-financed by the European Union through the European Regional Development Fund (FEDER). Additionally, author A.M.L.-P. acknowledges support from the Spanish Ministry of Science, Innovation and Universities through the Industrial Doctorate Spanish National grant program. The predoctoral industry grant ID is DIN2018-010129.

Institutional Review Board Statement: The study was conducted in accordance with the Declaration of Helsinki and approved by the Bioethics Committee of Rey Juan Carlos University (Reference PI17/00858).

Informed Consent Statement: All participants included in the study provided informed consent. Written consent has been obtained from the patient(s) to publish this paper.

Data Availability Statement: The data presented in this study are available on request from the corresponding author. The data are not publicly available due to confidentiality measures aimed at preserving the information of the participants and ensuring their privacy and anonymity.

Conflicts of Interest: The authors declare no conflicts of interest.

References

1. Heidari, F.; Afshari, M.; Moosazadeh, M. Prevalence of fibromyalgia in general population and patients, a systematic review and meta-analysis. *Rheumatol. Int.* **2017**, *37*, 1527–1539. [CrossRef] [PubMed]
2. Mas, A.J.; 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*, 519–526. [PubMed]
3. Hsu, W.-H.; Han, D.-S.; Ku, W.-C.; Chao, Y.-M.; Chen, C.-C.; Lin, Y.-L. Metabolomic and proteomic characterization of sng and pain phenotypes in fibromyalgia. *Eur. J. Pain* **2022**, *26*, 445–462. [CrossRef] [PubMed]
4. Arnold, L.M.; Choy, E.; Clauw, D.J.; Goldenberg, D.L.; Harris, R.E.; Helfenstein, M., Jr.; Jensen, T.S.; Noguchi, K.; Silverman, S.L.; Ushida, T. Fibromyalgia and chronic pain syndromes: A white paper detailing current challenges in the field. *Clin. J. Pain* **2016**, *32*, 737. [CrossRef] [PubMed]
5. Mercieca, C.; Borg, A.A. EULAR recommendations underplay importance of severe anxiety and depression in fibromyalgia treatment. *Ann. Rheum. Dis.* **2017**, *76*, e53. [CrossRef] [PubMed]
6. Segura-Jimenez, V.; Alvarez-Gallardo, I.C.; Carbonell-Baeza, A.; Aparicio, V.A.; Ortega, F.B.; Casimiro, A.J.; Delgado-Fernandez, M. Fibromyalgia has a larger impact on physical health than on psychological health, yet both are markedly affected: The al-Andalus project. *Semin. Arthritis Rheum.* **2015**, *44*, 563–570. [CrossRef] [PubMed]
7. Sosa-Reina, M.D.; Nunez-Nagy, S.; Gallego-Izquierdo, T.; Pecos-Martín, D.; Monserrat, J.; Álvarez-Mon, M. Effectiveness of therapeutic exercise in fibromyalgia syndrome: A systematic review and meta-analysis of randomized clinical trials. *BioMed Res. Int.* **2017**, *2017*, 2356346. [CrossRef] [PubMed]
8. Sener, U.; Ucok, K.; Ulasli, A.M.; Genc, A.; Karabacak, H.; Coban, N.F.; Simsek, H.; Cevik, H. Evaluation of health-related physical fitness parameters and association analysis with depression, anxiety, and quality of life in patients with fibromyalgia. *Int. J. Rheum. Dis.* **2013**, *19*, 763–772. [CrossRef]
9. Vancampfort, D.; Van Damme, T.; Albanio Machado, V.; McGrath, R.L.; Stubbs, B.; Schuch, F.B. Levels of sedentary behaviour in people with fibromyalgia: A systematic review and meta-analysis. *Disabil Rehabil* **2023**, *21*, 1–7. [CrossRef]
10. Estévez-López, F.; Álvarez-Gallardo, I.C.; Segura-Jiménez, V.; Soriano-Maldonado, A.; Borges-Cosic, M.; Pulido-Martos, M.; Aparicio, V.A.; Carbonell-Baeza, A.; Delgado-Fernández, M.; Geenen, R. The discordance between subjectively and objectively measured physical function in women with fibromyalgia: Association with catastrophizing and self-efficacy cognitions. The al-Ándalus project. *Disabil. Rehabil.* **2018**, *40*, 329–337. [CrossRef]
11. Kaleth, A.S.; Bigatti, S.M.; Slaven, J.E.; Kelly, N.; Ang, D.C. Predictors of Physical Activity in Patients With Fibromyalgia: A Path Analysis. *J. Clin. Rheumatol. Pract. Rep. Rheum. Musculoskelet. Dis.* **2022**, *28*, e203–e209. [CrossRef]
12. Pastor-Mira, M.-Á.; López-Roig, S.; Martínez-Zaragoza, F.; Toribio, E.; Nardi-Rodríguez, A.; Peñacoba, C. Motivational Determinants of Objective Physical Activity in Women with Fibromyalgia Who Attended Rehabilitation Settings. *J. Clin. Med.* **2021**, *10*, 5547. [CrossRef]
13. Alvarez, M.C.; Albuquerque, M.L.L.; Neiva, H.P.; Cid, L.; Rodrigues, F.; Teixeira, D.S.; Matos, R.; Antunes, R.; Morales-Sánchez, V.; Monteiro, D. Exploring the Relationship between Fibromyalgia-Related Fatigue, Physical Activity, and Quality of Life. *Int. J. Environ. Res. Public Health* **2022**, *19*, 4870. [CrossRef] [PubMed]
14. McToal, M.; McVeigh, R.C.; McVeigh, J.G. The impact of fatigue on people with Fibromyalgia Syndrome: A survey. *Musculoskelet. Care* **2023**, *21*, 1175–1181. [CrossRef] [PubMed]
15. Nijs, J.; Roussel, N.; Van Oosterwijck, J.; De Kooning, M.; Ickmans, K.; Struyf, F.; Meeus, M.; Lundberg, M. Fear of movement and avoidance behaviour toward physical activity in chronic-fatigue syndrome and fibromyalgia: State of the art and implications for clinical practice. *Clin. Rheumatol.* **2013**, *32*, 1121–1129. [CrossRef]
16. KoÇyİĞİt, B.F.; Akaltun, M.S. Kinesiophobia Levels in Fibromyalgia Syndrome and the Relationship between Pain, Disease Activity, Depression. *Arch. Rheumatol.* **2020**, *35*, 214–219. [CrossRef] [PubMed]
17. Scioli-Salter, E.R.; Smith, B.N.; McSheffrey, S.; Bair, M.J.; Sillice, M.A.; Driscoll, M.; Higgins, D.M.; Allsup, K.; Amalathas, A.; Gerber, M.R. Self-Efficacy for Adoption and Maintenance of Exercise Among Fibromyalgia Patients: A Pilot Study. *Am. J. Lifestyle Med.* **2020**, *14*, 437–442. [CrossRef] [PubMed]
18. Sanz-Baños, Y.; Pastor-Mira, M.; Lledó, A.; López-Roig, S.; Peñacoba, C.; Sánchez-Meca, J. Do women with fibromyalgia adhere to walking for exercise programs to improve their health? Systematic review and meta-analysis. *Disabil. Rehabil.* **2018**, *40*, 2475–2487. [CrossRef] [PubMed]
19. Pastor-Mira, M.-A.; López-Roig, S.; Peñacoba, C.; Sanz-Baños, Y.; Lledó, A.; Velasco, L. Predicting walking as exercise in women with fibromyalgia from the perspective of the theory of planned behavior. *Women Health* **2020**, *60*, 412–425. [CrossRef] [PubMed]
20. Macfarlane, G.J.; Kronisch, C.; Dean, L.E.; Atzeni, F.; Häuser, W.; Fluß, E.; Choy, E.; Kosek, E.; Amris, K.; Branco, J.; et al. EULAR revised recommendations for the management of fibromyalgia. *Ann. Rheum. Dis.* **2017**, *76*, 318. [CrossRef]
21. Wolfe, F.; Clauw, D.J.; Fitzcharles, M.-A.; Goldenberg, D.L.; Häuser, W.; Katz, R.L.; Mease, P.J.; Russell, A.S.; Russell, I.J.; Walitt, B. 2016 Revisions to the 2010/2011 fibromyalgia diagnostic criteria. *Semin. Arthritis Rheum.* **2016**, *46*, 319–329. [CrossRef]
22. von Elm, E.; Altman, D.G.; Egger, M.; Pocock, S.J.; Gøtzsche, P.C.; Vandenbroucke, J.P. The Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) Statement: Guidelines for reporting observational studies. *Int. J. Surg.* **2014**, *12*, 1495–1499. [CrossRef]
23. Bennett, R.M.; Friend, R.; Jones, K.D.; Ward, R.; Han, B.K.; Ross, R.L. The Revised Fibromyalgia Impact Questionnaire (FIQR): Validation and psychometric properties. *Arthritis Res. Ther.* **2009**, *11*, R120. [CrossRef]

24. Burckhardt, C.S.; Clark, S.R.; Bennett, R.M. The fibromyalgia impact questionnaire: Development and validation. *J. Rheumatol.* **1991**, *18*, 728–733.
25. Luciano, J.V.; Aguado, J.; Serrano-Blanco, A.; Calandre, E.P.; Rodriguez-Lopez, C.M. Dimensionality, reliability, and validity of the revised fibromyalgia impact questionnaire in two Spanish samples. *Arthritis Care Res.* **2013**, *65*, 1682–1689. [CrossRef] [PubMed]
26. Salgueiro, M.; García-Leiva, J.M.; Ballesteros, J.; Hidalgo, J.; Molina, R.; Calandre, E.P. Validation of a Spanish version of the revised fibromyalgia impact questionnaire (FIQR). *Health Qual. Life Outcomes* **2013**, *11*, 132. [CrossRef] [PubMed]
27. Schwarz, R.; Krauss, O.; Hinz, A. Fatigue in the general population. *Oncol. Res. Treat.* **2003**, *26*, 140–144. [CrossRef] [PubMed]
28. Smets, E.; Garssen, B.; Bonke, B.D.; De Haes, J. The Multidimensional Fatigue Inventory (MFI) psychometric qualities of an instrument to assess fatigue. *J. Psychosom. Res.* **1995**, *39*, 315–325. [CrossRef] [PubMed]
29. Munguía-Izquierdo, D.; Segura-Jiménez, V.; Camiletti-Moirón, D.; Pulido-Martos, M.; Alvarez-Gallardo, I.C.; Romero, A.; Aparicio, V.A.; Carbonell-Baeza, A.; Delgado-Fernández, M. Multidimensional Fatigue Inventory: Spanish adaptation and psychometric properties for fibromyalgia patients. The Al-Andalus study. *Clin. Exp. Rheumatol.* **2012**, *30*, 94–102. [PubMed]
30. Anderson, K.O.; Dowds, B.N.; Pelletz, R.E.; Edwards, T.W.; Peeters-Asdourian, C. Development and initial validation of a scale to measure self-efficacy beliefs in patients with chronic pain. *Pain* **1995**, *63*, 77–83. [CrossRef] [PubMed]
31. Martín-Aragón, M.; Pastor, M.; Rodríguez-Marín, J.; March, M.; Lledó, A. Percepción de Autoeficacia en Dolor Crónico. Adaptación y Validación de la Chronic Pain Selfefficacy Scale. *Rev. Psicol. Salud* **1999**, *11*, 51–76.
32. Tkachuk, G.A.; Harris, C.A. Psychometric properties of the Tampa Scale for Kinesiophobia-11 (TSK-11). *J. Pain* **2012**, *13*, 970–977. [CrossRef] [PubMed]
33. Gómez-Pérez, L.; López-Martínez, A.E.; Ruiz-Párraga, G.T. Psychometric properties of the Spanish version of the Tampa Scale for Kinesiophobia (TSK). *J. Pain* **2011**, *12*, 425–435. [CrossRef] [PubMed]
34. Craig, C.L.; Marshall, A.L.; Sjöström, M.; Bauman, A.E.; Booth, M.L.; Ainsworth, B.E.; Pratt, M.; Ekelund, U.; Yngve, A.; Sallis, J.F. International physical activity questionnaire: 12-country reliability and validity. *Med. Sci. Sport. Exerc.* **2003**, *35*, 1381–1395. [CrossRef] [PubMed]
35. Roman-Viñas, B.; Serra-Majem, L.; Hagströmer, M.; Ribas-Barba, L.; Sjöström, M.; Segura-Cardona, R. International physical activity questionnaire: Reliability and validity in a Spanish population. *Eur. J. Sport Sci.* **2010**, *10*, 297–304. [CrossRef]
36. Committee, I.R. Guidelines for Data Processing and Analysis of the International Physical Activity Questionnaire (IPAQ)-Short and Long Forms. 2005. Available online: http://www.ipaq.ki.se/scoring.pdf (accessed on 19 March 2023.).
37. Hayes, A.F. PROCESS: A Versatile Computational Tool for Observed Variable Mediation, Moderation, and Conditional Process Modeling [White Paper]. 2012. Available online: http://www.afhayes.com/public/process2012.pdf (accessed on 19 March 2023).
38. Baron, R.M.; Kenny, D.A. The moderator–mediator variable distinction in social psychological research: Conceptual, strategic, and statistical considerations. *J. Personal. Soc. Psychol.* **1986**, *51*, 1173. [CrossRef]
39. Young, M.D.; Plotnikoff, R.; Collins, C.; Callister, R.; Morgan, P. Social cognitive theory and physical activity: A systematic review and meta-analysis. *Obes. Rev.* **2014**, *15*, 983–995. [CrossRef]
40. Codella, R.; Puci, M.V.; Vandoni, M.; Correale, L.; Galvani, C.; Togni, F.; Casolo, F.; Passi, A.; Orizio, C.; Alberti, G.; et al. School self-efficacy is affected by gender and motor skills: Findings from an Italian study. *PeerJ* **2020**, *8*, e8949. [CrossRef]
41. Veley, A.; Degen, M.; Rimmer, L.; Collins, L.; Dorocicz, I.; Smith, J.; Barclay, R.; Scodras, S.; Alsbury-Nealy, K.; Salbach, N.M. Do measures of physical capacity and walking self-efficacy relate to frailty in older adults with difficulty walking outdoors? A secondary data analysis. *Disabil. Rehabil.* **2023**, 1–8. [CrossRef]
42. Segura-Jiménez, V.; Álvarez-Gallardo, I.C.; Estévez-López, F.; Soriano-Maldonado, A.; Delgado-Fernández, M.; Ortega, F.B.; Aparicio, V.A.; Carbonell-Baeza, A.; Mota, J.; Silva, P.; et al. Differences in sedentary time and physical activity between female patients with fibromyalgia and healthy controls: The al-Ándalus project. *Arthritis Rheumatol.* **2015**, *67*, 3047–3057. [CrossRef]
43. Peñacoba, C.; López-Gómez, I.; Pastor-Mira, M.A.; López-Roig, S.; Ecija, C. Contextualizing goal preferences in fear-avoidance models. Looking at fatigue as a disabling symptom in fibromyalgia patients. *PLoS ONE* **2021**, *16*, e0254200. [CrossRef]
44. Merriwether, E.N.; Frey-Law, L.A.; Rakel, B.A.; Zimmerman, M.B.; Dailey, D.L.; Vance, C.G.T.; Golchha, M.; Geasland, K.M.; Chimenti, R.; Crofford, L.J.; et al. Physical activity is related to function and fatigue but not pain in women with fibromyalgia: Baseline analyses from the Fibromyalgia Activity Study with TENS (FAST). *Arthritis Res. Ther.* **2018**, *20*, 199. [CrossRef]
45. Leon-Llamas, J.L.; Murillo-Garcia, A.; Villafaina, S.; Domínguez-Muñoz, F.J.; Morenas, J.; Gusi, N. Relationship between Kinesiophobia and Mobility, Impact of the Disease, and Fear of Falling in Women with and without Fibromyalgia: A Cross-Sectional Study. *Int. J. Environ. Res. Public Health* **2022**, *19*, 8257. [CrossRef]
46. Bränström, H.; Fahlström, M. Kinesiophobia in patients with chronic musculoskeletal pain: Differences between men and women. *J. Rehabil. Med.* **2008**, *40*, 375–380. [CrossRef]
47. Collado-Mateo, D.; Lavin-Perez, A.M.; Penacoba, C.; Del Coso, J.; Leyton-Roman, M.; Luque-Casado, A.; Gasque, P.; Fernandez-Del-Olmo, M.A.; Amado-Alonso, D. Key Factors Associated with Adherence to Physical Exercise in Patients with Chronic Diseases and Older Adults: An Umbrella Review. *Int. J. Environ. Res. Public Health* **2021**, *18*, 2023. [CrossRef] [PubMed]
48. Vlaeyen, J.W.S.; Linton, S.J. Fear-avoidance and its consequences in chronic musculoskeletal pain: A state of the art. *Pain* **2000**, *85*, 317–332. [CrossRef]
49. Leeuw, M.; Goossens, M.E.; Linton, S.J.; Crombez, G.; Boersma, K.; Vlaeyen, J.W. The fear-avoidance model of musculoskeletal pain: Current state of scientific evidence. *J. Behav. Med.* **2007**, *30*, 77–94. [CrossRef] [PubMed]

50. Martínez, M.P.; Sánchez, A.I.; Miró, E.; Medina, A.; Lami, M.J. The relationship between the fear-avoidance model of pain and personality traits in fibromyalgia patients. *J. Clin. Psychol. Med. Settings* **2011**, *18*, 380–391. [CrossRef] [PubMed]
51. Martinez-Calderon, J.; Flores-Cortes, M.; Morales-Asencio, J.M.; Luque-Suarez, A. Intervention Therapies to Reduce Pain-Related Fear in Fibromyalgia Syndrome: A Systematic Review of Randomized Clinical Trials. *Pain Med.* **2021**, *22*, 481–498. [CrossRef] [PubMed]
52. Hochbaum, G.M. *Public Participation in Medical Screening Programs: A Socio-Psychological Study*; US Department of Health, Education, and Welfare, Public Health Service: Washington, DC, USA, 1958.
53. Tierney, S.; Mamas, M.; Skelton, D.; Woods, S.; Rutter, M.K.; Gibson, M.; Neyses, L.; Deaton, C. What can we learn from patients with heart failure about exercise adherence? A systematic review of qualitative papers. *Health Psychol. Off. J. Div. Health Psychol. Am. Psychol. Assoc.* **2011**, *30*, 401–410. [CrossRef]
54. Segura-Jiménez, V.; Munguía-Izquierdo, D.; Camiletti-Moirón, D.; Alvarez-Gallardo, I.C.; Ortega, F.B.; Ruiz, J.R.; Delgado-Fernández, M. Comparison of the International Physical Activity Questionnaire (IPAQ) with a multi-sensor armband accelerometer in women with fibromyalgia: The al-Ándalus project. *Clin. Exp. Rheumatol.* **2013**, *31*, S94–S101. [PubMed]