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Predicting walking as exercise in women with fibromyalgia from the perspective of the theory of planned behavior

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ABSTRACT

Based on the theory of planned behavior, this study examined factors related to the intention to adhere to an unsupervised walking program and the intention-behavior gap in relation to walking adherence in women with fibromyalgia. We also accounted for specific variables: fear of movement, pain intensity, distress and disability. TPB constructs, walking behavior and the above-mentioned variables were assessed in 274 women aged 18 to 70 years old (mean 51.8, range 25.5–69.1 years) at baseline and seven weeks later (n = 219) during 2012. Intention to adhere to a walking program showed medium scores at baseline and was associated with attitude and perceived behavioral control (PBC). Self-reported walking adherence at Time 2 was only predicted by perceived behavioral control. The intention-behavior gap was present in 33% of participants. Logistic regression analysis showed PBC associated with being a successful intender. Women with fibromyalgia were motivated to walk; however, they did not act on their intentions, and PBC appeared as the main explanation. Women who perceived high control in comparison to those who perceived low control, increased their likelihood of adhering to a walking program about three-fold. Women with fibromyalgia should increase their perceived control through different strategies

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Introduction

Fibromyalgia (FM) is a chronic pain disorder of unknown etiology, which is defined by generalized musculoskeletal pain that is present for more than three months, along with fatigue, tiredness, sleep disorders, anxiety and depressive symptoms (among others); the prevalence of this condition is 3.4% for women and 0.5% in men (Wolfe et al. 2010). It is one of the most prevalent causes of chronic pain in primary care settings and is associated with important perceived health impacts and socioeconomic burden (Knight et al. 2013; Reisine et al. 2004; Rivera et al. 2009). The most effective interventions combine pharmacological strategies, physical exercise and cognitive-behavioral therapy (Häuser et al. 2009). In particular, exercise of low to moderate intensity has shown benefits in FM

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health outcomes (Beltrán-Carrillo et al. 2013; Busch et al. 2011; Häuser et al. 2010), and walking has been shown to decrease pain and improve mobility and function (Kayo et al. 2012; O'Connor et al. 2015). However, adherence to walking programs is low, especially the ones of low intensity (Mannerkorpi et al. 2010). In a previous study, we showed that the prevalence of an unsupervised walking program was 30.8% in a community sample of women belonging to FM associations (López-Roig et al. 2016).

Taking into account the benefits for health outcomes in women with FM, promoting walking as a part of management strategies becomes a relevant therapeutic target. Walking should be considered fundamental to these strategies, and needs to be implemented based on well-established theories about this particular behavior. Doing this is an innovative approach in this framework. The Theory of Planned Behavior (TPB; Fishbein and Ajzen 2010) has identified intentions associated with walking (Darker et al. 2010; Galea and Bray 2006). TPB is one of the most used psychosocial models to identify factors associated with behavior. The TPB (Figure 1) proposes that the immediate determinant of carrying out a behavior is the person's intention to do so (behavioral intention). Intention is determined by the attitude toward the behavior (global assessment of the personal positive and negative consequences associated with carrying out the behavior), the subjective norm (perception of social pressure to carry out the behavior) and the perceived behavioral control (PBC, perceiving that the behavior is under control). The PBC can also have a direct effect on the behavior, not needing to be mediated by intentions. These proposed predictors are, respectively, explained by behavioral beliefs, normative beliefs and control beliefs.

Based on this theory two main explanations have been identified for why people do not carry out a behavior. First, they do not intend to do it, and second, they intend to do it but are unable to act upon their intentions. Despite correlational studies showing the relationship between intentions and physical activity (McEachan et al. 2011), having an intention is not always enough to perform a behavior (named the "intention-behavior gap"). Regarding physical activity, Rhodes and De Bruijn (2013a) identified an "intention-behavior gap" in about 46% of adults in nonclinical settings. According to Rhodes and De Bruijn (2013b), affective attitude, PBC, planning, habit and self-identity have been associated with this gap. TPB states that people will behave according to their intentions only if they perceive to have enough control over performing the specific behavior. This can be a crucial point in FM, in which people have the experience that symptoms persist despite treatments and that their intensity is unpredictable.

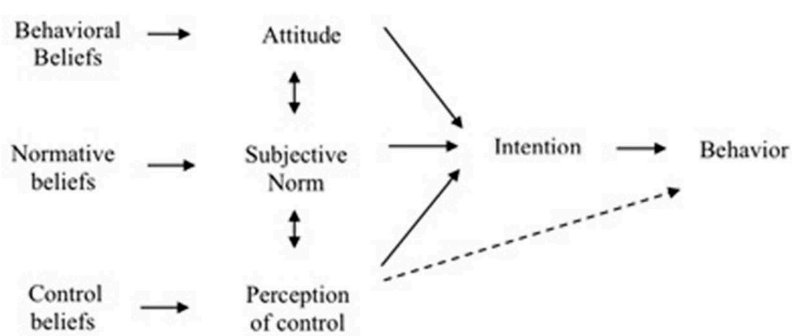

Figure 1. Theory of planned behavior.

Uncertainty is inherent in FM, along with the loss of control over the illness as well as of life in general (Sim and Madden 2008). Therefore, to promote walking as exercise in mainly sedentary women with FM, TPB can help to identify the cognitions upon which to base an intervention (Pastor et al. 2014). In non-clinical populations, PBC or attitude and subjective norm have predicted walking intentions. In relation to walking behavior, PBC has been a significant predictor (Darker et al. 2010).

In studies which have included participants with health problems, PBC has emerged as the main cognition, with 12% of explaining variance in walking limitations in patients with stroke (Bonetti and Johnston 2008), up to 48% in orthopedic patients scheduled for joint replacement surgery (Dixon et al. 2008), 69% after the replacement surgery (Quinn et al. 2012) and 55% in community-dwelling people with chronic pain (Dixon et al. 2012). In a sample of individuals with chronic pain, PBC and intention were significant predictors of walking, explaining, along with pain, 26% of its variance (Dixon et al. 2012). Specifically in FM, TPB constructs have explained 32% of the variance of the intention to exercise (Doyle-Baker 2001), but we have no data regarding walking in this population. TPB establishes that predictions can be different depending on the specific behavior and population (Fishbein and Ajzen 2010). In the context of physical exercise in FM, some authors have suggested taking into account symptom severity and function (Mannerkorpi and Iversen 2003). Moreover, in fibromyalgia, fear of movement and avoidance are highly prevalent and related to patients′ disability levels (Nijs et al. 2013). All these factors could affect both intention and walking behavior, and they should be considered in exploratory approaches. Using the TPB, this study sought to identify motivational processes involved in carrying out a recommended walking program in women with FM, so that in a second phase it would be possible to design an intervention based on these results to enhance the short, medium and long-term adherence to this program.

This study thus aimed to explore: (1) the TPB factors associated with intention to adhere to a fixed walking program, (2) the TPB factors associated with self-reported adherence to the walking program and walking behavior, (3) the contribution of other variables, such as fear of movement, pain intensity, distress and impact on FM and, (4) the intention-behavior gap related to adherence to a fixed walking program in women with FM to differentiate between successful and unsuccessful intenders.

Materials and methods

Procedure

This study was the first part of a broader study aimed at increasing unsupervised walking in women with FM (trial registration number: ISRCTN68584893). The study protocol was approved by the Ethical Committee of the Miguel Hernández University. Recruitment was undertaken between January and November 2012. First, a total of 2,438 members with fibromyalgia belonging to four Spanish FM associations were contacted. To select the reference population, the associations' records were first used to select the female members who were aged between 18 and 70 years (n = 2,227). Later, letters were sent to the 2,227 women containing information about the study, along with informed consent forms, the London Fibromyalgia Epidemiology Study Screening Questionnaire (Branco et al. 2010; White et al. 1999) and other questionnaires covering the remaining variables related to the sample characteristics and participation criteria. As no second clinical diagnosis confirmation was available, the London-4 criteria were used to ensure population homogeneity. Although these criteria screen only for widespread musculoskeletal pain and do not take into consideration other clinical aspects of FM, they give an optimal sensitivity (100%) in studies screening for FM in populations and good positive predictive values for women in rheumatology settings (Branco et al. 2010). A total of 972 questionnaires (43.5%) were returned in two attempts. Our reference population subsequently consisted of 920 members with FM (44 did not fit the London-4criteria, and eight questionnaires did not contain enough data). A total of 582 members (63.3%) satisfied the criteria (Pastor et al. 2014). These eligible participants were contacted; however, 122 refused to participate, six were not contacted, and 180 failed to attend the evaluation session but did not initially refuse to participate in the study. Finally, 274 (47.1%) attended the appointment with the interviewers/facilitators (psychologists) at their FM patients' association or the university lab (time 1, T1). They all signed the informed consent form and filled out the questionnaires. Following a principle of efficiency related to financial coverage and geographic accessibility and proximity and supported by previous studies with same population (Pastor et al. 2014, 2015; Sanz-Baños et al. 2016), at T1, pedometers were provided to 115 participants of the Elche and Alicante FM patients' association. No differences were observed in sociodemographic variables or FM symptoms between women from the four different associations or the ones who were given pedometers. Instructions about the use and how to wear the pedometers were given along with written instructions. The pedometer was worn by participants only when they walked for exercising, over the period of six consecutive weeks. All participants received a new appointment seven weeks later (T2, n = 219) for final assessment and to return the pedometers. Assessment instruments were administered in groups under the supervision of two researchers. The participants were not involved in any interventions or assignments during the time the study was being conducted.

Measures

TPB variables

These variables were measured following the TPB authors´ recommendations (Fishbein and Ajzen 2010):

(1) *Intention to adhere to a walking program* (*Intention*) was measured with five items regarding the readiness to comply with the walking program (α = 0.94) (i.e.:"*I intend to walk at least 30 minutes, in bouts of 15 minutes with a small rest between bouts, twice a week over 6consecutive weeks"*). (2) S*ubjective norm* included five items about the social pressure perception related to engaging in the walking program or not (α = 0.76) (i.e.: "*Most people with this health problem walk at least …* "). (3) *PBC* included nine items about self-efficacy and behavioral control (i.e.: *"In spite of my pain, if I really want to, I can walk at least …* "; "*Walking at least … depends completely on myself*")(α = 0.91). These three TPB variables were scored using a seven-point scale. The anchors of the answer scales were totally agree-totally disagree.

(4) A*ttitude* was measured with a semantic differential scale and included three affective and four instrumental adjectives toward engaging in the specific walking program (*For me, walking at least … is …*, i.e.:*"Good-Bad*", "*Nice-nasty*") (Attitude total score: α = 0.81).

Each variable was measured by the mean score and ranged from 1 to 7. High scores represented high intention, positive attitudes, high social pressure perception and high

PBC. We also computed separate scores for instrumental (α = 0.77) and affective attitude (α = 0.75), due to the role of the latter on physical exercise. The questionnaire was tested in a previous study (for details of the complete version including questions for each construct please consult Pastor et al. 2015).

Fear of movement

We used the total score, ranging from 11 to 44, (the sum of the 11 items regarding fear of movement, answers are given using a four-point scale: 1 totally agree – 4 totally disagree) of the Spanish adaptation of the Tampa Scale for Kinesiophobia (Gómez-Pérez and López-Martínez 2011), answered at T1. Higher scores mean increased fear of movement. This scale is sufficiently reliable (α = 0.78) and valid (Gómez-Pérez and López-Martínez 2011). Internal consistency for this sample was alpha = 0.77.

Pain intensity

We used the mean score of the maximum, minimum, and usual pain intensity during the last week and pain intensity at time of the assessment. This scale has shown good psychometric properties in women with fibromyalgia (Lledó et al. 2010). These items were answered at T1 with an 11-point numerical rating scale (0 = "no pain at all" and 10 = "the worst pain you can imagine") (α = 0.87). Higher scores indicate high pain intensity.

Distress

The total score of the Spanish adaptation of the Hospital Anxiety and Depression Scale (Terol et al. 2007) was used. The scale includes seven items for anxiety and seven for depression. All items used a four-point scale ranging 0 to 3. The total possible range of scores is 0 to 42 (α = 0.88); high scores indicate increased distress. The questionnaire has been shown to be valid and reliable (Terol et al. 2007).

Fibromyalgia impact

We used the Spanish adaptation of the Fibromyalgia Impact Questionnaire (Esteve-Vives et al. 2007). It is a 10-item self-report questionnaire that measures the health status of people with fibromyalgia; the range of the scale is 0 to 100 (Burckhardt, Clark, and Bennett 1991). The first item focuses on the patient's ability to perform physical activities. The following two items require the person to indicate the number of days in the past week they felt good and how many days of work he or she missed. The remaining seven items concern the ability to work, pain, fatigue, morning tiredness, stiffness, anxiety, and depression and are measured with the visual analogue scale (VAS). High scores indicate high fibromyalgia impact perception (α = 0.82).

Self-reported adherence to a walking program (self-reported walking adherence)

For FM, some authors have recommended walking above 50 minutes, in bouts of 15–-20 minutes (with a small rest in between for delaying fatigue and allowing the activity to continue) two to four times a week over a minimum of six consecutive weeks (Gusi et al. 2009). However, considering that our target population was mainly sedentary and that it is recommended that these patients participate in physical activity in a gradual way (Pastor et al. 2014), we asked participants to indicate whether, in the past month and a half, they had walked with the aim of doing exercise '*at least 30 minutes, in two bouts of 15 minutes* *with a small rest between bouts, twice a week over 6 consecutive weeks'* as it is the recommended fixed program. Based on TPB, and including the complete behavior with all its elements (Fishbein and Ajzen 2010), psychometric properties of the total four items (Pastor et al. 2015) were previously analyzed; of them, two showed better indicators. These two items were scored using a seven point scale (1–7), ranging between True-False and Definitively yes-Definitively no (Pastor et al. 2015). The internal consistency scores were 0.93 at base line (T1) and 0.91 seven weeks later (T2). Mean scores were computed considering that higher scores indicated increased behavior. The self-reported walking adherence measure at T2 has shown significant and moderate correlations with the number of weeks women walked at least 30 minutes twice a week (r = 0.46, p < .001) assessed using daily logs over the same period as a validity indicator.

Walking behavior: steps

Walking behavior was measured by a pedometer step count (Yamax EX5103D USB pedometer). The pedometer was worn only while walking for exercise and not throughout the day; it registered the steps taken each day. It stored the days and steps walked over the weeks. For this study the average steps per walking day for exercising were used (empirical range of minimum: 554.7 steps and maximum: 10503.5).

Figure 2 shows the measures for each time point.

Statistical analysis

We used the SPSS 21 Statistics Package. Descriptive, Cronbach's Alfa coefficient, Pearson´s correlation and t-test were carried out. We considered $p \leq 0.01$ as criteria because of the number of the comparisons and the sample size. Taking into account the exploratory purposes of our study, multiple regression analyses were performed to identify the factors associated with intention, self-reported walking adherence and walking behavior (steps) at T2. A guided

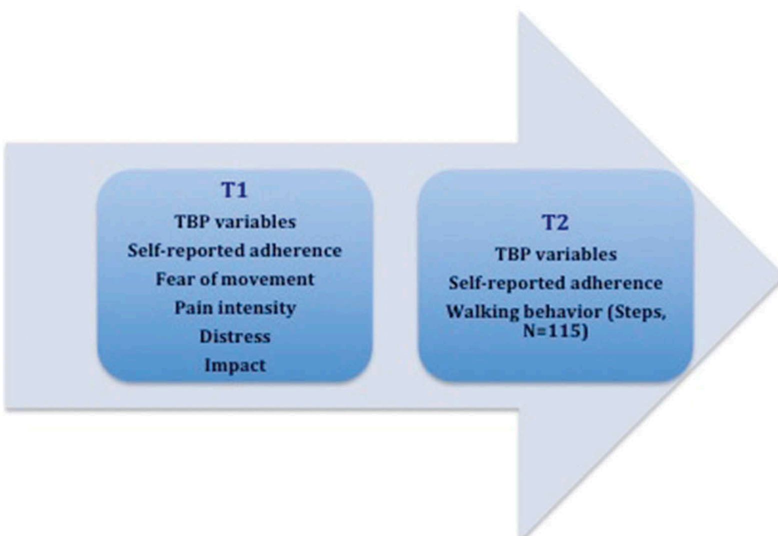

Figure 2. Measures for each time point.

selection of variables was implemented to keep the TPB variables, the principle of hierarchy (in the case of significant interactions) and the control of potential confounders (related to fibromyalgia condition). In the first phase of analysis, the ENTER and BACKWARD methods were combined. ENTER was used for TPB variables (subjective norm, PBC and attitude to predict intention at T1; and intention and PBC to predict walking adherence at T2), the FM condition variables (pain intensity, distress and fibromyalgia impact) related to dependent variables at $p \leq 0.05$ and self-reported walking, all of them measured at T1; and we later used the BACKWARD elimination method to explore interactions. In the second analysis phase, ENTER was combined for all variables and the interaction terms not removed in the first phase, and then a BACKWARD elimination method was used for all variables except the TPB one to adjust in the regression equation. Inclusion criteria applied a Tolerance >0.001 and exclusion criteria $p > .10$. The final model was estimated with an ENTER blocked hierarchical method (third analysis phase).

Missing data (0.15% of all variables) were estimated by mean imputation procedure. We examined outliers, influential observations, autocorrelation, normality of standardized residuals, linearity and homocedasticity. Some of the assumptions were not met (linearity, homocedasticity and normality) for self-reported walking adherence at T2; so, we performed a logarithmic transformation, but as it did not improve assumptions, we proceeded to perform a logistic regression. In this case, the dependent variable was dichotomized considering the top (5–7) and the bottom (3–1) responses (Rhodes and De Bruijn 2013a), and respondents at midscale were excluded (n = 37).

Potentially related factors at $p < .20$ were selected from univariate analyses. Then, ENTER and BSTEP(LR) (backward stepwise logistic regression with the Likehood ratio test) were combined, and the Hosmer and Lemeshow (2000) good fit test was applied. Statistics to identify outliers, influential observations and linearity were obtained.

Results

Participants' mean age was 51.8 years (95% Confidence Interval [CI]50.7, 52.9 years; *SD* = 9.1, *Median* = 52.6 years) ranging between 25.5–69.1 years. Forty-seven percent reported having completed a primary education (*n* = 129), 28.1% a secondary education (*n* = 77), 1% a university education (*n* = 33), and 12.8% were literate (*n* = 35). Thirty-one percent of participants were working away from home (*n* = 85); 26% were housewives (*n* = 71); 21.6% were unemployed (*n* = 59); 9.9% were retired due to pain (*n* = 27); 6.6% were on sick leave (*n* = 18), and 4.8% were retired (*n* = 13). Reportedly, 78.2% (*n* = 212) said they had the medical recommendation to walk.

No significant differences were found in socio-demographic and symptom perception variables between participants and those who did not attend the appointment. Also, no significant differences were observed between women who participated in both T1 and T2 (*n* = 219) and women who did not attend T2 (*n* = 55; 25.1% of drop-outs) in age, fear of movement, pain intensity, distress, impact on FM or in TPB variables, walking behavior (steps) and self-reported walking adherence (Table 1). Analyses to predict self-reported walking adherence at T2 only included participants at both time measures.

Self-reported walking adherence and steps were correlated at T2 ($p \leq 0.01$; n = 115). Intention was positively correlated with PBC, attitude and subjective norm ($p \leq 0.01$). Self-reported walking at T1 was positively related to intention and PBC ($p \leq 0.01$) but at T2 was only significantly correlated with PBC. Pain intensity was related to intention, and fibromyalgia impact was related to self-reported walking adherence in T1 and T2 ($p \leq 0.01$).

According to the linear regression, TPB variables accounted for 28% of the explained variance of the intention (Table 2). Instrumental attitude and PBC contributed significantly to the model, with the highest beta for attitude ($\beta = 0.37$, $p < .001$).

As no factors were significantly associated with the number of steps, logistic regression analysis was performed with dichotomized self-reported walking adherence and showed PBC as being the only significant factor (odds ratio [OR] = 1.30, 95% $p = .032$ (Table 3). Linearity of PBC was not confirmed in extreme values; therefore, we repeated the analysis using categorized PBC based on percentiles. Taking the lowest category (PBC_{P25}) as the reference, results showed no significant prediction of self-reported walking adherence at T2 for PBC_{50} (OR = 1.33, 95% CI0.58, 3.08; $p = .501$) but significant predictions forPBC_{P75} (OR = 2.83, 95% CI1.07, 7.52; $p = .037$) and PBC_{P100} (OR = 3.84, 95% CI1.47, 10.02; $p = .006$) ($\chi^2 = 10.54$, $p = .015$; good fit test: $p = 1.000$). Polynomic contrast analysis confirmed a significant linear trend ($B = 1.071$, $p = .002$).

In accordance with Rhodes and De Bruijn (2013a, 2013b), we calculated the intention-behavior gap and conducted a logistic regression to identify cognition which differentiated between successful and unsuccessful intenders. Intention (T1) was also dichotomized as we did with self-reported walking adherence at T2. The ratio of unsuccessful intenders

Table 1. Descriptive statistics and correlations with self-reported adherence, behavior and intention.

				Correlation coefficients			
				Self-reported adherence			
	Mean [95% CI]	*SD*	*Median*	T1	T2	Behavior	Intention
Self-reported adherence T1	4.22 [3.95, 4.50]	2.30	4.50				
Self-reported adherence T2 (week 7)	4.78 [4.52, 5.06]	2.03	5.00		**0.17**		
Behavior (Steps)	3922.40 [3594.65, 4250.15]	1726.28	3945.78	–	**0.29**		
Intention	5.93 [5.76, 6.09]	1.41	6.40	**0.24**	0.15	0.15	
PBC	5.26 [5.09, 5.43]	1.41	5.55	**0.35**	**0.21**	0.19	**0.37**
Attitude	5.74 [5.61, 5.87]	1.09	6.00	–	–	–	**0.44**
Subjective Norm	4.99 [4.86, 5.13]	1.16	5.00	–	–	–	**0.32**
Fear of movement	27.52[26.67, 28.36]	7.09	27	-0.07	-0.05	0.01	-0.04
Pain intensity	6.51 [6.32, 6.70]	1.62	6.50	-0.02	0.004	0.02	**-0.16**
Distress	20.39[19.54,21.24]	7.16	20.00	-0.07	-0.03	0.06	-0.08
Fibromyalgia impact	65.95[64.10, 67.80]	15.56	68.08	**-0.17**	**-0.18**	-0.12	-0.14

In bold $p \leq .01$; PBC: Perceived behavioral control; – : correlations were not performed because we only did those derived from the relationships established among the TPB constructs; T1: n = 274; T2: n = 219

Table 2. Multiple regression of factors related to intention[(a)].

Criterion	Factors	R^2	*F*	*df*	β	*B* [95%CI]
Intention		0.28	28.87***	4, 273		
	Attitude (Instrumental)				0.37***	0.48 [0.34, 0.63]
	Perceived Behavioral Control				0.15**	0.15 [0.03, 0.27]
	Subjective Norm				0.11	0.14 [−0.00, 0.28]
	Self-reported adherence at T1				0.09	0.06 [−0.01, 0.12]

***: $p \leq .001$; **: $p \leq .01$; *: $p \leq .05$; [a] Data reported are the ones entered in the regression equation. Fear of movement, pain intensity, distress and impact perception did not meet inclusion criteria and were thus not included

Table 3. Multiple logistic regression results.

Criterion	Factors	*B*	*S.E.*	*Wald*	*p*	*OR (Exp^B)*	[95% CI]
Self-reported adherence at T2[(a)]							
	Perceived behavioral control	0.28	0.124	5.21	.02	1.30	[1.02, 1.66]
	Intention	0.17	0.117	2.20	.14	1.19	[0.95, 1. 50]
Successful intention[(b)]							
	Perceived behavioral control	0.53	0.152	12.21	.0005	1.70	[1.26, 2.30]

[a] Omnibus Tests of Model Coefficients: $\chi2$ = 10.71, *p* = .005 *df* = 2; good fit test: *p* = .691, n = 182; Data reported are those entered in the regression equation. Impact perception and Self-reported adherence at T1 did not meet inclusion criteria and thus were excluded
[b] Omnibus Tests of Model Coefficients: $\chi2$ = 12.96, *p* = .0003 *df* = 1; good fit test: *p* = .868, n = 145;

(intenders who did not perform the required behavior in the walking program; *n* = 36) to successful intenders (those who did carry out the required behavior in the walking program; *n* = 109) was 0.33.Logistic regression analysis showed PBC as associated with successful intention (OR = 1.70, *p* = .0005) (Table 3). Taking the lowest category (PBC_{P25}) as the reference, results showed significant association of the intention-behavior gap for all categories: PBC_{50} (OR = 2.72, 95% CI1.04, 7.13; *p* = .042), PBC_{P75} (OR = 3.36, 95% CI1.04,10.89; *p* = .043) and PBC_{P100} (OR = 5.44, 95% CI1.73, 17.11; *p* = .004) (χ^2 = 10.57, *p* = .014; good fit test: *p* = 1.00, *n* = 145). Polinomic contrast analysis confirmed a significant linear trend (*B* = 1.183, *p* = .004).

Discussion

In this study, we found that the women who intended to walk according to a walking program, held positive attitudes toward the program, and perceived some control and social pressure to comply. In spite of these findings, 33% of the participants did not behave according to their intentions. This is the first study of which we are aware that measured the relationship between intention to adhere to a walking program and subsequent behavior in women with FM, so that to the best of our knowledge, no other studies are available to which to compare to our findings.

Our results suggest that the main explanation for this intention-behavior gap in adherence is associated to perceived control, as has been suggested by previous research in other samples (Galea and Bray 2006; Rhodes and De Bruijn 2013b). The predictive value of PBC in relation to the fixed walking program here proposed was supported by the results of the logistic regression analysis. The women who perceived high control, in comparison to women with low control, increased their likelihood of walking about three-fold. This is a relevant finding, considering that 25% of sample scored below 4 on PBC, which is low perceived control. In this study, 33% of participants had an intention-behavior gap, which is a lower percentage than the percentage found in the meta-analysis by Rhodes and De Bruijn (2013b) with non-clinical samples, with a gap of 46% between intention and physical activity. Also, only PBC was associated with successful intention, supporting its role in promoting unsupervised walking in individuals with FM. Self-reported walking adherence and steps at T2 were slightly correlated, but intention or PBC were not significant predictors of the pedometer data (steps). Other studies have found similar results (Scotts et al. 2007), as well as concluding that the type of behavioral measure can act as a moderator of the TPB predictions, finding that self-reports are predicted better than objective measures (McEachan et al. 2011). It is worth underlining that no variables related to the condition of FM were significantly related to the two walking measures. This is a relevant result because pain, distress and impact on FM were frequent self-reported inhibitors for walking and "to have more pain" was the first expected outcome of carrying out the behavior in the previous elicitation study (Pastor et al. 2015). However, these variables did not significantly contribute to either intention or walking behavior.

Instrumental attitude (the good, positive or beneficial outcome for the person for performing the behavior) and PBC accounted for 28% of the explained variance of intention at T1. This result coincides with the findings of Galea and Bray (2006) in people with intermittent claudication. In our population, attitude was the most strongly associated factor for intention, followed by PBC, with no contribution from subjective norm, which is consistent with the reviewed literature regarding exercise (Symons-Downs and Haunsenblas 2005). However, the lack of association with affective attitude is in contrast with the same evidence. In spite of this, the main role of instrumental attitude in our participants, instead of affective attitude, is coherent with our sample's situation. Most of our participants had a medical recommendation to walk and had also received information during the recruitment process about the aims of this study and the benefits of walking.

Self-reported previous behavior in T1 was not a significantly associated either with intention (T1) or with the self-reported walking program (T2), in contrast with the evidence of other prospective studies on exercise (McEachan et al. 2011). However, our results are in line with the assumptions of the TPB on the role of cognition (intention and PBC) and previous behavior in future behavior. TPB states that cognition is relevant for engaging in a new behavior, but for the maintenance of a behavior, previous behavior is more relevant. In this study, our participants had to introduce a new behavior (walking for exercise) into their lives; so, the fact that behavior at T1 did not play an important role is coherent with TPB. The adherence to the self-reported walking program was higher at T2 than at T1. This change cannot be explained by the pedometer because it was not associated with increased behavior. Some authors have shown that asking about intentions can change the equivalent behavior by increasing attitude accessibility (Wood et al. 2014). This could be the case here, taking into account that our population was motivated and received information about the benefits of walking.

The results of this study showed that between the two main reasons for not walking, intention was not the problem. We had a considerable proportion of "unsuccessful intenders" for whom PBC, which included both self-efficacy and controllability of the behavior, was the only factor related to walking. The main issue would be to help these women to act upon their intentions, increasing perceived control using, among others, volitional strategies to engage in walking, forming plans for managing the perceived inhibitors of this behavior (Fishbein and Ajzen 2010).

This study has several strengths. First, it was focused on women with FM who suffered several debilitating symptoms, which could limit intentions and walking behavior. In fact, women with FM are less physically active than age-matched healthy women (McLoughlin et al. 2011). Second, this study is the first of which we are aware to explore factors associated with walking in women with FM; it was grounded in a well-established theoretical framework and took into account specific factors related to this complex and incapacitating chronic condition. Third, walking is a purposeful behavior and an easy exercise that has shown positive results for health outcomes among individuals with FM; in our study, it was not a recreational activity or a non-intentional behavior. Also, walking is cost-effective and could improve other areas of health as well as ameliorate the impact of FM. Finally, we adopted a prospective approach, measuring behavior seven weeks following the initial assessment of TPB cognitions and considering behavior at baseline measurements (T1) and specific variables associated with FM, which showed no relevance to intentions or walking behavior.

This study also had some limitations. First, it is possible that strong intention does not reflect the current situation of the FM population due to a sample bias. This means that the 47% who attended the appointment were women who wanted to walk. Participants knew the study was the first phase for a trial to implement walking among individuals with FM. However, no significant differences were found between participants and non-participants in socio-demographic characteristics and symptom perception. Similarly, no significant differences were observed between women who completed this study and those who did not complete at T2. Also, 25% of the sample reported low intention according to the 25thpercentile. Second, the sample was taken from different geographic areas; however, no differences were observed between them based on geographic location in the previous study (Pastor et al. 2014). Third, pedometer data (steps) was an objective measure, but it did not fit the compatibility principle with our self-reported measure as TPB authors' have stated. Despite this, we found a slightly significant correlation between both measures. Lastly, incorporating planning, habit and self-identity was not measured for test the intention-behavior gap and it could contribute to the multi-process action control framework (Rhodes and De Bruijn 2013b).

In conclusion, our results suggest that to promote walking as a management strategy for women with FM (including all elements for performing it properly), health providers should help patients to comply with their intentions by increasing perceived control. It is important to know what the inhibitors are, to be able to offer information adjusted to reality and dismantle "irrational" ideas about the consequences of walking. In this sense, different self-regulation strategies can be offered for dealing with the primary inhibitors of walking, such as implementation of intentions (Sanz-Baños et al. 2016). Also, the facilitators of performing this behavior should be known to increase patients' likelihood of walking.

Although these are general recommendations that could increase the chances of the behavior being conducted, it is also important to elaborate an individually tailored walking program adapted to each particular situation of each woman (Pastor et al. 2014, 2015; Sanz-Baños et al. 2016). For example, the general prescription "you should go for walks" should be avoided by instead specifying the walking plan (when, how, and how much) as well as developing a plan for dealing with potential inhibitors, such as pain, fatigue, mood or having a bad day, among others identified previously (Pastor et al. 2015). Health providers should support the women's confidence and facilitate their feeling of control of the physical activity that they are performing (Johnston and Dixon 2014; Sim and Madden 2008) to increase their self-efficacy and therefore their perceived control over their disease. As has been shown previously (Sanz-Baños et al. 2016), women consider the recommendations by their physicians to be especially important, and clinicians should be aware of this so to help them identify their facilitators and inhibitors through a more in-depth assessment with greater personalized communication.

Thus, a multidisciplinary approach that helps patients to overcome their medical condition and cope with the difficulties associated to the illness could be particularly effective for increasing not only the intention of walking but also the actual carrying out of a behavior that has been proved to be particularly helpful for women with fibromyalgia. Walking is an accessible and easy exercise that has shown positive results for health outcomes among individuals with FM, improving functioning and symptoms. To promote walking exercise as a rehabilitation strategy, future research should aim to motivate health providers to consider increasing perceived control and help patients to comply with their intentions. Offering different strategies for dealing with the inhibitors and knowing the facilitators of walking could increase patients' probability of walking and improve their adherence. Furthermore, future research should also include all the variables of the "intention-behavior gap" to fully test that approach. Finally, exploring more the behavioral beliefs related to fear of movement and impact on FM would help to adhere to a treatment based on walking, as it has been found to be an excellent opportunity for patients to manage their health condition by themselves.

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