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FACULTAD DE CIENCIAS SOCIOSANITARIAS

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ANDAR COMO EJERCICIO FÍSICO EN FIBROMIALGIA: APORTACIONES DESDE LA TEORÍA DE LA ACCIÓN PLANEADA

Tesis doctoral

Presentada por:

Dña. Yolanda Sanz Baños

Dirigida por:

Dra. María Ángeles Pastor Mira

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D. JUAN CARLOS MARZO CAMPOS, Director del Departamento de Psicología de la Salud de la Universidad Miguel Hernández,

INFORMA:

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Da su conformidad a la lectura y defensa de la Tesis Doctoral "ANDAR COMO EJERCICIO FÍSICO EN FIBROMIALGIA: APORTACIONES DESDE LA TEORÍA DE LA ACCIÓN PLANEADA", de la que es autora la doctoranda Yolanda Sanz Baños y dirigida por la Dra. Mª Ángeles Pastor Mira, para la obtención del título de Doctor de la Universidad Miguel Hernández.

Y para que así conste a los efectos oportunos, emite el presente informe en

Elche, a 13 de junio de 2016

Fdo: D. Juan Carlos Marzo Campos.
Director del Departamento de Psicología de la Salud

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Dña. MARIA ÁNGELES PASTOR MIRA, profesora del Departamento de Psicología de la Salud de la Universidad Miguel Hernández de Elche.

INFORMA

Que la presente memoria ha sido realizada bajo mi dirección, en el Departamento de Psicología de la Salud de la Universidad Miguel Hernández de Elche, por la Licenciada Dña. Yolanda Sanz Baños. Constituye su tesis para optar al grado de Doctora y cumple los requisitos para su defensa.

Para que conste, en cumplimiento de la legislación vigente, autoriza la presentación de la referida tesis doctoral ante la Comisión de Doctorado de la Universidad Miguel Hernández de Elche,

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Elche, 15 de Junio de 2016

Mª Ángeles Pastor Mira

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Esta tesis doctoral ha sido desarrollada en el marco del **proyecto de investigación** titulado "Intervención motivacional e intenciones de implementación para la adhesión terapéutica al ejercicio físico en la fibromialgia", dirigido por la Dra. Mª Ángeles Pastor Mira y subvencionado por el Ministerio de Economía y Competitividad. Referencia del proyecto: PSI2011-25132.

La doctoranda ha sido beneficiaria de una **beca del programa VALi+d** de la Consellería d'Educació, Cultura i Esport de la Generallitat Valenciana, del 01 de junio de 2013 hasta 31 de mayo de 2016, cuya finalidad era la ayuda para la contratación de personal investigador en formación de carácter predoctoral en la Universidad Miguel Hernández de Elche (ORDEN 23/2012, de 25 de mayo, de la Conselleria de Educación, Formación y Empleo, por la que se convocan diferentes tipos de becas y ayudas para el fomento de la investigación científica y el desarrollo tecnológico en la Comunitat Valenciana [2012/5541]). La tesis que se presenta se organiza en torno a 5 estudios que constituyen la primera fase de la investigación arriba mencionada. Algunos de los estudios han sido publicados y se adjuntan en el anexo correspondiente.

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Yolanda Sanz-Baños

Mayo, 2016

RESUMEN

Introducción: La presente tesis se enmarca en la primera fase de un trabajo más amplio cuyo objetivo es incorporar el ejercicio físico de andar en mujeres con fibromialgia. La actividad física es uno de los pilares del tratamiento de la fibromialgia (Alegre de Miquel et al., 2010). Andar regularmente es un ejercicio aeróbico moderado fácil de adaptar a las circunstancias de cada persona (O'Connor et al., 2015). Una pauta recomendada en fibromialgia es andar dos o cuatro veces por semana, durante al menos 40-60 minutos, con un pequeño descanso a los 20 minutos para retrasar la fatiga y el dolor (Gusi et al., 2009). Sin embargo, la adhesión al ejercicio en fibromialgia es baja (Mannerkorpi et al., 2010) dificultando mantener los beneficios para la salud a largo plazo (Busch et al., 2013; Jordan et al., 2010). La Teoría de la Acción Planeada [TAP] (Ajzen, 1985, 1991), con frecuencia utilizada en la predicción de conductas saludables, ha mostrado su capacidad predictiva sobre la conducta de andar y la intención de ejecutarla (Darker et al., 2010). Por ello, resulta pertinente plantearse su aplicación a la predicción de ambas en el contexto de problemas crónicos como la fibromialgia, donde desconocemos cuáles son las cogniciones determinantes de la intención y la realización del ejercicio físico de andar. En este estudio, dada la baja actividad física de las personas con fibromialgia, la conducta específica a estudiar es: *andar al menos 30 minutos, con un pequeño descanso a los 15 minutos, al menos dos veces por semana durante el próximo mes y medio como mínimo.*

Objetivos: Los objetivos de este trabajo han sido, en personas con fibromialgia: 1) identificar y caracterizar a la población de intervención, 2) identificar la adhesión a las intervenciones sobre ejercicio físico que incluyen andar y sus variables moderadoras, 3) identificar la prevalencia de la pauta de ejercicio seleccionada para esta población, así como sus predictores sociodemográficos y clínicos, 4) identificar las creencias sobre la pauta de ejercicio seleccionada utilizando la TAP, 5) elaborar un cuestionario basado en la TAP para evaluar la intención y la conducta de andar y sus cogniciones determinantes y, finalmente, 6) identificar los predictores de la intención conductual de andar y de 7) la conducta de andar para hacer ejercicio físico, teniendo la TAP como estructura teórica de referencia e integrando en ella otros constructos relevantes en la actividad de personas con dolor crónico (estado de salud y miedo al movimiento). Todo ello como fase previa al diseño, aplicación y análisis de los efectos de una intervención motivacional y volitiva para implementar la conducta seleccionada en personas con fibromialgia en un contexto comunitario.

Metodología: Esta fase comprende cinco estudios (uno de ellos un metanálisis sobre la adhesión a los programas de ejercicio físico que incluyen andar como ejercicio principal). Respecto de los estudios empíricos, la metodología y el tamaño muestral dependen de cada estudio y sus objetivos. Sin embargo, en todos ellos se ha trabajado con mujeres con fibromialgia entre 18 y 70 años pertenecientes a cuatro asociaciones de Madrid, Talavera de la Reina, Elche y Alicante.

Resultados: Las características de la muestra estudiada son representativas de la población con fibromialgia. La revisión de las intervenciones de fibromialgia que incluyen andar como ejercicio ha mostrado una alta adhesión, en términos de asistencia a las sesiones (73-83.2%). La duración de las sesiones y el reclutamiento por los médicos fueron los únicos moderadores de la adhesión registrada. La mayoría de las mujeres con fibromialgia tienen recomendación médica para andar (77.5%), pero la prevalencia de la conducta específica de andar en nuestra población fue baja (30.8%), y el predictor más relevante fue el consejo médico (OR = 1.876) seguido de la percepción

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de fatiga (OR = 1.30) y de la edad (1.021). Identificamos un mayor número de creencias positivas asociadas a esta conducta y relacionadas con la mejora de la salud; sin embargo, las creencias negativas fueron más frecuentes y estuvieron relacionadas con el empeoramiento de la sintomatología de la fibromialgia. Además, respecto de las creencias de control, las más frecuentes también se asociaron a factores inhibitorios de la conducta como el dolor, la fatiga y el malestar psicológico. El instrumento elaborado para evaluar los constructos TAP mostró buenos resultados psicométricos. Finalmente, la percepción de control fue el único predictor de la conducta siete semanas más tarde de la evaluación inicial. La percepción de control (β = .37) y la actitud (instrumental) (β = .15) fueron los predictores significativos de la intención.

Conclusiones: Debido a la variabilidad de las intervenciones que incluyeron andar y la adhesión informada a través de la asistencia exclusivamente, se desconoce el cumplimiento específico del ejercicio de andar en y entre las sesiones o durante el seguimiento. Por ello, se sugiere que en futuras intervenciones se registre específicamente la conducta de andar en términos de frecuencia, duración e intensidad. En este estudio, la TAP ha resultado una teoría útil para la predicción de la intención, pero no tanto para la predicción de la conducta. Resulta pertinente la combinación de las técnicas motivacionales utilizando la TAP y técnicas volitivas con intenciones de implementación para cubrir el “gap” intención-conducta detectado en esta muestra.

Palabras clave: Fibromialgia, Ejercicio físico, Andar, Teoría de la Acción Planeada, creencias.

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ABSTRACT

Introduction: This thesis is part of the first phase of a larger project aimed at incorporating exercise walking in women with fibromyalgia. Physical activity is one of the mainstays of treatment for patients with fibromyalgia (Alegre de Miquel et al., 2010). Walking regularly is a moderate aerobic exercise easy to adapt to each person´s circumstances (O'Connor et al., 2015). A recommended fibromyalgia guideline is to walk two or three times a week for at least 40-60 minutes with a break after 20 minutes to delay fatigue and pain (Gusi et al., 2009). However, in fibromyalgia, adherence to this exercise is low (Mannerkorpi et al., 2010), making difficult to maintain the long-term health benefits (Busch et al, 2013; Jordan et al., 2010). The Theory of Planned Behavior [TPB] (Ajzen, 1985, 1991), frequently used to predict health behaviors, has shown its predictive power for walking behavior and the intention to do so (Darker et al., 2010). Since the cognitions that determine walking exercise behavior and the intention to perform it are unknown, we believe appropriate to apply the model referred to, in the context of chronic problems such as fibromyalgia. In this study, given the low physical activity of people with fibromyalgia, the specific behavior to study is: *to walk at least 30 minutes, with a short break after 15 minutes, at least twice a week for the next month and a half as minimum*.

Objectives: The objectives of this work were, in people with fibromyalgia: 1) to identify and characterize the population of intervention, 2) to identify the adherence to interventions on physical exercise that include walking and its moderating variables, 3) to identify the prevalence of the selected guideline of exercise for this population as well as their socio-demographic and clinical predictors, 4) to identify the beliefs about the selected guideline using TPB, 5) to develop a questionnaire based on TPB to evaluate

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the intention and behavior of walking and their determinant cognitions, and finally, objectives 6) to identify the predictors of behavioral intention and 7) walking behavior with physical exercise purposes, taking TPB as a theoretical reference structure and integrating into it other relevant factors in the activity of people with chronic pain (health status and fear of movement). All this, as a preliminary phase to the design, implementation and analysis of the effects of a motivational and volitional intervention to implement the selected behavior in people with fibromyalgia in a community setting.

Methodology: This first phase includes five studies (one of them is a meta-analysis on adherence to exercise programs including walking as the main exercise). Regarding empirical studies, methodology and sample size depend on each study and its objectives. However, we worked with women with fibromyalgia between 18 and 70 years members of four associations of Madrid, Talavera de la Reina, Elche and Alicante.

Results: The characteristics of the sample are representative of the population with fibromyalgia. The interventions that include walking as exercise have shown high adherence in terms of meeting attendance (73-83.2%). Most women with fibromyalgia have medical recommendation to walk (77.5%), and although the most important predictor was precisely the medical advice (OR = 1.876), followed by perception of fatigue (OR = 1.30) and patients´age (1.021), the prevalence of walking exercise behavior was low (30.8%). We identified a greater number of positive beliefs associated with this behavior and related to health improvement; however, negative beliefs were more frequent and were related to the worsening of fibromialgia symptoms. In addition, regarding control beliefs, the most frequent were also inhibiting factors of the behavior such as pain, fatigue and psychological distress. The instrument developed to evaluate the TPB variables showed good psychometric results. Finally, the perception of

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behavioral control was the only predictor of the behavior seven weeks after the initial assessment. The perception of behavioral control (β = .37) and attitude (instrumental) (β = .15) were significant predictors of intention.

Conclusions: Due to the variability of interventions that included walking and that the adherence measurement was based on patients´ assistance, the performance of walking exercise in the specified terms in and between the sessions or during the follow-up is unknown. Therefore, in future interventions we suggest to record the behavior of walking taking into account the criteria of frequency, duration and intensity. In this study, TPB has proved to be a useful theory for predicting the intention, but not as good for predicting the behavior. It is pertinent to combine motivational techniques using the TPB and volitional techniques of implementation intentions to cover the intention-behavior "gap" detected in this sample

Keywords: Fibromyalgia, Physical exercise, Walking, Theory of Planned Behavior, beliefs

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ACRÓNIMOS

ACR	American College of Rheumatology
APS	American Pain Society
CIE	Clasificación Internacional de Enfermedades
EPISER	Estudio de Prevalencia de enfermedades reumáticas en la población española de la Sociedad Española de Reumatología
EULAR	European League Against Rheumatology
FC	Frecuencia cardíaca
FCM	Frecuencia cardíaca máxima
ICAF	Índice combinado de Afectación de enfermos con Fibromialgia
MSPSI	Ministerio de Sanidad, Política Social e Igualdad
OMERACT	Outcome Measures in Rheumatoid Arthritis Clinical Trials
OMS	Organización Mundial de la Salud
TAP	Teoría de la Acción Planeada
TAR	Teoría de la Acción Razonada
TCC	Tratamiento cognitivo-conductual

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1. JUSTIFICACIÓN

Se ha demostrado que en personas con fibromialgia, realizar un adecuado ejercicio aeróbico es beneficioso tanto física como psicológicamente (Häuser, Thieme y Turk, 2010). Además, el ejercicio se presenta como una alternativa óptima de tratamiento a la insatisfacción y los efectos secundarios de los medicamentos (Rodero, García-Campayo, Casanueva y Buriel, 2009) que fomenta la autonomía del paciente y disminuye la dependencia tanto a fármacos como a servicios sanitarios (Cadenas-Sanchez y Ruiz-Ruiz, 2014). Por consiguiente, el número de estudios sobre el ejercicio físico en fibromialgia ha aumentado en los últimos años (Busch et al., 2011; Cadenas-Sánchez y Ruiz-Ruiz, 2014; Cazzola, Atzeni, Salaffi, Stisi, Cassisi y Sarzi-Puttini, 2010; Häuser et al., 2010a; Kelley, Kelley, Hootman y Jones, 2010; Latorre-Santiago y Torres-Lacomba, 2014; Sañudo, Galiano, Carrasco y de Hoyo, 2010; Thomas y Blotman, 2010). Andar de forma regular es un ejercicio aeróbico moderado, adaptable y con bajo impacto en los pacientes (Gusi et al., 2009; Mannerkorpi y Iversen, 2003; O'Connor et al., 2015) que se ha incorporado como tratamiento de la fibromialgia tanto en programas solo de ejercicio (Bircan, Karasel, Akgün, El y Alper, 2007; Etnier et al., 2009; Gowans et al., 2001; Holtgrefe, McCloy y Rome, 2007; Kayo, Peccin, Sanches y Trevisani, 2012; Kelley y Loy, 2008; Latorre et al., 2013; Mannerkorpi et al., 2010; Matsutani, Assumpção y Marques, 2012; Meiworm, Jakob, Walker, Peter y Keul, 2000; Meyer y Lemley, 2000; Nichols y Glenn, 1994; Paolucci et al., 2014; Richards y Scott, 2002; Rooks et al., 2007; Sañudo, Carrasco, de Hoyo y McVeigh; 2012; Sañudo et al., 2010a; Sañudo, Galiano, Carrasco, de Hoyo y McVeigh, 2011; Valim et al., 2002) como en programas multidisciplinares (Casanueva-Fernández, Llorca, Rubió, Rodero-Fernández y González-Gay, 2012; Hamnes, Mowinckel, Kjeken y Hagen, 2012; Harden et al., 2012; King, Wessel, Bhambhani, Sholter y Maksymowych, 2001; Lemstra y Olszynski, 2005; Lera et

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al., 2009). Sin embargo, entre un 20% y un 50% de las personas participantes no completaron los programas que incluían andar como ejercicio físico (Busch et al., 2008; Gowans et al., 2001; Mannerkorpi et al., 2010; Meyer y Lemley, 2000; Richards y Scott, 2002; Rooks et al., 2007; Valim et al., 2000) y esto impide mantener los beneficios a largo plazo (Jordan et al., 2010). La falta de adhesión se ha relacionadado con las características sintomatológicas de la fibromialgia como el dolor, la fatiga o el estado emocional (Busch et al., 2011, Dobkin, Abrahamovicz, Fitzcharles, Dritsa y Costa, 2005; Dobkin, et al., 2006a; Dobkin, Sita y Sewitch, 2006), la pérdida de funcionalidad (Sañudo et al., 2010b; De Gier, Peters y Vlaeyen, 2003; de Roiij et al., 2011; Peters, Vlaeyen y Weber, 2005; Turk, Robinson y Burwinkle, 2004) y la evitación del ejercicio físico asociada al miedo al movimiento, prevalente en población con fibromialgia y fatiga crónica (Nijs et al., 2013). Por otra parte, hay evidencia científica que reivindica la necesidad de personalizar y adaptar los programas de ejercicio a los síntomas y la forma física de los participantes con fibromialgia, además de tener en cuenta sus preferencias y metas para prevenir las bajas en las intervenciones (Busch et al., 2011; Jones y Liptan, 2009).

En las intervenciones que incluyen andar como forma de ejercicio físico en fibromialgia se suele contar con sujetos clínicos (reclutados a través de médicos: Bircam et al., 2007; Lemstra et al., 2005; Lera et al., 2009; Meiworm et al., 2000) o provenientes de la comunidad (a través de anuncios: Gowans et al., 2001; Mannerkorpi et al., 2010; Meyer y Lemley, 2000; Rooks et al., 2007). Generalmente, en los estudios donde los sujetos provienen de contextos clínicos, el ejercicio de andar se realiza bajo supervisión (Hamnes et al., 2012; Lemstra et al., 2005) y la adhesión a andar se sitúa en torno al 80% (Bircam et al., 2007; Hamnes et al., 2012; Lemstra et al., 2005; Lera et al., 2009; Meiworm et al., 2000), más alta que en la mayoría de los estudios de contextos

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comunitarios arriba mencionados. Sin embargo, desconocemos la situación en torno a la realización de ejercicio físico sin ninguna supervisión, como puede ser el desarrollado en el contexto asociativo. En este contexto, andar es una actividad terapéutica que puede ser especialmente útil para las personas con fibromialgia, dada su accesibilidad, ausencia de coste económico y de efectos secundarios, además de sus efectos positivos en los resultados de salud (O'Connor et al., 2015) y como estrategia de auto-manejo de la enfermedad (Rooks et al., 2007).

Teniendo todo esto en cuenta, para desarrollar el contenido de un programa que aumente el ejercicio físico de andar en estas personas, resulta pertinente conocer la situación, barreras y necesidades particulares de las personas con fibromialgia, además de caracterizar esta población en el contexto asociativo y en relación con el ejercicio de la conducta elegida. Además, como fase previa al diseño de una intervención, se pretende explorar los predictores específicos de la intención y de la conducta de andar en esta población, sobre la base de modelos teóricos bien establecidos en psicología social y de la salud como la Teoría de la Acción Planeada (TAP: Ajzen, 1985, 1991; Ajzen y Madden, 1986; Fishbein y Ajzen, 2010). La TAP es un modelo frecuente en la predicción de conductas saludables, idónea para identificar los predictores de una conducta concreta y la intención de llevarla a cabo en una población específica. Asimismo, el estudio de elicitación de creencias salientes indicado en esta teoría, permite profundizar en los factores explicativos de la intención y la conducta de andar en las mujeres con fibromialgia, siendo su modificación el objetivo último de la intervención para lograr la incorporación y mantenimiento de esta conducta.

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2. INTRODUCCIÓN

2.1. Diagnóstico, epidemiología y características clínicas de la fibromialgia.

La fibromialgia es un síndrome de etiología desconocida, de carácter crónico, cuyos criterios diagnósticos fueron establecidos por primera vez en 1990 por el Colegio Americano de Reumatología (American College of Reumatology, [ACR]): 1) dolor musculo-esquelético generalizado y difuso de más de tres meses de duración y 2) dolor a la presión en 11 de 18 puntos dolorosos o "puntos gatillo" sensibles a la palpación digital del clínico o mediante algómetro con una presión aproximada de 4 kilogramos (Wolfe et al., 1990).

En 1992, el término fibromialgia fue reconocido por la Organización Mundial de la Salud [OMS] y lo incorporó como entidad clínica en su manual de Clasificación Internacional de Enfermedades [CIE]. En la CIE-9 (7ª edición 2010), la fibromialgia se clasifica con el código 729.1 que comprende todas las mialgias y miositis no especificadas. Posteriormente, en la CIE-10 (2007), se clasifica en del apartado M79 "Other soft tissue disorders, not elsewhere classified", con el código M79.7 "Fibromyalgia", incluyendo a su vez "Fibromyositis, Fibrositis y Myofibrositis" (Ministerio de Sanidad, Política Social e Igualdad [MSPSI], 2011).

En la actualidad, la existencia de síntomas compartidos con otros problemas de dolor crónico (Aaron, Burke y Buchwald, 1994; Hasset y Claw, 2010) y la falta de reconocimiento como una enfermedad con una fisiopatología clara y diferenciada (Aceves-Ávila, Ferrari y Ramos-Remus, 2004; Hazemeijer y Busker, 2003; Wolfe et al., 2010) ha relacionado a la fibromialgia con los llamados síndromes de sensibilización central (Henningsen, Zipfel y Herzog, 2007; Yunus, 2008). Se reclama que, al darle una excesiva importancia a los síntomas periféricos, se olvidan otros síntomas clínicos que los pacientes con fibromialgia reivindican más allá del dolor (Mease et al., 2009). De hecho, algunos estudios han cuestionado la especificidad diagnóstica de los “puntos gatillo” aduciendo que pueden variar con el grado de estrés psicológico y que hiper-representan a las mujeres frente a los hombres (Harden et al., 2007; Wolfe et al., 2010).

Por consiguiente, la definición y criterios de clasificación de la fibromialgia (Wolfe et al., 1990) han sido revisados para convertirlos en criterios de mayor precisión diagnóstica, añadiendo otros síntomas característicos como la fatiga, el sueño no reparador, las alteraciones cognitivas (problemas de atención, concentración y memoria), síntomas psicológicos (ansiedad y depresión) y otros síntomas somáticos (migrañas, debilidad muscular, alodinia y parestesias en las extremidades, rigidez matutina, hinchazón en las manos, sensación de frío, cambios intestinales, colon irritable, sequedad de ojos, síndrome temporo-mandibular, entre otros) (Wolfe et al., 2010).

Una de las peculiaridades del surgimiento de estos nuevos criterios como alternativa a la tradicional evaluación de los “puntos gatillo”, es que permite diagnosticar a un mayor número de hombres que no solían responder a la sensibilidad de los 11 puntos dolorosos (Clauw, 2014, 2015).

La prevalencia mundial de fibromialgia en la población general es de 2.7%, siendo más frecuente en mujeres (4.1%) que en hombres (1.4 %) (Queiroz, 2013). La prevalencia en la población general europea es del 2.9% (Branco et al., 2010). En España, se ha estimado que un 2.4% de la población mayor de 20 años padece fibromialgia (Carmona, Ballina, Gabriel y Laffon y grupo EPISER, 2001; Valverde, Juan, Rivas y Carmona, 2001). De esta cifra, casi el 90% son mujeres, con una prevalencia entre los hombres de un 0,2% frente a un 4.2% en las mujeres (Valverde et al., 2001;

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Mas, Carmona, Valverde y Ribas, 2008; Villanueva et al., 2004). Es el diagnóstico reumatológico más común después de la artrosis (Claw, 2015) y el más frecuente en mujeres entre 40 y 60 años que refieren dolor musculo-esquelético (5.8%) (Valverde et al., 2001). Sin embargo, hasta el 73% de los pacientes con fibromialgia recibe un diagnóstico erróneo, siendo incluidos en otras enfermedades reumáticas (Walitt, Nahin, Katz, Bergman, y Wolfe, 2015). Aunque los síntomas pueden aparecer en todos los grupos de edad, incluida la infancia, la edad media de inicio es de 49 años y es bastante infrecuente en personas mayores de 80 años (Wolfe, 2010). Se da con igual frecuencia en países, culturas y grupos étnicos diferentes y no hay evidencia de que ocurra en mayor medida en países industrializados (Clauw, 2015; Jones et al., 2015).

El estado de salud de las personas con fibromialgia está gravemente afectado debido al impacto de los problemas de sueño, el dolor, la fatiga, los problemas emocionales y cognitivos (Arnold et al., 2008). Teniendo en cuenta toda esta sintomatología, la mayoría de los pacientes con fibromialgia tienen una capacidad física reducida, tienden a ser sedentarios y se ven limitadas las actividades de la vida diaria (Sañudo et al., 2010b). La fibromialgia suele ir acompañada de dificultades laborales (interrupción de la promoción profesional o educativa), reducción del tiempo dedicado al ocio y a la actividad física y problemas sociales (relaciones familiares y de amistad alteradas y aislamiento social) (Arnold et al., 2008). Se estima que entre un 13% y un 63% de los pacientes de fibromialgia padecen algún trastorno de ansiedad y entre un 20% y un 80% padecen depresión (Fietta y Manganelli, 2007).

La fibromialgia se ha constituido como un importante problema de salud pública asociado a elevados costes socio-sanitarios, dada su prevalencia, el impacto en la calidad de vida en los pacientes y la cantidad de profesionales sanitarios que intervienen en su diagnóstico y tratamiento. El coste medio total (costes directos e indirectos) por paciente y año se sitúa en torno a los 10.000 euros sólo en el caso de pacientes de reumatología. El 35% de este gasto se atribuye a costes directos: consumo de fármacos, consultas médicas, fisioterapia o intervenciones quirúrgicas. El 66%, se dirige a costes indirectos relacionados con bajas laborales, incapacidad o reducción de horas de trabajo (Rivera, Rejas, Esteve-Vives, Vallejo y Grupo ICAF, 2009).

2.2. Etiopatogenia de la fibromialgia

Como hemos comentado, no existe una etiología clara de la fibromialgia. Sin embargo, la evidencia sugiere su multidimensionalidad (Figura 1). Se asume un modelo integrador que considera múltiples factores biológicos (genético, neurofisiológico, inmunológico, neuroendocrino y autonómico) implicados en el inicio y mantenimiento de la fibromialgia, así como psicológicos, sociales y comportamentales como moduladores de la experiencia y la respuesta ante el dolor en las personas afectadas (Clauw, 2015).

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Varios estudios sugieren la importancia de la predisposición poli-genética en la fibromialgia, ya que familiares de primer grado de pacientes tienen una probabilidad 8,5 veces de padecer dolor crónico (Arnold et al., 2004; Buskila, Sarzi-Puttini y Ablin, 2011; Holliday y McBeth, 2011; Woolf, 2011). Muchos de estos genes están relacionados con la regulación de los neurotransmisores relativos a la modulación de la sensibilidad al dolor (Clauw, 2015). El dolor en fibromialgia se atribuye a un mecanismo de amplificación de la señal debido a la sensibilización central, junto con la incapacidad de inhibición de esa señal (Bellato et al., 2012; Jensen et al., 2009; Lannersten y Kosek, 2010).

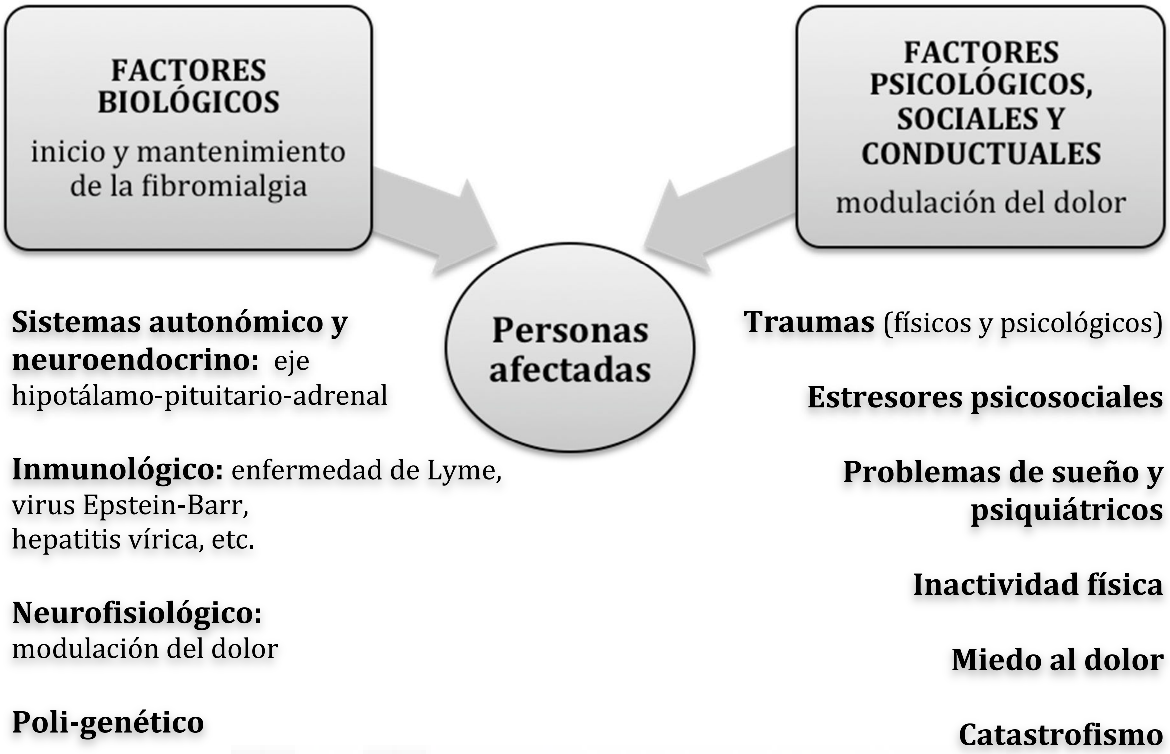

Figura 1. Multidimensionalidad en la etiopatogenia de la fibromialgia.

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La sensibilización central consiste en un incremento de las respuestas centrales a estímulos periféricos nocivos como el calor o la presión, y no nocivos como el tacto (Yunus, 2007) y cuya expresión clínica incluye fenómenos sensoriales como la alodinia (disminución de los umbrales de respuesta al dolor) o la hiperalgesia (aumentos desproporcionados de dichas respuestas) entre otros (Kidd y Urban, 2001; Woolf y Salter, 2000). Debido a esta hiperexcitabilidad, una mínima señal periférica, como la derivada de cualquier actividad cotidiana aparentemente inofensiva, resulta suficiente para retroalimentar y mantener el estado de sensibilización y de dolor clínico patológico, cronificando la experiencia de dolor (Staud, 2004). También se piensa que en las personas con fibromialgia, el sistema neuroendocrino y el sistema nervioso autónomo están implicados a través del eje hipotálamo-pituitario-adrenal, por ello también se ha considerado un trastorno relacionado con el estrés (Crofford, 2002).

Muchos de los factores que suelen desencadenar el problema son “estresores” que se asocian a un dolor agudo durante algunas semanas como, por ejemplo, infecciones (Buskila Atzeni y Sarzi-Puttini, 2008), traumas físicos a causa de accidentes (McLean et al., 2011) o estrés post-traumático (Lewis et al., 2012). En cuanto al estrés psicosocial, hasta el 40% de los pacientes ha informado de la aparición de los síntomas tras algún evento desencadenante (Fitzcharles y Yunus 2012; Sundgren et al., 2007). Los problemas de sueño también se sitúan en la base de la etiopatogenia de la fibromialgia (Bigatti, Hernandez, Cronan y Rand, 2008).

Hay otros factores relacionados con problemas de dolor crónico como la fibromialgia como es el catastrofismo (Quartana, Campbell, y Edwards, 2009) y el miedo al dolor (Turk et al., 2004) que ayudan a mantener el problema conduciendo progresivamente a un desajuste funcional. Según el Modelo de Miedo-Evitación (Vlaeyen y Linton, 2000) cuando una persona valora el significado de su dolor pensando que el movimiento y la actividad lo empeorarán o harán que se produzca una nueva lesión (pensamientos catastrofistas), desarrollará miedo al dolor y evitará moverse. Entonces, intentará detectar cualquier situación o estímulo que pueda provocar dolor (hipervigilancia), provocando la amplificación de las señales somato-sensoriales que mantienen el estado de alerta y fomentando, a su vez, el miedo (Peters, Vlaeyen y Kuneen, 2002). Debido a los comportamientos de evitación, la persona no confrontará sus expectativas y creencias de dolor, llevando a un “síndrome de desuso”, caracterizado por un deterioro gradual del sistema muscular y la aptitud física de la persona, que agrava el problema de dolor (Verbunt et al., 2003). Finalmente, la persona entra en un círculo vicioso caracterizado por pensamientos catastrofistas, conductas de evitación e incapacidad física (Vlaeyen y Linton, 2000).

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Por último, la prevalencia de enfermedades psiquiátricas entre los pacientes afectados por fibromialgia es más alta que entre los sujetos de otras enfermedades reumáticas (Giesecke et al., 2003), siendo las más comunes: ansiedad, somatización, distimia, trastornos de pánico, estrés postraumático y depresión general (Bellato et al., 2012; Clauw y Crofford, 2003; Cohen et al., 2002; Katon, Sullivan y Walker, 2001; McBeth, Macfarlane, Benjamin y Silman, 2001).

El número y complejidad de las posibles relaciones entre los diferentes factores desencadenantes, mantenedores y moduladores de la experiencia de dolor de la fibromialgia, revela de manera particular el reto al que la comunidad científica se enfrenta desde hace tiempo en torno a la mejora de la calidad de vida y resultados de salud de las personas con este problema.

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2.3. Tratamiento de la fibromialgia

En relación con los tratamientos farmacológicos, debido a la inexistencia de una causa determinada, no hay ninguno curativo. Se recomienda frecuentemente el uso de analgésicos (por ejemplo, tramadol, paracetamol) y antidepresivos (Cassisi, Ceccherelli, Atzeni y Sarzi-Puttini, 2012; Lunn, Hughes y Wiffen, 2014; Mika et al., 2013) para aliviar el dolor y mejorar el sueño (Häuser, Walitt, B., Fitzcharles y Sommer, 2014). Los autores de un meta-análisis donde se compararon varios antidepresivos con un placebo (Häuser, Bernardy, Uçeyler y Sommer, 2009) concluyeron que hay una fuerte evidencia de su eficacia en la reducción del dolor, las alteraciones del sueño, la depresión y la calidad de vida en las personas con fibromialgia. Los más eficaces son la amitriptilina (Häuser et al., 2009), la duloxetina (Cahppell et al., 2008) y la fluoxetina (Arnold et al., 2005). La pregabalina (conocida en el mercado como Lyrica) es un medicamento que, según la Agencia de Alimentos y Medicamentos de EE.UU. (Food and Drug

Administration [FDA]), es prescrito específicamente para la fibromialgia; sin embargo, su eficacia no está demostrada claramente y genera efectos secundarios (Parker, Huelin, Khankhel, Wasiak y Mould, 2014). Lamentablemente, muchos pacientes terminan abandonando el tratamiento farmacológico debido a los efectos secundarios (Marcus, 2009), la baja percepción de control al no contar con su participación activa en la intervención (Londoño, Contreras, Delgadillo, Tobón y Vinaccia, 2005) y a la desaparición de los beneficios una vez finalizado el tratamiento (Rodero et al., 2009).

Para el abordaje efectivo de los pacientes con fibromialgia, tanto la Asociación Americana del Dolor (American Pain Society [APS]) (Burckhardt et al., 2005), como la Liga Europea contra el reumatismo (European League Against Rheumatism [EULAR]) (Carville et al., 2008) y en España, tanto la Guía del Ministerio de Sanidad, Política Social e Igualdad (MSPSI, 2011), como el Documento de Consenso Interdisciplinario Español (Alegre de Miquel et al., 2010), recomiendan el tratamiento multidisciplinar, en el que el tratamiento farmacológico se combina con el ejercicio físico y el tratamiento cognitivo-conductual (TCC), o al menos, con uno de los dos (Häuser et al., 2010b; Rivera et al., 2006). Además, hay evidencia de resultados positivos en los tratamientos multidisciplinares que incluyen también psicoeducación (Burckhart, Clark y Bennett, 2005; Demirbag y Ogunzoncul, 2012; Luciano et al., 2011; Van Abbema, van Wilgen, van der Schans y van Ittersum, 2011). Los programas de psicoeducación aportan información al paciente sobre el manejo del dolor, proporcionan un mejor afrontamiento, resaltan la importancia de la actividad física y del apoyo social y proveen de estrategias individuales para el cambio de conducta (Rodero et al., 2009). La terapia psicológica, ya sea individual, con grupos o familiares, es significativamente eficaz en la reducción del dolor y los síntomas depresivos (Glombiewsky et al., 2010). Según una reciente revisión sistemática sobre los tratamientos psicológicos en los últimos 20 años, la intervención psicológica más utilizada en fibromialgia son los TCC (Lami, Martínez y Sánchez, 2013) que han mostrado eficacia para mejorar las estrategias de afrontamiento, la autoeficacia y las conductas de dolor (Bernardy, Füber, Koellner y Häuser, 2010; Bernardy, Klose, Busch, Choy, y Häuser, 2013; Lami et al., 2013). Los TCC incluyen, entre otros, discusión cognitiva, habilidades de afrontamiento, técnicas de resolución de problemas, manejo del estrés, actividades graduales y establecimiento de metas (Rodero et al., 2009).

El tratamiento de la fibromialgia se sostiene en tres pilares (Figura 2): los dos mencionados (intervención farmacológica y psicológica, siendo la TCC la indicada) y el ejercicio físico (que se describe a continuación).

Figura 2. Tratamiento de la fibromialgia.

El *ejercicio físico*, es considerado el tratamiento no farmacológico principal y más estudiado de la fibromialgia durante los últimos años (MSPSI, 2011; Rodero et al., 2009; Sañudo et al., 2010b) y prospera como alternativa recomendable para reducir la dependencia del tratamiento farmacológico (Cadenas-Sanchez y Ruiz-Ruiz, 2014; Carbonell-Baeza et al., 2010; Mannerkorpi y Henriksson, 2007; Sarzi-Puttini, Buskila,

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Carrabba, Doria y Atzeni, 2008). Muchos estudios han demostrado que el ejercicio es beneficioso para los pacientes con fibromialgia: reduciendo la intensidad del dolor y la fatiga, mejorando la función física, la calidad del sueño y el estado de ánimo (ansiedad y depresión) y aumentando la percepción del bienestar y la calidad de vida (Arcos-Carmona et al., 2011, Assis et al., 2006; Busch, Barber, Overend, Peloso y Schachter, 2007; Häuser et al., 2010a). Se ha defendido en la literatura que los tratamientos de ejercicio físico, podrían incluso reactivar las vías descendentes inhibitorias del sistema nociceptor en pacientes con fibromialgia (Staud, Craggs, Robinson, Perlstein y Price, 2007), disminuyendo el proceso de sensibilización central. Hay gran variedad de modalidades de ejercicio físico, pero según recomendaciones basadas en la evidencia y la opinión de expertos en fibromialgia, se sugiere la elección entre un entrenamiento en fortalecimiento muscular o de resistencia, la flexibilidad o estiramientos y el ejercicio aeróbico, ya sea individualmente o en combinación (Pedersen y Saltin, 2006). Aunque otros autores recomiendan aplicar varios tipos de ejercicio en la misma o en diferentes sesiones (Cazzola et al., 2010).

Los ejercicios de fuerza, pretenden mejorar la resistencia y potencia muscular realizando contracciones musculares contra resistencias como bandas elásticas, pesas, máquinas o con el propio peso del cuerpo (por ejemplo flexiones o abdominales). Los ejercicios para mejorar la fuerza se realizan a una alta intensidad (60-70% de la Frecuencia Cardiaca Máxima, [FCM]) y pocas repeticiones (8-12) (American College of Sports Medicine [ACSM], 2009; Garber 2011). En cambio, para la resistencia, la intensidad es relativamente ligera (40-60% FCM) y se realizan más repeticiones (hasta 15). Para mejorar la potencia (producir fuerza rápidamente), la intensidad debe ser de leve a moderada (hasta 60% FCM), realizando de una a seis repeticiones de movimientos rápidos. Este tipo de entrenamiento no sólo aumenta la fuerza muscular y la masa, sino que también produce mejoras en el equilibrio, la coordinación y la agilidad (ACSM, 2009; Jones et al., 2015; Larsson et al., 2015). Las personas con fibromialgia presentan disminución de la fuerza y la resistencia y una mayor fatiga muscular que las mujeres sanas sedentarias (Kingsley, Panton, McMillan y Figueroa, 2009), esta situación puede contribuir a la discapacidad (Raftery, Bridges, Heslop y Walker, 2009). Una reciente revisión Cochrane (Busch et al., 2013) mostró evidencias de que el entrenamiento de resistencia, a intensidades moderada y moderada-alta, mejora la función física, el dolor, los puntos gatillo y la fuerza muscular en mujeres con fibromialgia; sin embargo, no se encontraron evidencias suficientes de que las mujeres puedan cumplir la intensidad moderada-alta de manera segura (sin efectos adversos).

Por su parte, los estiramientos tienen como objetivo mejorar la flexibilidad muscular y de los tejidos blandos a través de movimientos lentos con amplitud articular amplia. Los efectos del entrenamiento en flexibilidad como estrategia individual, no están muy claros ya que, generalmente, se usa en programas que combinan varios tipos de ejercicios, como complemento en intervenciones sin ejercicios (Busch et al., 2007) o tan sólo como terapia control (Sañudo et al., 2010b). Por ello, los ejercicios de flexibilidad tienen escasa evidencia a favor (Busch et al., 2011; Calandre et al., 2009). Sin embargo, se suelen incluir al final de los programas de ejercicios para ayudar al enfriamiento tras la actividad principal (Busch et al., 2011).

En cuanto al ejercicio aeróbico, es un tipo de actividad física en la que se utilizan grandes grupos musculares consumiendo oxígeno de forma sostenida y progresiva. La intensidad del ejercicio no debe llegar a superar 70-85% de la FCM para cada edad, porque se estaría sobrepasando el umbral anaeróbico. En el entrenamiento de pacientes con fibromialgia, es necesario comenzar con una intensidad moderada (hasta 60-70%

FCM) para ir adaptándose e incrementando progresivamente la intensidad y disminuir la frecuencia. La Sociedad Americana del Dolor [APS] recomienda realizarlo dos o tres veces por semana (Burckhardt et al., 2005). Se han comprobado los beneficios de este tipo de ejercicio en fibromialgia: reduce el dolor, la fatiga, las limitaciones de la calidad de vida relacionadas con la salud y mejora el estado de ánimo y la condición física (Häuser et al., 2010a). Los ejercicios aeróbicos recomendados y con resultados positivos en fibromialgia, son ejercicios de baja intensidad como: caminar en suelo o cinta, bicicleta, o ejercicios de bajo impacto en agua caliente o danza (Rodero et al., 2009).

Andar de forma regular, es un tipo de ejercicio aeróbico moderado, con un bajo riesgo de impacto musculoesquelético y se puede adaptar a las circunstancias de cada persona (Gusi et al., 2009; Jones y Liptan, 2006; O'Connor et al., 2015; Mannerkorpi y Iversen, 2003). Andar a una intensidad moderada (a un ritmo que aumente la frecuencia respiratoria y cardíaca pero que permita mantener una conversación) ha demostrado que mejora la capacidad aeróbica, el índice de masa corporal, la presión sanguínea, los niveles de triglicéridos y de colesterol tanto en personas sanas sedentarias (Tschentscher, Niederseer y Niebauer; 2013; Tully et al., 2007), como en personas con problemas cardiovasculares (Eijsvogels et al., 2010) y diabetes tipo 2 (Johnson, Bell, McCargar, Welsh y Bell, 2009). Asimismo, hay evidencia de la eficacia de andar en fibromialgia, como la disminución del dolor, el aumento de los niveles de serotonina y la mejora de la movilidad y la función física (Valim et al., 2013). Un reciente meta-análisis sobre intervenciones que incluían el ejercicio de andar en problemas musculo-esqueléticos, concluye que andar es una recomendación efectiva y con grandes beneficios para la salud de las personas afectadas; sin embargo, debe ser complementada con estrategias destinadas a mantener la participación en la actividad (O'Connor et al., 2015). Frente a otro tipo de actividades que requieren la supervisión

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de un profesional, como los ejercicios de flexibilidad o de fuerza (Busch, Schachter, Overend, Peloso y Barber, 2008; Mannerkorpi et al., 2010; Richards y Scott, 2002) andar depende exclusivamente de la motivación individual para realizarla. Es decir, a través de la recomendación de andar por parte del personal sanitario, se traslada al paciente la responsabilidad de auto-gestionar la actividad fuera del ámbito sanitario. La autogestión requiere de la implicación activa del paciente en el proceso terapéutico, controlando él mismo el grado de esfuerzo de la actividad y su frecuencia, potenciando, además, su confianza en el automanejo de la enfermedad (Rooks et al., 2007). Por tanto, andar con el objetivo de hacer ejercicio físico aparece como una conducta segura y de bajo impacto para estas personas que, además, consigue beneficios tanto físicos como psicológicos en relación con su enfermedad. Todo ello, la configura como un objetivo terapéutico de elección.

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Durante los últimos 25 años, se han realizado unos 25 estudios en población con fibromialgia que incluyeron la pauta de andar en sus programas y han mostrado efectos positivos en los resultados de salud, tanto en programas sólo de ejercicio físico (Bircam et al., 2007; Etnier et al., 2009; Gowans et al., 2001; Holtgrefe et al., 2007; Kayo et al., 2012; Latorre et al., 2013; Mannerkorpi et al., 2010; Meiworm et al., 2000; Meyer y Lemley, 2000; Nichols y Glenn, 1994; Richards y Scott, 2002; Rooks et al., 2007; Sañudo et al., 2010a; Sañudo et al., 2011; Sañudo et al., 2012; Paolucci et al., 2014; Kelley et al., 2008; Matsutani et al., 2012; Valim et al., 2002) como en programas multidisciplinares, en los que se incluyeron otros tratamientos además de andar u otros ejercicios (Casanueva-Fernández et al., 2012; King et al., 2001; Lemstra et al., 2005; Lera et al., 2009; Hamnes et al., 2012; Harden et al., 2012). En cuanto a la prescripción del ejercicio de andar, en estos estudios se observa una amplia variabilidad, tanto en la duración del ejercicio (5-45 minutos), como en la intensidad a la que se realiza (60-80% FCM), la frecuencia (1-4 veces por semana) o el tiempo total durante el cual se ha practicado andar (6-24 semanas). A pesar de esta heterogeneidad, una de las pautas básicas recomendadas para personas afectadas por problemas crónicos como la fibromialgia, es andar durante al menos seis semanas seguidas, de dos a cuatro veces por semana en torno a 50 minutos cada vez, en bloques de 15-20 minutos con un pequeño descanso entre ellos, para retrasar la fatiga y el dolor y poder continuar con la actividad (Gusi et al., 2009). Teniendo en cuenta la inactividad física de las personas con fibromialgia (McLoughlin et al., 2011) y la recomendación de iniciar el ejercicio siempre gradualmente (Jones y Liptan, 2009), para los trabajos que conforman esta tesis y posterior intervención, se ha adaptado esta pauta a unos mínimos alcanzables para quienes no realizan ejercicio físico o lo hacen de forma esporádica. Puesto que el objetivo de la intervención que se realizará en la segunda fase del trabajo en la que se enmarca la tesis es que mujeres con fibromialgia incorporen y mantengan la conducta de caminar para hacer ejercicio físico, esta debe plantearse en términos accesibles según las recomendaciones sobre la prescripción de ejercicio físico en fibromialgia (Jones y Liptan, 2009; Mannerkorpi y Iversen, 2003). En este sentido, configuramos una pauta mínima como conducta objeto de intervención, que será la conducta a evaluar en la primera fase del proyecto. Sobre la base de la recomendación de Gusi et al (2009) establecimos como criterio mínimo: *andar al menos 30 minutos con un pequeño descanso a los 15 minutos, al menos dos veces por semana durante un mes y medio consecutivo.*

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2.4. Adhesión al ejercicio físico en fibromialgia

En la literatura revisada, la adhesión a los tratamientos en fibromialgia suele ser baja (Dobkin et al., 2006b) tanto en los programas de ejercicio físico en general (Busch et al., 2008; Rivera et al., 2006; Thomas et al., 2010) como en los de ejercicio de andar en particular (Dobkin et al., 2005; Dobkin et al., 2006a; Jones y Liptan, 2009; Meyer y Lemley, 2000; Schachter et al., 2003). En concreto, entre un 20% y un 50% no completan los programas que incluían andar como ejercicio físico (Busch et al., 2008; Gowans et al., 2001; Mannerkorpi et al., 2010; Meyer y Lemley, 2000; Richards y Scott, 2002; Rooks et al., 2007; Valim et al., 2000). Se ha demostrado que la baja adhesión al ejercicio físico en problemas musculoesqueléticos puede limitar la eficacia a largo plazo de sus beneficios para la salud (Häuser et al., 2010a; Hayden, van Tulder y Tomlinson, 2005; Jordan et al., 2010). Por ello, en problemas como la fibromialgia, la gestión de las condiciones de adhesión a los programas terapéuticos es un aspecto al que se le está prestando cada vez mayor atención (Ang et al., 2013; Jordan et al., 2010; Thomas et al., 2010). Hay autores que han señalado el efecto entorpecedor del estado de salud en general, incluido el estado emocional, en el inicio y mantenimiento del ejercicio físico en la fibromialgia (Dobkin et al., 2005; Dobkin et al., 2006a; Dobkin et al., 2006b). Busch y colaboradores (2011), en una revisión sistemática sobre programas de ejercicio aeróbico en fibromialgia, concluyeron que el incremento de los síntomas como el dolor y la fatiga y las lesiones musculoesqueléticas, dificultaba la adhesión de los participantes. Además de estos factores, en fibromialgia y otros problemas de dolor crónico, se da con frecuencia la evitación del movimiento asociada al miedo al dolor (Peters et al., 2005). Según el modelo de miedo-evitación (Vlaeyen y Linton, 2000) el miedo al dolor viene determinado por pensamientos catastrofistas (Esteve y Ramírez-Maestre, 2013) basados en expectativas negativas ante el dolor (Sullivan et al., 2001) que se ha relacionado con mayor intensidad y sensibilidad al dolor y mayor discapacidad y depresión en fibromialgia (Buenaver, Edwards y Haythornthwa, 2008; Vowles, McCracken y Eccleston, 2007; García-Campayo et al., 2009). Como hemos comentado, la creencia de que la actividad causará más dolor o más daño (Leeuw, Goossens, Linton, Crombez, Boersma y Vlaeyen, 2007) suele conducir a un patrón conductual de excesivo reposo y evitación de actividades que, en los problemas de dolor crónico, se ha asociado con mayor intensidad de dolor, discapacidad y depresión (De Gier, Peters y Vlaeyen, 2003; de Roiij et al., 2011; Peters et al., 2005; Turk et al., 2004). Por tanto, la presencia de miedo al dolor, catastrofismo y un estado de salud afectado en personas con fibromialgia, podrían influir tanto en el inicio como en el mantenimiento de la conducta de andar como ejercicio físico para mejorar la salud.

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2.5. La Teoría de la Acción Planeada como modelo para la intervención sobre andar como ejercicio físico

En psicología de la salud cada vez más se subraya la importancia de trabajar sobre la base de modelos bien establecidos, puesto que permiten el diseño de intervenciones coherentes, además de la identificación de los procesos por los cuales estas intervenciones son eficaces. Se recomienda adoptar modelos parsimoniosos que dispongan de evidencia sobre su eficacia en el cambio conductual (Hagger, 2010; Michie y Johnston, 2012). Muchos de los modelos aplicados a la actividad física en general, trabajan desde teorías socio-cognitivas y motivacionales que tienen la *intención* como constructo principal (Hagger y Chatzisarantis, 2014). Este tipo de modelos asume que la conducta es autorregulada, intencional y sobre la base del establecimiento de metas; así, las personas se involucran en un proceso consciente de decisión para actuar, teniendo en cuenta, por ejemplo, las características de la conducta que se les pide ejecutar y ciertas creencias almacenadas y altamente accesibles en la memoria, antes de formar una *intención* de realizarla (Ajzen, 2011; Armitage y Conner, 2000). La *intención* es un constructo motivacional que refleja el grado en el que las personas invertirán esfuerzos para realizar una acción. Por lo tanto, la *intención* es considerada el predictor inmediato o más próximo de la conducta (Armitage y Conner, 2000) y por ello, es un constructo clave en teorías como la social-cognitiva (Bandura, 1986), la motivación protectora (Rogers, 1983) o la que nos ocupa en este trabajo, entre otras. La teoría de la acción razonada ([TAR] Fishbein y Ajzen, 1975) y su sucesora, la teoría de la acción planeada ([TAP] Ajzen, 1991) son los modelos socio-cognitivos más utilizados para predecir la actividad física (Scott, Eves, French y Hoppé, 2007). En relación con la actividad física en general, se ha podido comprobar que la TAP es más eficaz que la TAR para la predicción de la *intención* de realizarla y de su ejecución efectiva (Hagger, Chatzisarantis, y Biddle, 2002).

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2.5.1. La Teoría de la Acción Planeada (TAP)

La TAP (Ajzen, 1991) asume, como en las teorías arriba mencionadas, que las personas son racionales y consideran las distintas implicaciones de sus actos antes de decidir realizarlos. Por tanto, propone que el comportamiento está determinado por la *intención* que tiene la persona de realizarlo. Esto no siempre significa que siempre haya una correspondencia entre *intención* y *conducta*, pero las personas suelen actuar de acuerdo con sus intenciones; o dicho de otro modo, tener una intención aumenta la probabilidad de actuar en ese sentido. La intención, que se entiende como la disposición a actuar o la probabilidad de ejecución de la conducta, se puede predecir a través de sus tres determinantes. Es decir, como se puede ver en la Figura 3, la *actitud,* la *norma* *subjetiva y la percepción de control comportamental*. Determinantes que, a su vez, son el resultado de las *creencias comportamentales, normativas* y *de control*.

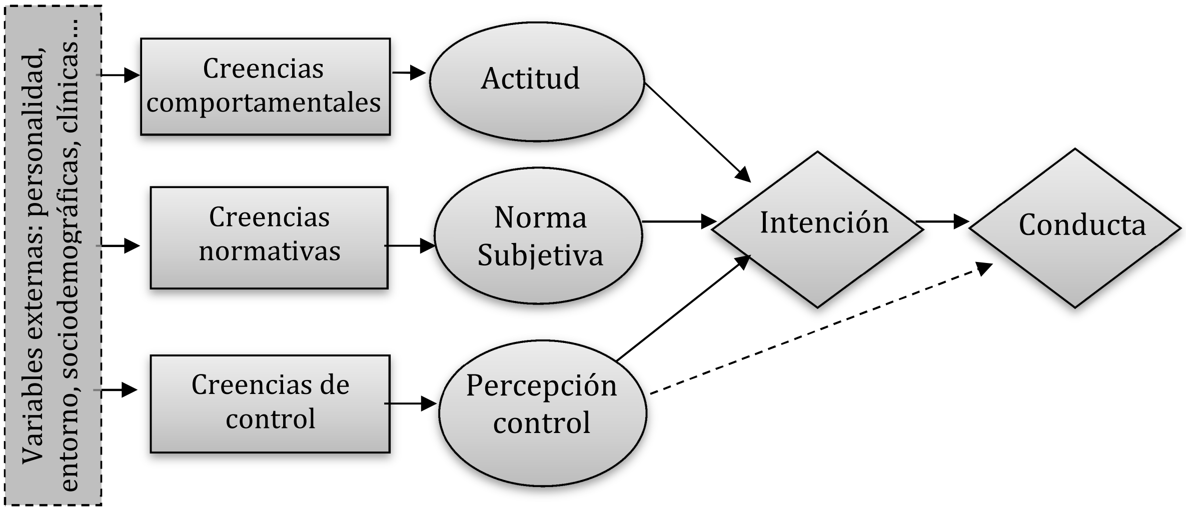

Figura 3. Teoría de la Acción Planeada.

La teoría propone que variables clásicas en la predicción del comportamiento como la personalidad, las condiciones biológicas, estado de salud, entorno social o historia de aprendizaje, entre otras, funcionan como *variables externas* al modelo al ejercer su influencia a través de la configuración de las creencias. Como es sabido, la TAP (Azjen, 1991) es una ampliación de la TAR (Fishbein y Ajzen, 1975) y la aportación que permitió mejorar el alcance predictivo de la teoría fue la incorporación de la *percepción de control comportamental,* variable que puede afectar directa o indirectamente, a través de la intención, al comportamiento. La *percepción de control comportamental* fue introducida por los autores de la teoría, al constatar que hay conductas que no se realizan a pesar de tener una alta intención de realizarlas, tener una actitud favorable hacia ellas y percibir presión social para ejecutarlas. Según los autores, estas conductas se caracterizan por un bajo control por parte de los individuos, ya sea porque necesitan habilidades o recursos para realizarlas, o porque son situaciones en las que pueden surgir obstáculos, interfiriendo en la *intención* de realizarlas (Ajzen, 1985; Ajzen y Madden, 1986). La *percepción de control comportamental*, refleja la percepción global de un conjunto de variables tanto externas (por ejemplo, la oportunidad de acción, el tiempo o momento en que la conducta ha de realizarse o la presencia de otras personas para realizar la conducta) como internas (por ejemplo, la percepción de habilidad para llevar a cabo la acción) (Azjen y Fishbein, 1980) que no están sujetas exclusivamente al control voluntario del individuo. *La percepción de control comportamental* se considera una estimación del control real que tiene la persona sobre el comportamiento, por lo que será un buen predictor de la conducta si esa percepción y el control real son equivalentes (Fishbein y Azjen, 2010). Esta correspondencia depende, por un lado, de que la persona identifique bien los factores internos y externos que afectan a la realización de la conducta y, por otro, de que realice una evaluación realista del control que posee.

La TAP subraya la importancia de evaluar las cogniciones sobre la ejecución individual de un comportamiento, no sobre el comportamiento en términos genéricos. Es decir, en el caso que nos ocupa, el objeto de valoración no será andar o el ejercicio físico como conceptos generales, sino que la persona concreta ande o haga el ejercicio indicado. En este sentido, la definición del comportamiento será determinante puesto que afectará a las creencias que se tengan sobre su ejecución. De este modo, los autores sugieren especificar la conducta en términos de la acción específica que hay que realizar, el objetivo para el que se realiza, y el contexto y el tiempo en el que se realiza (Ajzen y Fishbein, 1980). La TAP no aconseja valorar resultados de conducta (tener menos dolor, o estar sano, por ejemplo) sino la ejecución de conductas. Esto, además de su estructura funcional, con pocos constructos y relaciones claramente especificadas, la hace especialmente útil para trabajar con ella en el contexto de problemas de salud y de la adquisición de conductas necesarias para su cuidado.

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Como se ha comentado, en la TAP la *intención conductual* es el determinante inmediato de la conducta (Ajzen, 1985, 1991; Ajzen y Madden, 1986) y se predice con tres constructos (Figura 3): la *actitud hacia la conducta*, la *norma subjetiva* y la *percepción de control*. La *actitud hacia la conducta* es la valoración global en términos afectivos e instrumentales de lo bueno o lo malo que la persona cree que será para ella realizar la conducta que le piden (Plotnikoff, Lippke, Courneya, Birkett y Sigal, 2010; Vallance, Murray, Johnson y Elavsky, 2011). La *norma subjetiva* es la percepción que tiene la persona de la presión social de su entorno para que realice la conducta. En las formulaciones más recientes del modelo (Fishbein y Ajzen, 2010) los autores detallan dos aspectos: la *norma prescriptiva,* que se refiere al contenido clásico del constructo (creo que personas importantes para mí quieren que haga lo que se me indica); y la *norma descriptiva*, que añade la idea de que la observación de la conducta en modelos con los que la persona se identifica, constituye otra forma de presión social percibida. Por su parte, la *percepción de control* es el grado en que la persona cree que la conducta está bajo control, considerando facilitadores e inhibidores internos y externos y puede influir directamente en la conducta no solo a través de la intención (Ajzen, 1987). Cada uno de estos tres constructos predictivos están determinados, a su vez, por las creencias: las *creencias comportamentales,* que se refieren a las consecuencias positivas y negativas esperadas por la realización de la conducta junto con una valoración actitudinal de cada una de ellas (valoración de lo buena o lo mala que es para la persona la consecuencia esperada). Las *creencias normativas,* o percepción de que referentes específicos quieren que la persona realice la conducta junto con la motivación para cumplir con esos referentes (creencias *prescriptivas*); además de la percepción de que referentes importantes hacen o harían la conducta que se pide en el caso de que estuvieran en el lugar de la persona, junto con el grado de identificación con cada uno de esos referentes (creencias *descriptivas*). Finalmente, las *creencias de control,* asociadas a los facilitadores e inhibidores que percibe la persona para realizar la conducta concreta, junto con la probabilidad de ocurrencia de cada uno.

Las *creencias* configuran el "nivel explicativo" de la conducta y, como se ha expuesto, pueden verse influidas por variables externas al modelo: a) individuales, como la personalidad, el estado de ánimo, emociones o la conducta previa; b) del entorno social o sociodemográficas, como la edad, el sexo, la educación, los ingresos, la religión o cultura; y c) de información como el conocimiento previo a través de diversas fuentes (Fishbein y Ajzen, 2010). Se consideran "externas" porque su influencia tanto en la intención como en la conducta siempre será a través de las creencias. De forma consecuente, el objetivo de cualquier intervención basada en la TAP, será el cambio de las creencias "salientes" en relación con la ejecución de un comportamiento dado. Las personas pueden tener muchas creencias pero las realmente determinantes serán las rápidamente accesibles en nuestro sistema cognitivo.

2.5.2. Aplicación de la TAP al ejercicio físico

La TAP ha mostrado capacidad predictiva tanto en el contexto del ejercicio físico en general (Hagger et al., 2002; Symons-Downs y Hausenblas, 2005; Vallance et al., 2011) como en andar en particular (Darker et al., 2010; Galea y Bray, 2006; Rhodes, Brown y Mclntyre, 2006). En relación con la *intención* para realizar ejercicio físico, la varianza explicada por los tres constructos antecedentes es de una media del 44.5% (Hagger et al., 2002). Con respecto a la *intención* de andar en poblaciones con problemas de salud crónicos, en un estudio con pacientes con el síndrome de claudicación intermitente o "síndrome del escaparate" (afección vascular que reduce el flujo sanguíneo y el oxígeno en los músculos activos durante la actividad de andar y que provoca dolor en las piernas), la varianza explicada fue del 67%, siendo la *actitud* y la *percepción de control comportamental* predictores significativos, además de que la percepción de control fue el predictor más potente de la conducta (Galea y Bray, 2006). En la literatura revisada, sólo hemos identificado dos investigaciones que apliquen esta teoría al ejercicio físico o a andar en personas con dolor crónico además del artículo arriba comentado: en 2001 se realizó un estudio de pacientes con fibromialgia, en donde los constructos de la TAP explicaron el 32% de la varianza en la intención de realizar ejercicio físico en general (Doyle-Baker, 2001) y en un trabajo del 2012, tanto la *percepción de control comportamental* como la *intención,* fueron predictores significativos de andar en una muestra comunitaria con dolor crónico, con un 29% de varianza explicada (Dixon, Johnston, Elliot y Hannaford, 2012).

En los diferentes trabajos empíricos y revisiones en el contexto del ejercicio físico, la *actitud* y la *percepción de control* aparecen como mejores predictores de la *intención* que la *norma subjetiva* (Hagger et al., 2002, Symons-Downs y Hausenblas, 2005) y, en relación con la conducta, tanto *intención* como *percepción de control* han mostrado su capacidad predictiva (Symons-Downs y Hausenblas, 2005).

Por tanto, la TAP se configura como una teoría útil sobre la que basar las intervenciones para cambiar conductas relacionadas con la actividad y el ejercicio físico (Conner y Sparks, 2005; McEachan, Conner, Taylor y Lawton, 2011). Se ha demostrado que sus constructos son eficaces para trabajar la motivación de las personas para realizar la conducta (Kwan y Bryan, 2010; Lin, Lee, Modeste y Johnson, 2012).

Para aplicar una intervención basada en la TAP, los autores proponen realizar la llamada "formative research" (Fishbein y Ajzen, 2010) que consiste en dos fases. En la primera, se realiza un estudio con cuatro objetivos: identificar las creencias modales

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salientes en una población, conocer la situación de la muestra en relación con el comportamiento objeto de intervención, probar los ítems diseñados para las medidas de variables predictivas de la teoría (actitud, norma subjetiva y percepción de control) y probar las relaciones entre los constructos predictivos y la conducta previa como un indicador de la conducta futura (Fishbein y Ajzen, 2010). A partir de estos resultados, se elabora un cuestionario que, en la segunda fase, se aplica a una muestra representativa de la población objeto de estudio.

A pesar de la extensa literatura donde la TAP se ha utilizado para predecir la actividad física y otros comportamientos relacionados con la salud, sobre todo en población general, existe una escasez de estudios experimentales (French, Darker, Eves y Sniehotta, 2012; Hardeman et al., 2002). La TAP se ha utilizado principalmente para predecir la intención y la conducta y no tanto para desarrollar intervenciones dirigidas a cambiarlas (Darker et al., 2010; De Bruijn y Rhodes, 2011; Hagger et al., 2002; Symons-Downs y Hausenblas, 2005). Una posible razón de esto es que aunque la TAP ayuda a identificar las creencias fundamentales en las que centrar las intervenciones, no se proporcionan directrices sobre cómo cambiarlas (Norman y Conner, 2005). Cuando se utiliza la TAP con el objetivo de promover el cambio conductual, es imprescindible desarrollar un estudio de identificación de creencias sobre la conducta objetivo en la población de interés, ya que sobre ellas se centrará la intervención. Estas creencias siempre son específicas, es decir, varían según la conducta y la población que se esté estudiando (Ajzen y Fishbein, 1980; Fishbein y Ajzen, 2010).

Por lo tanto, para desarrollar una intervención con el fin de aumentar tanto la intención como la conducta de andar de forma no supervisada y con el objetivo de hacer ejercicio físico en mujeres con fibromialgia, será necesaria la exploración e identificación de las creencias modales salientes de esta población respecto de la ejecución de la conducta objeto de estudio.

Sin embargo, como hemos apuntado en apartados anteriores, tener la intención de realizar una conducta no siempre implica su ejecución efectiva. La intención es una condición necesaria, pero no siempre suficiente. Esta cuestión se ha popularizado en la literatura revisada como el “gap” o la “brecha” intención-conducta (Rhodes y De Bruijn, 2013a, 2013b). Las intenciones de implementación (Gollwitzer, 1999) surgen como una técnica para reducir ese “gap”, ayudando a materializar las *intenciones de meta* (o *intención conductual* según la TAP) en comportamientos concretos. Las intenciones de implementación son planes que especifican cuándo, dónde y cómo se va a llevar a la acción una meta propuesta o cómo se va a superar una dificultad, uniendo una situación crítica (componente *"si",* relacionado con una oportunidad o un obstáculo anticipado) con una conducta dirigida a la meta (componente "*entonces*"). Estos planes están formados en función del estado final con cuya realización el individuo se siente comprometido y han mostrado un efecto entre moderado y alto en el logro de metas (Gollwitzer y Sheeran, 2006). El vínculo "*si*…*entonces*…" actúa a través de dos procesos: 1) La creación de un vínculo mental entre la situación crítica especificada y la conducta dirigida a la meta, que hace que la representación mental de la situación crítica se active y sea altamente accesible, y 2) La automatización de la respuesta dirigida a la meta. Así, este vínculo delega en la situación crítica el control de la conducta dirigida a la meta y los esfuerzos dirigidos a la misma se inician de forma inmediata en presencia de la situación especificada, sin requerir un intento consciente y sin consumo de recursos cognitivos (Gollwitzer, 1999; Schweiger-Gallo y Gollwitzer, 2007a, 2007b; Schweiger-Gallo, De Miguel, Rodríguez-Monter, Álvaro y Gollwitzer, 2009). En el contexto del

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ejercicio físico, han resultado útiles para facilitar la transición intención-conducta (Bélanger-Gravel, Godin y Amireault, 2013; Norman y Conner, 2005).

En población general, la combinación de las técnicas motivacionales utilizando la TAP y técnicas volitivas con intenciones de implementación o con planes de acción, ha resultado eficaz para aumentar el ejercicio físico de andar (Darker et al., 2010; French, Stevenson y Michie, 2012; Milne, Orbell, y Sheeran, 2002; Preswitch, Lawton y Conner, 2003). Sin embargo, no hay trabajos que muestren su eficacia en poblaciones con problemas físicos que pueden afectar directamente a esta conducta como es el caso del dolor crónico o de la fibromialgia.

La presente tesis se enmarca en una investigación más amplia sobre el estudio del dolor crónico y de la fibromialgia desde las aproximaciones teóricas de la psicología social y la psicología de la salud. El objetivo general de dicha investigación es aumentar una pauta terapéutica de ejercicio aeróbico moderado (andar) en mujeres con fibromialgia, identificando los procesos motivacionales y conductuales que pueden explicarla. Para ello, se diseñó un estudio en dos fases (Fase I: identificación de la población objeto de intervención y de los predictores de la conducta seleccionada siguiendo la TAP como estructura teórica de referencia; y la Fase II: el diseño, la aplicación y el análisis de los efectos de una intervención motivacional (basada en los resultados de la Fase I) y volitiva sobre esa conducta (*andar como mínimo 30 minutos con un pequeño descanso a los 15 minutos, al menos dos veces por semana durante un mes y medio consecutivo*). El trabajo que se desarrolla a continuación corresponde a la Fase I de la investigación y se estructura en torno a cinco estudios secuenciados que constituyen la tesis que se presenta.

3. OBJETIVOS

En relación con la conducta de andar con el objetivo de hacer ejercicio físico, cumpliendo determinadas condiciones (tiempo y frecuencia mínima semanal, consideración de descansos y mínimo de semanas consecutivas en las que mantener esa pauta para obtener beneficios en resultados de salud) y en personas con fibromialgia en un contexto comunitario, la tesis que se presenta tiene como *objetivo general* identificar la población objeto de intervención y los predictores de la conducta seleccionada (*andar al menos 30 minutos, con un pequeño descanso a los 15 minutos, al menos dos veces por semana durante el próximo mes y medio como mínimo*) siguiendo la TAP como estructura teórica de referencia.

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Los *objetivos específicos* (Figura 4) son:

1) identificar y caracterizar a la población con fibromialgia de un contexto comunitario sobre la que se va a intervenir,
2) identificar el grado de adhesión a andar y sus variables moderadoras, en intervenciones que incluyen este ejercicio para fibromialgia,
3) identificar la prevalencia de la pauta seleccionada de andar en personas con fibromialgia así como sus predictores,
4) identificar las creencias sobre la ejecución individual de la conducta seleccionada, utilizando la TAP como estructura teórica,
5) elaborar un cuestionario basado en la TAP para evaluar la conducta de andar con el objetivo de realizar ejercicio físico, la intención de realizarla y sus determinantes inmediatos,
6) identificar y explorar el papel de los predictores de la intención conductual de andar para hacer ejercicio físico considerando los constructos de la teoría

y otros relevantes para la ejecución de actividades en problemas de dolor como el estado de salud y el miedo al movimiento y, finalmente,

7) identificar y explorar el papel de los predictores de la conducta de andar para hacer ejercicio físico, considerando los constructos de la teoría y otros relevantes para la ejecución de actividades en problemas de dolor como el estado de salud y el miedo al movimiento.

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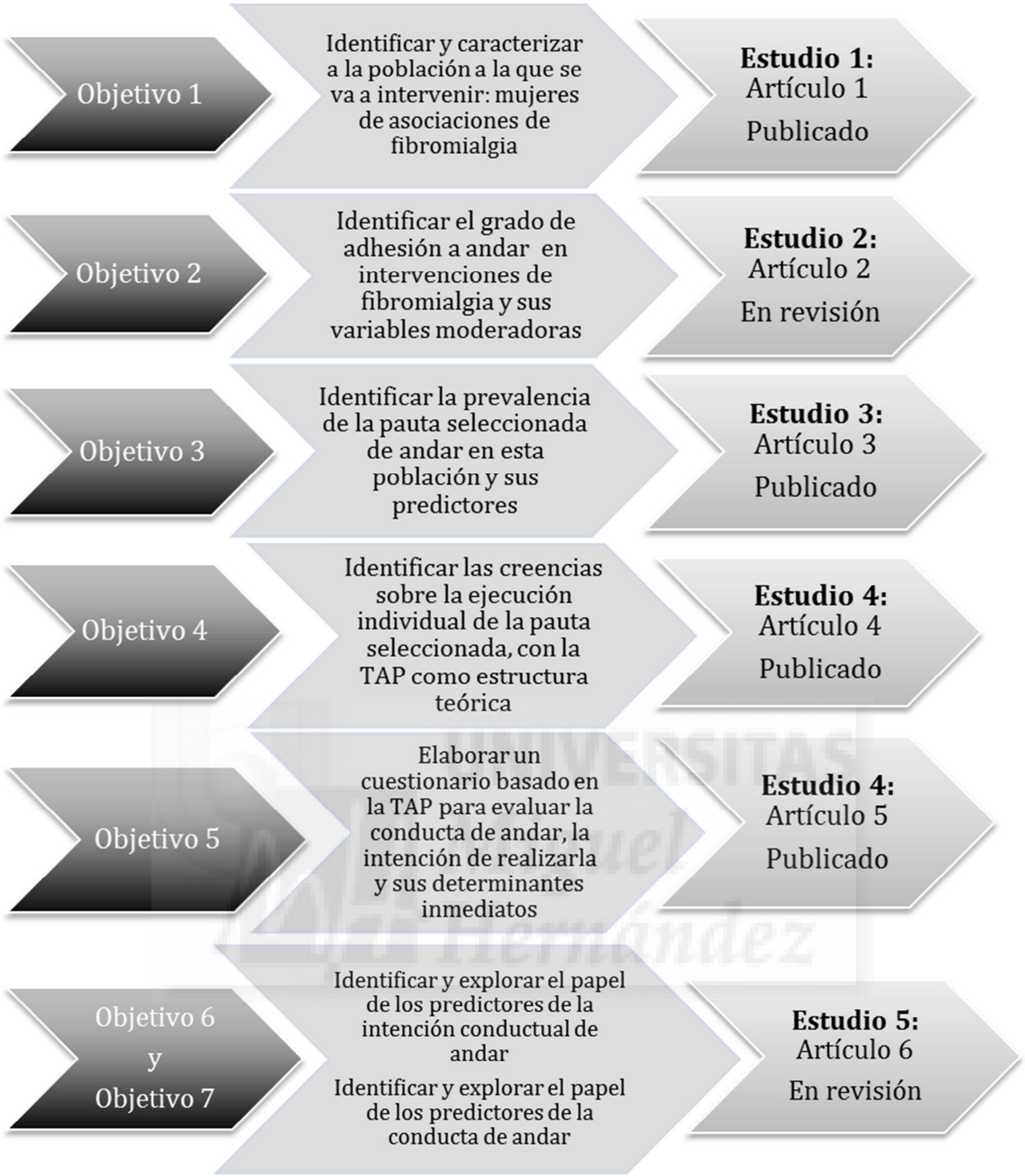

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Figura 4. Relación de objetivos con los estudios y artículos realizados.

4. METODOLOGÍA

En este apartado, se desarrollarán cuestiones metodológicas generales relacionadas con los diferentes estudios ya que en cada uno de ellos se explica con mayor detalle los aspectos relevantes relacionados con este punto.

En relación con los/las *participantes*, de una población de 2438 personas pertenecientes a cuatro asociaciones de fibromialgia de Elche, Alicante, Madrid y Talavera de la Reina, aplicando los criterios de inclusión expuestos en el Estudio 1 (mujeres pertenecientes a las mencionadas asociaciones de fibromialgia de entre 18 y 70 años), seleccionamos a 2227 de las cuales finalmente participaron 920 mujeres. Esta constituyó nuestra población de referencia a partir de la cual seleccionamos la población elegible (n= 582) considerando los criterios expuestos en el Estudio 3 (mujeres con recomendación médica para andar y, aunque tengan comorbilidades: a) no andan pero pueden hacerlo o b) andan por debajo de lo establecido en la conducta seleccionada. De esta población, seleccionamos al azar la muestra necesaria para: 1) el Estudio 4 que incluye el análisis de creencias y la elaboración del cuestionario TAP (n= 50) al que acudieron 46 de ellas (92%) y 2) la muestra para el Estudio 5 (n= 276) (Figura 5).

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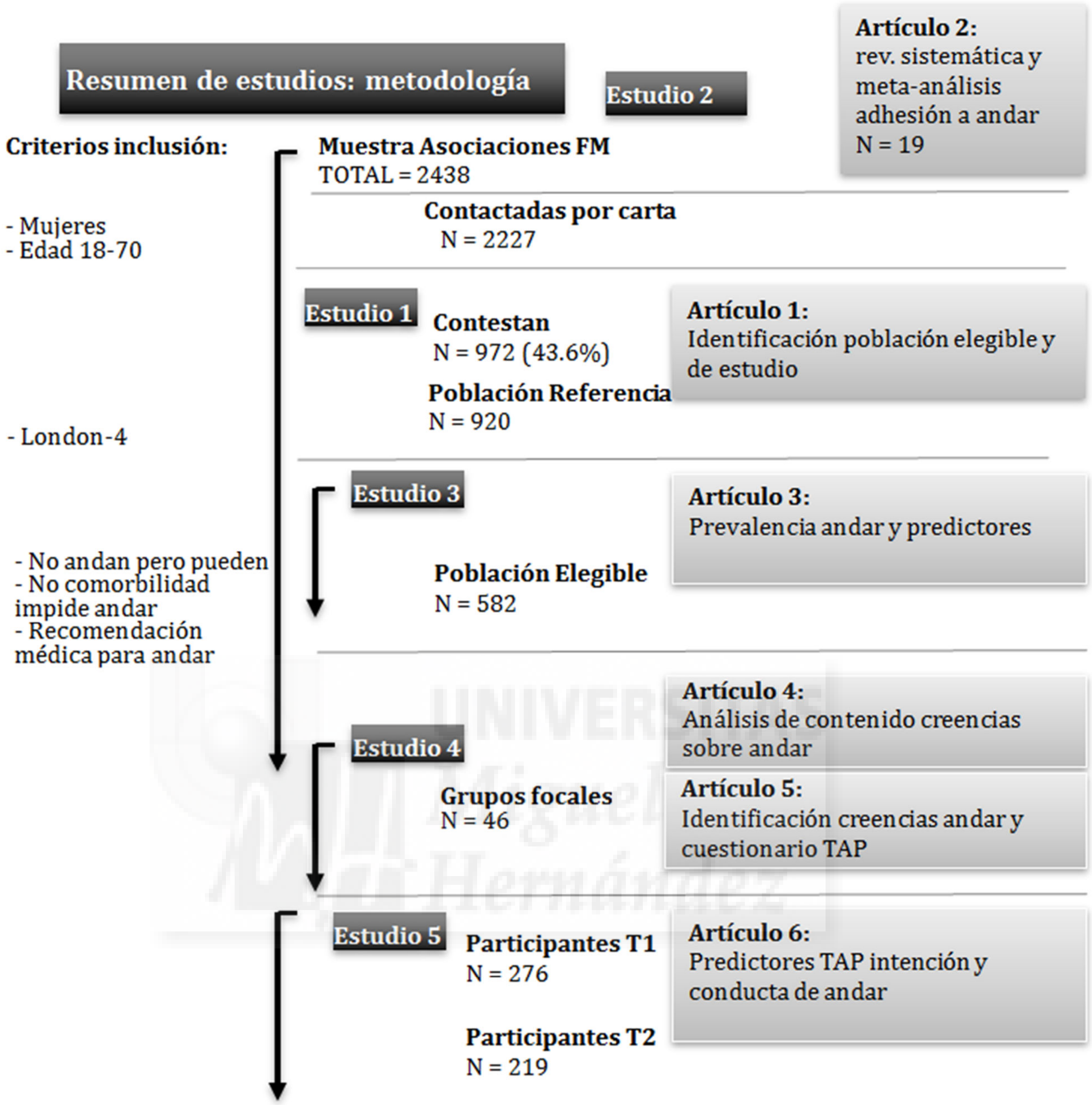

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Figura 5. Resumen metodología de los estudios y artículos realizados.

En todos los estudios se utilizaron análisis descriptivos y el programa estadístico de referencia fue el IBM SPSS 21. Además, en el Estudio 1 se realizaron análisis de diferencias con pruebas paramétricas y no paramétricas (análisis de varianza, pruebas t, X^2) para la caracterización de la población de referencia y de estudio. En el Estudio 2, se aplicaron los coeficientes kappa de Cohen y correlación intraclase para comparar los datos revisados entre codificadoras y para el meta-análisis de los estudios seleccionados, se asumió un modelo de efectos aleatorios, se hicieron ANOVAS ponderados, pruebas de heterogeneidad y meta-regresiones simples (con el programa Comprehensive Meta-analysis 3.3). En los Estudios 3 y 5, se utilizaron análisis de regresión con el objetivo de identificar y explorar los predictores de la intención y conducta de caminar. En el primer caso, regresión logística (binaria y ordinal) y, en el segundo, múltiple y logística. Finalmente, en el Estudio 4, se realizaron dos trabajos: un análisis temático (con el programa NVivo 10) con los resultados de los grupos focales para explorar las creencias sobre andar de las mujeres con fibromialgia (Artículo 4) y un análisis de identificación de las creencias modales con análisis de ítems y correlaciones para analizar las propiedades del cuestionario de evaluación basado en la TAP (Artículo 5) (Figura 5).

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4.2. Procedimiento

En cada estudio se detalla el procedimiento seguido. En todos ellos se utilizaron cuestionarios administrados en formato grupal. Además, en el Estudio 4 se organizaron grupos focales que fueron grabados para su posterior análisis y en el Estudio 5 una parte de las participantes llevaron un podómetro durante el período especificado en la pauta de ejercicio andando (6 semanas). La aportación individual de la doctoranda en los estudios se detalla al final de cada uno de ellos.

5. ESTUDIOS

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5.1. Estudio 1: Identificación y caracterización de la población objeto de la intervención.

Artículo 1

Combining motivational and volitional strategies to promote unsupervised walking in patients with fibromyalgia: study protocol for a randomized controlled trial.

AUTHORS

María-Ángeles Pastor[1,], Sofía López-Roig[1], Ana Lledó[1], Cecilia Peñacoba[2], Lilian Velasco[2], Inge Schweiger-Gallo[3], Margarita Cigarán[2], Carmen Écija[2], Ramón Limón[4] and Yolanda Sanz[1]

[1]Department of Health Psychology, Universidad Miguel Hernández, Sant Joan d'Alacant.

[2]Department of Psychology, Universidad Rey Juan Carlos, Madrid.

[3]Department of Social Psychology, Universidad Complutense, Madrid.

[4]Servicio de Medicina Preventiva y Calidad Asistencial. Hospital de la Plana, Castellón.

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ABSTRACT

Background: Fibromyalgia patients are often advised to engage in regular low- to moderate-intensity physical exercise. The need of fibromyalgia patients to walk has been stressed in previous research. Behavioral self-regulation theories suggest that a combination of motivational aspects (to develop or strengthen a behavioral intention: Theory of Planned Behavior) and volitional aspects (engagement of intention in behavior: implementation intentions) is more effective than a single intervention. In this paper, we describe a protocol for identifying the motivational processes (using the Theory of Planned Behavior) involved in the practice of walking (phase I) and for studying the efficacy of an intervention that combines motivational and volitional contents to enhance the acquisition and continuation of this exercise behavior (phase II). The paper also shows the characteristics of eligible individuals (women who do not walk) and ineligible populations (women who walk or do not walk because of comorbidity without medical recommendation to walk). Both groups consist of members of any of four patients' associations in Spain who are between 18 and 70 years of age and meet the London Fibromyalgia Epidemiology Study Screening Questionnaire criteria for fibromyalgia. Furthermore, using this study protocol, we will explore the characteristics of participants (eligible women who agreed to participate in the study) and nonparticipants (eligible women who refused to participate).

Methods/Design: Two studies will be conducted: Phase I will be a cross-sectional study, and phase II will be a triple-blind, randomized longitudinal study with two treatment groups and one active control group. The questionnaires were sent to a total of 2,227 members of four patients' associations in Spain. A total of 920 participants with fibromyalgia returned the questionnaires, and 582 were ultimately selected to participate.

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Discussion: The first data gathered have allowed us to identify the characteristics of the study population and they support the appropriateness of the inclusion criteria.. When the study is complete, the results will enable us to establish whether this kind of intervention can be used as a self-regulation tool for increasing and maintaining walking as unsupervised physical exercise of low to moderate intensity in fibromyalgia patients.

Trial registration: Trial registration number: ISRCTN68584893

Keywords: Fibromyalgia, Implementation intention, Intervention, Theory of planned behavior, Walking

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INTRODUCTION

Fibromyalgia (FM) is a complex chronic condition characterized by widespread musculoskeletal pain, fatigue, sleeping problems and other symptoms with no well-established etiology. Physical exercise is a component of effective treatment [1], and aerobic exercise in particular has been shown to lead to improvements in various health outcomes [2-7]. To the best of our knowledge, most studies conducted to date have included supervised physical exercise programs, which are often associated with low patient adherence [8-12]. In fact, one of the main challenges in FM treatment is achieving long-term adherence to maintain the positive effects of physical exercise on patients' health [10,13]. Some authors have suggested that adherence represents a main issue and should be a mandatory focus in studies of physical exercise [6]. Walking is a low- to moderate-intensity exercise which has been shown to have positive effects on FM patients' health status [4, 14-15] and is a well-established aerobic activity for these patients [10]. It is also a simple recommendation that promotes patients' self-management.

Any behavior, such as walking, is more likely to be practiced if people are motivated and develop strategies to engage in it. In the general population, combining motivational and volitional interventions to increase physical exercise or walking are more effective than initiating and promoting each of them separately [16-20]. Motivational intervention encourages individuals to form an intention, and volitional intervention encourages them to form a plan stating when, where and how they will carry out their intention (implementation intentions). In FM patients, however, this combination has not been tested. It is important to examine this issue in this population because the presence of symptoms such as pain and fatigue, which are associated with

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FM, could affect walking behavior. Furthermore, these symptoms may influence both motivational and volitional processes for starting and maintaining walking behavior in FM patients, which is not the case in the general population. Recently, Ang *et al.* [21] applied an intervention using motivational interviewing to increase supervised walking in FM patients. As these authors underlined, this strategy is not based on any specific theory of health behavioral change. In spite of the good results in the short-term, they concluded that motivational interviewing alone is insufficient to increase physical activity in the long term. These results support the importance of using volitional strategies as well as basing the intervention on well-established theories of health behaviors.

The Theory of Planned Behavior (TPB) [22-24] is a well-established theory in health behavior and has been shown to have predictive power regarding walking and physical exercise [25, 26]. In FM patients, TPB constructs (see the "Interventions" subsection below) explained 32% of the variance in the intention to exercise [27]. However, a strong behavioral intention is necessary, but not sufficient, to implement action. The implementation intentions are a theoretical proposal that focuses on the gap between intention and action [28]. Implementation intentions are specific plans that enhance the transition of goal intentions into actions. Motivation is the starting point for behavioral change and volitional strategies, based on implementation intentions, to increase the likelihood of this change [18]. Once the behavior is started, the processes associated with implementation intentions (automatic activation of the behavior when environmental cues are present) are expected to promote maintenance of the behavior because it neither consumes cognitive resources nor produces ego depletion as other self-regulation processes do. Moreover, we expect that the benefits on health status associated with walking behavior will also promote its maintenance in the long term. In other populations and behaviors, the implementation intentions approach has produced better long-term behavioral change [29]. Thus, we expect to find similar effects in our FM population.

Applying both theories to promote behavioral change in FM is expected to allow us to cover two basic processes: (1) the adoption or strengthening of behavioral intentions (motivational process) and (2) their effects on behaviors (volitional or postmotivational process). In the FM context, some special features, such as pain, health status impact and fear of movement, should also be considered [30]. These factors can influence both the intention to exercise and the exercise behavior itself. In fact, some factors have been observed to be barriers to walking (MAP, SLR, YS, CP, LV, MC, AL and CE, unpublished manuscript). Not taking these factors into account has been considered a limitation of previous studies [21].

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To increase walking as unsupervised physical exercise, it is important to test whether an intervention which includes motivational strategies (intentions) and volitional strategies (implementation intentions) will be effective. This paper describes the two phases of a protocol. In phase I, we will identify the motivational processes involved in intentions of performing a recommended walking pattern in FM patients, using the TPB and considering the above-mentioned specific FM factors. In phase II, to establish the efficacy of an intervention that combines both motivational processes (based on the results of phase I) and volitional processes to enhance the short-, medium- and long-term adherence to a walking program.

This paper also describes the characteristics of eligible populations (women belonging to FM associations, between 18 and 70 years of age, meeting the London Fibromyalgia Epidemiology Study Screening Questionnaire criteria (London-4) (see http://www.aafplearninglink.org/Resources/Upload/File/AAFP-10-106-London%20Screening-09-07-10.pdf) for FM and unable to walk) and noneligible populations (same characteristics mentioned above, but either able to walk or do not walk because of comorbidity without medical recommendation for walking). This aim is needed to test the similarities between both populations in order to ensure the external validity of the study. We will also explore the characteristics of participants (women from the eligible population who agreed to participate in the study) and nonparticipants (women who refused to participate).

METHODS/DESIGN

This study has been approved by the Research Ethics Board of the Miguel Hernández University, and we obtained informed consent from each participant. Furthermore, participants signed a commitment of confidentiality regarding the content of the assigned treatment.

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Description of the overall project

The study consists of two phases, both based on the same population.

Phase I, conducted over the course of 1 year, is a cross-sectional study with two measurement stages and the following three aims:

1) We will seek to gain access to the reference population, identify the eligible population, select the study population and identify the prevalence of our selected walking criteria (stage 1). The results of stage 1 are included in this paper.
2) We will seek to identify the predictors of the behavioral intention to carry out the selected walking program using the TPB and exploring the role of pain, impact of FM and fear of movement (stage 2).

3) We will seek to explore the concordance of walking behavior measurements (subjective and objective measures) (stage 2).

Phase II, which will be conducted over the course of 2 years, is an experimental, randomized, triple-blind study with two treatment groups and one active control group. Longitudinal measures will be taken at baseline and at 7 weeks, 3 months and 9 months of postexperimental intervention. One group will receive a motivational plus implementation intentions intervention (MIG), a second group will receive only an implementation intention intervention (IG) and the control group (CG) will be given a neutral task related to postural hygiene. The three groups will receive the same information on the benefits of physical exercise in FM. Motivational intervention will be based on the predictors of behavioral intention as measured and identified in phase I (stage 2) in order to create or strengthen the behavioral intention during the experimental study.

This triple-blind study includes masking of the following groups in the manner described. Participants will know only that there are different intervention sessions but will not know the session contents; moreover, they will be unaware of the assumptions regarding the superiority of one intervention over another. Measures will be taken by researchers who do not participate in the treatment application and who are blinded to the experimental conditions. The statistician will also be blinded to the study protocol. The researchers who apply implementation intentions will also be blinded with respect to the MIG or IG experimental condition. In this phase, we aim to study the efficacy of the MIG intervention on unsupervised walking over the short term (7 weeks), medium term (3 months) and long term (9 months). The measurement at 7 weeks will be taken during the week after completion of the 6-week minimum walking program. We will base the selection of the medium- and long-term measurements on the assumption that the highest percentage of dropouts occurs between 3 and 6 months in supervised physical exercise programs [8, 9]. On the day of the intervention, a researcher will be responsible for the distribution of the participants into the three different treatment groups following random assignment. The researcher will remind participants of their confidentiality commitment.

Our main hypothesis is that a combined intervention (both motivational and volitional) will significantly increase walking behavior in comparison to the control group and that this effect will be higher than that in a merely volitional intervention in the short term and stable in the medium and long term.

Our selected walking pattern for FM patients is between two and four times weekly for about 50 minutes in bouts of 15 to 20 minutes, with a small rest between bouts to allow patients to avoid fatigue and continue the activity, for a minimum of six consecutive weeks [31]. We chose this pattern because it includes several components which will encourage FM patients to do unsupervised physical exercise. Walking is an accessible, cheap and flexible activity; it includes resting; and it requires minimal time, which aids habit acquisition. Although we selected this pattern, we reduced the minimum daily time to 30 minutes (in two bouts of 15 minutes each) and at least two times weekly because our target population is sedentary. In addition, patients will be advised to start physical exercise gradually [10,11], beginning with a low, comfortable intensity according to differences in physical capacity [4]. It is well known that FM patients can benefit from low-intensity walking programs 2 or 3 days per week [32]. Moreover, 30 minutes of continued physical activity has also been shown to have positive effects on health in the general population [33].

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Study population and recruitment process

The fibromyalgia associations of Alicante (ADEFA), Elche (AFEFE), Madrid (AFIBROM) and Talavera de la Reina (AFIBROTAR) collectively comprise a total of 2,438 members with a clinical diagnosis of FM (75.8% diagnosed by rheumatologists, 9.2% by general practitioners, 5.3% by traumatologists, 2.2% by clinical rehabilitation specialists, 0.7% by neurologists and 6.7% by clinicians in other specialties). Slightly more than half (51.4%) of the sample are receiving psychological treatment because of FM. To select our reference population (women between 18 and 70 years of age who meet the London Fibromyalgia Epidemiology Study Screening Questionnaire criteria for fibromyalgia (London-4), we first used the associations' records to select the members who met the two first criteria (n = 2,227). We then sent letters to these 2,227 women with information about the study, together with informed consent forms, the London Fibromyalgia Epidemiology Study Screening Questionnaire [34, 35] and other questionnaires covering the remaining variables related to the sample characteristics and participation criteria. As we do not have a second clinical diagnosis confirmation, 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 FM screening population studies and good positive predictive values for women in rheumatology settings [35].

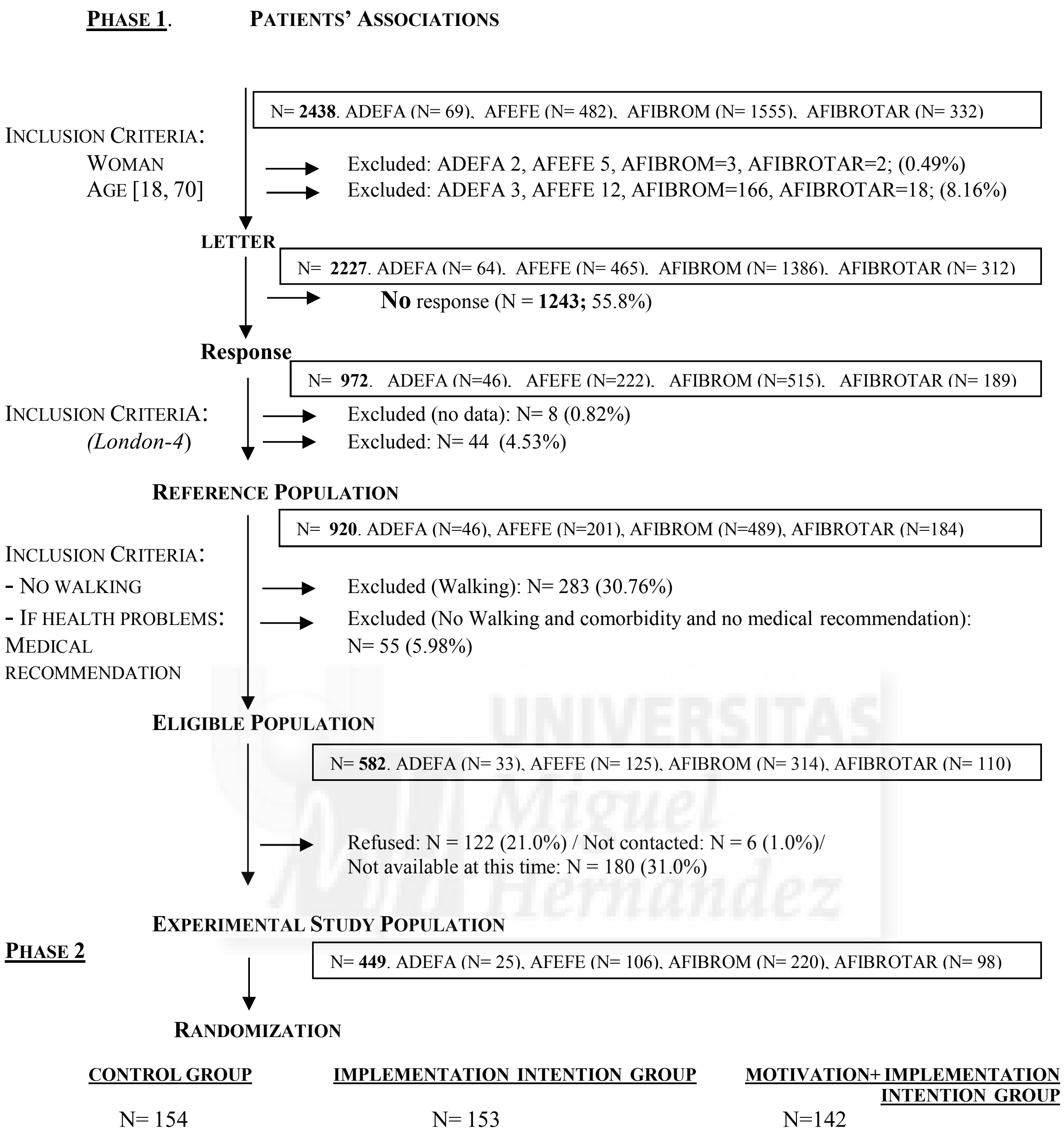

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***Figure 1* Flowchart of the participant recruitment process.** ADEFA: Fibromyalgia Association of Alicante; AFEFE: Fibromyalgia Association of Elche; AFIBROM: Fibromyalgia Association of Madrid; AFIBROTAR: Fibromyalgia Association of Talavera de la Reina (Toledo); London-4: London Fibromyalgia Epidemiology Study Screening Questionnaire criteria for fibromyalgia.

A total of 972 questionnaires (43.5%) were returned in two runs. The eligibility criteria were then applied, and our selected reference population subsequently consisted of 920 members with FM (44 did not fit the London-4 criteria and 8 questionnaires did not contain enough data). The remaining criteria were that the individual did not walk or the walking pattern did not comply with one or more features of the selected walking program, the individual was without comorbidity which impeded walking or, if there was comorbidity, the individual had received medical advice to walk. A total of 582 members (63.3%) satisfied these criteria. Figure 1 is a flowchart of the participant recruitment process.

Sample size calculation

We calculated the sample size for the experimental study by taking into consideration the 582 FM participants previously identified as the eligible population derived from the different associations: ADEFA (*n* = 33, 5.7%), AFEFE (*n* = 125, 21.5%), AFIBROM (*n* = 314, 54.0%) and AFIBROTAR (*n* = 110, 18.9%). The expected differential increase in the selected exercise prevalence from baseline is 10% for CG, 20% for IG and 40% for MIG. Given the rule that the frequency of dropouts should not exceed the frequency of the effect, we expect a maximum dropout rate of 30% before random allocation. This percentage will be added to the calculated sample size. We have defined the risk α as 5% and the study power as 80%. The minimum magnitude of the expected effect (in relation to the effect on CG) is 10% for IG and 30% for MIG. After we apply these conditions and dividing the sample population into three experimental groups, each group will consist of 115 persons, which is equal to 345 participants. In previously reported supervised programs of moderate-intensity walking, adherence has ranged from 62% [14] to only 37.5% [32]. In other studies, the percentage of patients who finished the supervised program was greater than 70% to 80% [7, 36-40]. In other words, studies have shown that more than 20% to 60% of patients do not complete physical activity programs which include walking. Therefore, we added a 30% dropout rate as a reasonable calculation, which gives us a sample size of 449 women with FM.

Randomization

We used a computer program to randomize the three experimental groups and four fibromyalgia associations, taking into account the size of each center [41]. The 449 participants were allocated to the three experimental groups as follows: CG = 154, IG = 153 and MIG = 142 (Table 1). We applied another computer program to generate random sequences to select the participants from each fibromyalgia association for the experimental and control groups [42]. The randomization results will be checked by analyzing potential confounders such as walking patterns, physical activity, impact of FM, pain, emotional status and age (see the "Statistical analysis" subsection below).

Table 1. Randomized experimental group-center assignments[a]

	Assignment, *n* (%)			
Patient associations	CG	IG	MIG	Total
ADEFA	7 (28.0)	9 (36.0)	9 (36.0)	25 (100)
AFEFE	42 (39.6)	29 (27.4)	35 (33.0)	106 (100)
AFIBROM	73 (33.2)	87 (39.5)	60 (27.3)	220 (100)
AFIBROTAR	32 (32.7)	28 (28.6)	38 (38.8)	98 (100)
Total	154 (34.3)	153 (34.1)	142 (31.8)	449 (100)

[a]ADEFA: Fibromyalgia Association of Alicante; AFEFE: Fibromyalgia Association of Elche; AFIBROM: Fibromyalgia Association of Madrid; AFIBROTAR: Fibromyalgia Association of Talavera de la Reina (Toledo); CG: Control group; IG: Implementation intention group; MIG: Motivation and implementation intention group.

Interventions

In previous studies in the reviewed literature, we found that interventions for the promotion of walking have been heterogeneous and that no single method has proved to be more effective than others [33]. One of the main advantages of our study is that the intervention is based on two well-established theories for predicting behavior.

Following the procedures described in previous research [43, 44], all participants will receive information about the benefits of physical exercise in relation to their FM, and they will be asked to engage in the selected walking criteria. In addition, MIG participants will receive motivational interventions, and both the MIG and IG groups will receive information on the positive effects of making plans, specifying (1) days, (2) specific times of day, (3) location (for example, close to work, around the neighborhood) and (4) duration of the exercise (starting from the established minimum). Thus, they will be requested to write a specific individualized plan. The estimated duration of the intervention in each group is 90 minutes, conducted in only one group session with a maximum of 10 people. Figure 2 shows the schedule for the intervention day.

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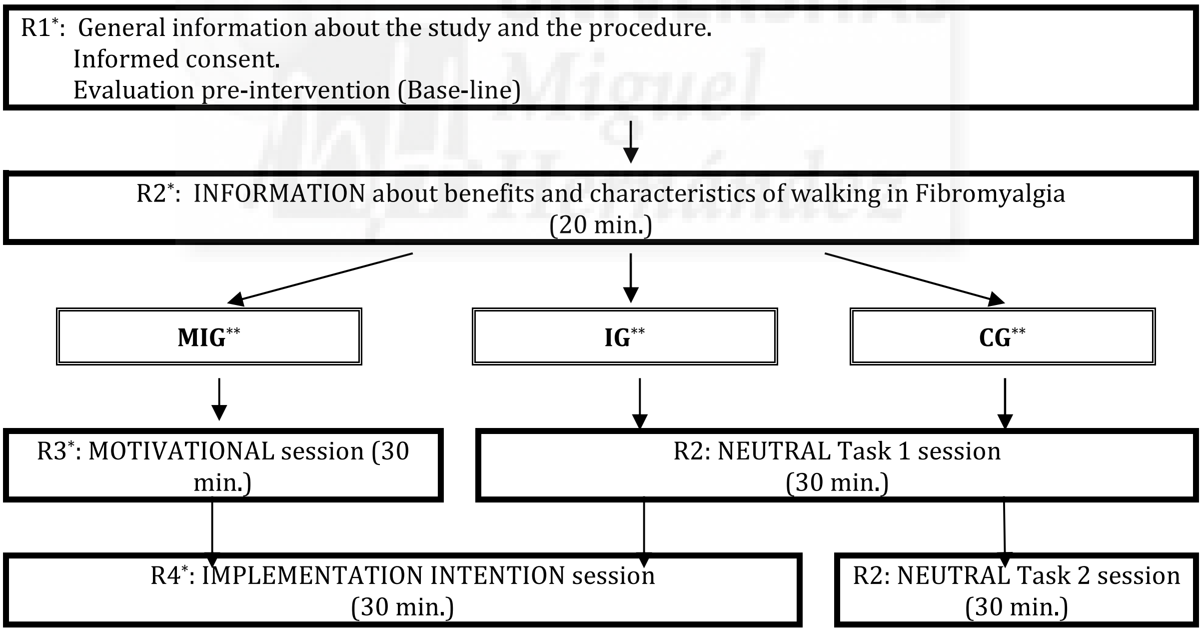

Figure 2 **Schedule for the intervention day. R1 is the researcher who gives general instructions** and distributes participants in each session. R2 is the researcher who gives information about walking to all participants and applies the control intervention. R3 is the researcher who applies the motivational intervention. R4 is the researcher who applies the implementation intention intervention and is blinded to participants' previous experiment condition (motivational or neutral). MIG: Motivation and implementation intention group; IG: Implementation intention group; CG: Control group.

Motivational intervention

The aim of the motivational intervention is to ensure strong behavioral intention. The TPB [24] establishes that the behavioral intention (that is, the readiness to perform a specific behavior) is determined by the person's attitude toward the behavior (the positive or negative global evaluation of performing the specific behavior), the subjective norm (the social pressure perception of engaging in the behavior or not) and the perceived behavioral control (the perception that the behavior is under the person's control). Attitudes, subjective norms and perceived behavioral control are explained, respectively, by behavioral beliefs, normative beliefs and control beliefs (Figure 3).

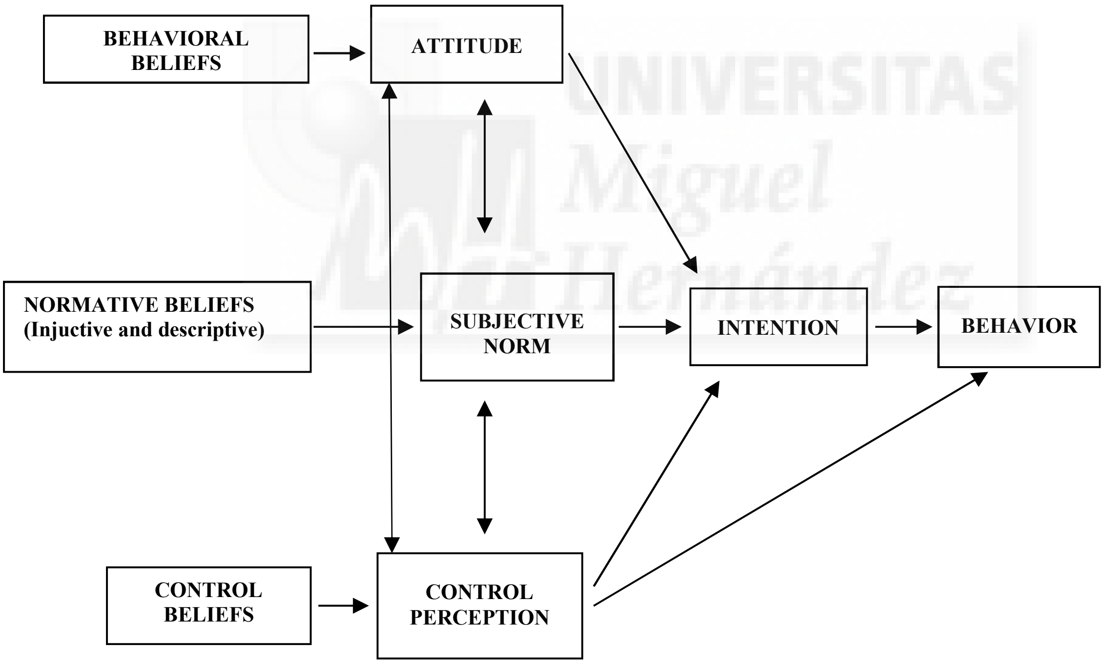

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Figure 3: Schematic illustrating the Theory of Planned Behavior**.**

In the TPB, beliefs represent the substantive information available to guide people's decisions with regard to their behavioral performance. Thus, we will target a modification of participants' beliefs in order to achieve a change with regard to the intention. The motivational intervention will be designed to produce changes in the behavioral, normative or control beliefs associated with the predictors of the behavioral intention (stage 2 of phase I of the research). With regard to the physical exercise behavior, attitude and control perception have been found to be the main predictors of the intention to engage in exercise [25-27]. However, the TPB establishes that the relative weight of each predictor (and consequently the targeted beliefs) changes if the specific behavior changes. In fact, with regard to walking, the control perception has more weight than attitudes [16]. This situation could differ in people with a chronic health problem such as FM. Therefore, it is necessary to explore the particular predictive relationships between the targeted walking behavior and the specific population [24].

A specific proposal for a brief intervention based on the TPB for interventions on walking was recently published [45]. The authors propose several steps for the intervention, such as the identification of the target constructs, the elicitation of key salient beliefs underpinning these constructs and the selection of appropriate behavior change techniques. We followed these recommendations, and phase I (stage 2) of the study is focused on the identification of the target constructs and the salient beliefs through an exploration of the TPB predictors of walking behavior. The beliefs associated with these predictors will be used to enhance intention by implementing writing and imagery techniques. Strategies such as a graded activity will be implemented [46] as soon as we establish the role of pain, FM impact and fear of movement on the behavioral intention in the whole group.

Volitive intervention: implementation intentions

Implementation intentions are “if–then” plans that specify when, where and how a goal will be achieved, linking a critical situation (the “if” component) with a goal-

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directed behavior (the “then” component) [28]. Implementation intentions are hierarchically subordinated to goal intentions (in this study, the behavioral intention)). Implementation intentions have been shown to have a moderate to strong effect on goal attainment [47].

We expect participants in the MIG and IG groups to be able to use their plans to adjust their walking activity to the circumstances they have foreseen and specified. We will focus these plans on the management of the inhibitors of the walking behavior, which we will have previously identified in stage 2 of phase I (control beliefs). As has been shown in previous research [48, 49], participants can regulate their emotional responses through attentional implementation intentions (for example, to ignore some stimuli) or by specifying their desired behavioral and emotional responses (for example, to be calm or relaxed). Participants form their plans individually, and, in order to facilitate the internalization and memorization of these plans, they will be requested to write the specific implementation intentions on a sheet of paper and place it in a visible location at home. A copy of the sheet will be given to the research team so that the team can perform the follow-up on the specific goals. This will be the last intervention of the day, and the researcher who conducts this session will ask participants to carry on with the task until they finish.

Measures

Phase I (first year)

In the first year of the study, measurements of physical activity, walking behavior, TPB variables, fear of movement, pain, FM impact and emotional status will be taken. All questionnaires will be self-administered by the participants. A summary of variables and schedules in this phase is shown in Table 2.

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Table 2. Measures taken and schedule during phase I[a]

		Schedule[b]		
			Stage 2	
Variables	**Instrument**	**Stage 1**	**Time 1**	**Time 2 (week 7)**
Walking behavior				
Walking pattern	Ad hoc self-report scale	X	X	X
	Daily logs			X
Minutes spent walking in previous week	IPAQ walking	X	X	
Steps and distance	Pedometer			X
TPB variables	Ad hoc TPB questionnaire			
Behavioral intention			X	
Attitude			X	
Perceived norm			X	
Perceived behavioral control			X	
Behavioral beliefs			X	X[c]
Injunctive and descriptive beliefs			X	X[c]
Control beliefs			X	X[c]
Fear avoidance	Spanish adaptation of TSK		X	
Total physical activity	IPAQ–Spanish Short Form	X	X	
Intense physical activity		X	X	
Moderate physical activity		X	X	
Sitting		X	X	
Fibromyalgia impact	Spanish adaptation of FIQ		X	
Pain intensity	11-item numerical rating scale	X	X	
Emotional status: Distress	Spanish adaptation of HADS		X	

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[a]FIQ: Fibromyalgia Impact Questionnaire; HADS: Hospital Anxiety and Depression Scale; IPAQ: International Physical Activity Questionnaire; TPB: Theory of Planned Behavior; TSK: Tampa Scale for Kinesiophobia. [b]Women who attended the association or university laboratory for assessment. Daily logs and pedometer readings were taken at time 1. [c]For test–retest reliability.

Behavioral variables

To assess for behavioral variables, we will gather participants' self-reported information as outlined below.

1. *Spanish version of the International Physical Activity Questionnaire–Short Form (IPAQ-S)* [50]: The IPAQ-S is an instrument designed to assess physical activity among adults. It can be used as a tool in intervention studies, although it was not

designed for this purpose. There is a lack of self-report measures of physical activity designed for FM patients. In addition, the results obtained from well-established instruments in general populations are not good enough in FM patients [51]. However, the IPAQ-S was previously found to be better than other physical activity instruments in identifying sedentary patients with chronic fatigue syndrome [52]. We have chosen to use the IPAQ-S because of its Spanish translation; its short form, which is an advantage for our first mailed survey and for the FM population; and because it includes walking as a type of physical activity. The IPAQ-S allows respondents to record their sitting, walking, moderate-intensity and vigorous activities in minutes per week and calculate a total physical activity score. We will use the median minutes per week for each activity for assessment purposes. The rules for cleaning and correcting data will be applied [50]. In this phase, we will use the IPAQ-S to characterize our reference and study populations.

2. *Behaviors*: We will use four measures to assess walking behavior. First, we will use a self-report scale to assess the usual walking pattern to identify the study population. The scale consists of six questions designed to assess whether participants usually walk for physical exercise, how many minutes they walk daily, how many days per week they walk, how many consecutive weeks they walked, whether they took rests during walking and whether they had been advised to walk by their doctor.

Second, we selected the walking score from the IPAQ-S [50]) because it refers to the previous week of the assessment. It can thus provide a more accurate measurement than our general measures because of its proximity in time and because it can limit the influence of the participant's memory.

Third, we have designed weekly and daily logs to assess walking behavior over the course of 6 consecutive weeks. Daily logs include the days and minutes of walking and the duration of rest during the activity. In addition, participants score the perceived intensity of the activity using the Borg Rating of Perceived Exertion scale [53]. Participants will use a pedometer (3D USB Pedometer PDM-2608) to record the number of steps and distance covered over the same period.

These measures will be used to explore the agreement between subjective and objective measurements. We need to establish this agreement because the entire study population will use daily logs, but only half of them will use pedometers.

Motivational variables

To assess for motivational variables, we will gather participants' self-reported information as outlined below.

1. *TPB variables*: Behavioral intentions, attitudes toward behaviors, perceived norms, perceived behavioral control, behavioral beliefs, normative beliefs and control beliefs will be measured according to the TPB recommendations [24]. The questionnaire was tested in a previous study and showed good psychometric properties (MAP, SLR, YS, CP, LV, MC, AL and CE, unpublished manuscript). These measures will allow us to identify the predictors of behavioral intentions and consequently to modify or strengthen the beliefs upon which they are based during the motivational interventions.
2. *Fear of movement*: We will use the total score on the Spanish adaptation of the Tampa Scale for Kinesiophobia to measure fear of movement [54]. Patients will rate 11 items on a four-point Likert scale (from 1 = totally disagree to 4 = totally

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agree). This measure will allow us to explore the role of fear of movement in relation to behavioral intentions.

Health status variables

To assess for health status variables, we will gather participants' self-reported information as outlined below.

1. *Pain*: We will use the total score on an 11-point numerical rating scale (from 0 = "no pain at all" to 10 = "the worst pain you can imagine") adapted from Jensen *et al*. [55] to assess the maximum, minimum and usual pain intensity during the week prior to the evaluation and the pain intensity that moment. The scale has shown good psychometric properties in Spanish FM samples [56, 57].
2. *FM impact*: We will use the total score of the consensus version of the Spanish adaptation of the Fibromyalgia Impact Questionnaire (FIQ), which is valid and reliable [58].
3. *Emotional status*: The perceived total distress is measured with the Spanish adaptation [59] of the Hospital Anxiety and Depression Scale [60]. Patients rate 14 items on a four-point answer scale. This scale has been shown to be valid and reliable [59].

Our aim in assessing these variables is, on the one hand, to explore their role in behavioral intention and, on the other hand, to explore them as potential confounders.

Phase II (second and third years)

A summary of variables and the schedule of phase II is given in Table 3.

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Table 3. Measures and schedule of phase II[a]

Outcomes	**Instrument**	**Schedule** **Baseline**	**Week 7**	**Week 20 (3 months)**	**Week 43 (9 months)**
Primary					
Walking pattern	Ad hoc self-report scale	X	X	X	X
	Daily logs		X	X	X
Steps and distance	Pedometer[b]		X	X	X
Secondary					
Total physical activity	IPAQ	X	X	X	X
Intense physical activity		X	X	X	X
Moderate physical activity		X	X	X	X
Walking		X	X	X	X
Sitting		X	X	X	X
Physical function	Six-Minute Walk Test	X	X	X	X
FM Impact	FIQ	X	X	X	X
Pain intensity	Ad hoc scale	X	X	X	X
Emotional status: Distress	HADS	X	X	X	X
Mediators					
Behavioral intention[c]	TPB items	X	X	X	X
Implementation intentions[c]	Ad hoc items		X	X	X

[a]FIQ: Fibromyalgia Impact Questionnaire; HADS: Hospital Anxiety and Depression Scale; IPAQ: International Physical Activity Questionnaire; TPB: Theory of Planned Behavior. [b]Limit of recording is 60 days. [c]Also measured at the end of the intervention sessions.

Primary outcome measures

Two primary outcomes will be assessed as indicators of each intervention's effect on exercise adherence:

1. We will measure the proportion of participants who perform the full minimum walking criteria (at least 30 minutes in bouts of 15 minutes with a small rest between bouts, twice times weekly over a minimum of 6 consecutive weeks) at the end of the 6-week period and the proportion of participants who have maintained it at 3 and 9 months. The expected efficacy of MIG is 30% higher than CG and 10% higher than IG.
2. Among participants who perform the full minimum walking criteria, we will focus on the proportion who reach the recommended pattern for FM patients at

week 6 (between two and four times weekly for about 50 minutes in bouts of 15 to 20 minutes over a minimum of 6 consecutive weeks) [31].

We will use the same self-reported measurements of the behavior from phase I (*ad hoc* self-reported items and daily logs) and pedometer readings.

Secondary outcome measures

Six-Minute Walk Test (6MWT): The 6MWT is a clinically relevant measure of the physical function that the Spanish Society of Rheumatology recommends using with FM patients [61]. The remaining secondary measures are described in the measures of phase I: IPAQ-S score [50], FIQ score [58], pain intensity rating [56] and emotional status [59].

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Mediators

1. *Behavioral intentions*: In a previous study, we designed and proved the high internal consistency (α = 0.87) of five items for an *ad hoc* questionnaire (MAP, SLR, YS, CP, LV, MC, AL and CE, unpublished manuscript). These items are used to assess the individual's readiness to carry out the full walking pattern: "I intend to walk," "I will walk," "I am willing to walk," "I plan to walk" and "I will make an effort to walk at least 30 minutes in bouts of 15 minutes, with a small rest between bouts, twice weekly for a minimum of 6 consecutive weeks." All answers given are scored according to a numerical rating scale from 1 to 7.
2. *Implementation intentions*: A postexperiment questionnaire will be used to assess how committed patients felt toward meeting their goals ("How committed did you feel to the self-regulation intention?" and "How much did you try to achieve your self-regulation intentions?") and their perceived performance ("How difficult was it to achieve your walking behavior?" "Did your self-

regulation intention help you achieve the proposed walking behavior?" and "How well did you succeed in realizing your self-regulation intention?"). All of these items will be accompanied by 11-point answer scales ranging from 0 ("not at all") to 10 ("very").

Statistical analysis

Data will be entered into a relational database system (Microsoft Access; Microsoft, Redmond, WA, USA) with range rules and forms, which will reduce the number of data entry mistakes. In addition, we will apply a program to check and clean data [62]. Analyses will be made using the IBM SPSS Statistics 21 software package and LISREL software (SSI Scientific Software International, Skokie, USA).

Phase I

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Descriptive analyses have been performed. The sociodemographic characteristics, symptoms, walking and physical activity of eligible and noneligible populations have been compared by conducting χ^2 tests, *t*-tests, analysis of variance and median nonparametric tests, depending on the characteristics of the variables (Table 4). These comparisons were conducted to ensure that both samples differ only with regard to the inclusion criteria of the study. The same analyses were performed to compare participants with individuals who refused to participate and nonresponders (that is, not contacted or not available at the time of measurement) (Table 5).

Table 4. Descriptive statistics in eligible and noneligible populations[a]

	Noneligible					Eligible				
Variables	**Mean**	**(95% CI)**	**SD**	**Median**	**(95% CI)**	**Mean**	**(95% CI)**	**SD**	**Median**	**(95% CI)**
Age (years)	53.51	(52.59 to 54.42)	8.52	54.24		52.14	(51.41 to 52.87)	8.96	52.91	
Pain intensity	6.63	(6.43 to 6.83)	1.82	6.62		6.73	(6.59 to 6.87)	1.70	6.75	
Fatigue	8.01	(7.79 to 8.23)	2.01	8.00		8.20	(8.36 to 8.39)	1.96	9.00	
Fatigue upon waking	7.99	(7.74 to 8.25)	2.37	9.00		8.17	(8.00 to 8.25)	2.20	9.00	
Fatigue impact perception	6.78	(6.48 to 7.08)	2.77	7.00		7.01	(6.78 to 7.23)	2.72	7.00	
Cognitive problems	6.77	(6.48 to 7.05)	2.62	7.00		7.00	(6.78 to 7.21)	2.66	8.00	
Sleeping disorder impact perception	7.07	(6.75 to 7.38)	2.94	8.00		7.02	(6.70 to 7.26)	2.95	8.00	
Cognitive problems impact perception	6.30	(6.00 to 6.61)	2.83	7.00		6.57	(6.34 to 6.80)	2.83	7.00	
IPAQ-Sitting, mi/wk				240.5	(240.5 to 300.5)				300.5	(240.5 to 300.5)
IPAQ-Walking, min/wk				300.5	(245.5 to 350.5)				180.5	(140.5 to 180.5)
IPAQ-Moderate activities, min/wk				0.5	(0.5 to 60.5)				0.5	(0.5 to 0.5)
IPAQ-Vigorous activities, min/wk				0.5	(0.5 to 0.5)				0.5	(0.5 to 0.5)
IPAQ-Total activities, min/wk				383.5	(300.5 to 420.5)				180.5	(150.5 to 210.5)
	n	**(%)**				**n**	**(%)**			
Education level										
Literate	42	(12.5)				67	(11.5)			
Primary	138	(40.9)				261	(44.8)			
Secondary	106	(31.5)				163	(28.0)			
University	51	(15.1)				91	(15.6)			
Employment status										
Working	88	(26.3)				177	(30.5)			
Unemployed	63	(18.8)				118	(20.4)			
Retired	26	(7.8)				38	(6.6)			
Retired (pain)	39	(11.6)				59	(10.2)			
Sick leave	32	(9.6)				50	(8.6)			
Housewife	87	(26.0)				138	(23.8)			

[a] CI: Confidence interval; IPAQ: International Physical Activity Questionnaire; SD: Standard deviation.

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Table 5. Descriptive statistics in participants and nonparticipants from eligible population[a]

	Nonparticipant group					Participant group				
Variables	**Mean**	**(95% CI)**	**SD**	**Median**	**(95% CI)**	**Mean**	**(95% CI)**	**SD**	**Median**	**(95% CI)**
Age (years)	52.41	(51.42 to 53.40)	8.79	53.17		51.84	(50.75 to 52.93)	9.16	52.69	
Pain intensity	6.76	(6.56 to 6.95)	1.72	6.75		6.70	(6.50 to 6.90)	1.67	6.50	
Fatigue	8.19	(7.96 to 8.42)	2.02	9.00		8.22	(7.99 to 8.44)	1.90	9.00	
Fatigue upon waking	8.24	(7.99 to 8.49)	2.22	9.00		8.10	(7.84 to 8.36)	2.17	9.00	
Fatigue impact perception	7.05	(6.76 to 7.34)	2.60	8.00		6.96	(6.62 to 7.29)	2.85	7.00	
Cognitive problems	6.92	(6.62 to 7.22)	2.69	7.00		7.08	(6.77 to 7.39)	2.63	8.00	
Sleep disorder impact perception	7.01	(6.66 to 7.35)	3.07	8.00		7.03	(6.70 to 7.37)	2.82	8.00	
Cognitive problems impact perception	6.46	(6.14 to 6.79)	2.86	7.00		6.68	(6.35 to 7.02)	2.79	7.00	
IPAQ-Sitting, min/wk				270.5	(240.5 to 300.5)				300.5	(240.5 to 330.5)
IPAQ-Walking, min/wk				150.5	(120.5 to 200.5)				180.5	(120.5 to 210.5)
IPAQ-Moderate activities, min/wk				0.5	(0.5 to 0.5)				0.5	(0.5 to 15.5)
IPAQ-Vigorous activities, min/wk				0.5	(0.5 to 0.5)				0.5	(0.5 to 0.5)
IPAQ-Total activities, min/wk				160.5	(120.5 to 210.5)				210.5	(180.5 to 240.5)
	n	**(%)**				**n**	**(%)**			
Education level										
Literate	32	(10.4)				35	(12.8)			
Primary	132	(42.9)				129	(47.1)			
Secondary	86	(27.9)				77	(28.1)			
University	58	(18.8)				33	(12)			
Employment status										
Working	92	(30.4)				85	(31.1)			
Unemployed	59	(18.9)				59	(21.6)			
Retired	25	(8.1)				13	(4.8)			
Retired (pain)	32	(10.4)				27	(9.9)			
Sick leave	32	(10.4)				18	(6.6)			
Housewife	67	(21.8)				71	(26.0)			

[a]CI: Confidence interval; IPAQ: International Physical Activity Questionnaire; SD: Standard deviation.

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No significant differences were found between the noneligible population (n = 338) and the eligible population (n = 582) regarding the distribution of the patients drawn from the different FM associations). With regard to sociodemographic variables, we found significant differences only for age between the eligible and the noneligible populations (t = 2.264, P = 0.024, df = 914, mean difference = 1.37, 95% CI = 0.18 to 2.55). This difference was not found, however, when we considered the FM associations in the analysis (eligible group by FM association: F = 1.928, P = 0.124; noneligible group by FM association: F = 2.403, P = 0.067). No significant differences were found between groups for either education level (χ^2 = 1.810, P = 0.613, df = 3) or employment status (χ^2 = 5.912, P = 0.436, df = 6). Groups were also similar in pain intensity perception (t = −0.833, P = 0.415, df = 913), fatigue (t = −1.38, P = 0.167, df = 909), fatigue upon waking (t = −1.16, P = 0.245, df = 910), impact perception of fatigue (t = −1.21, P = 0.226, df = 909), cognitive problems (t = −1.27, P = 0.205, df = 910), impact perception of cognitive problems (t = −1.37, P = 0.173, df = 908) and impact perception of sleeping disorders (t = 0.25, P = 0.806, df = 911). The last six variables were included in the mailed questionnaire to identify the study population. All of them were calculated for the previous week and were measured using an 11-point numerical rating scale (from 0 = nothing at all to 10 = totally). In relation to IPAQ-S variables, median total activity, walking and moderate-intensity activities were different ($P \leq 0.01$) and similar in vigorous activities (P = 0.296) and sitting (P = 0.442) (Table 4).

All eligible individuals were contacted (N = 582) because of the difficulties involved in the participation of the first 449 selected women, such as the failure to contact them after repeated attempts, nonattendance after three citations and distance of residence from the study location. Ultimately, 274 patients accepted and attended the first evaluation session (participation rate = 47.1%). No significant differences were found between these 274 participants and women with FM who did not participate in this phase of the study ($n = 308$) on the basis of any of the above-mentioned variables (age: $t = 0.767$, $P = 0.443$, df = 579; education level: $\chi^2 = 5.567$, $P = 0.135$; df = 3; employment status: $\chi^2 = 7.567$, $P = 0.272$, df = 6; pain intensity perception: $t = 0.389$, $P = 0.697$, df = 579; fatigue: $t = -0.178$; $P = 0.858$, df = 576; fatigue upon waking: $t = 0.785$, $P = 0.433$, df = 576; impact perception of fatigue: $t = 0.410$, $P = 0.410$, df = 577; cognitive problems: $t = -0.718$, $P = 0.473$, df = 577; impact perception of cognitive problems: $t = -0.939$, $P = 0.348$, df = 577; impact perception of sleeping disorders: $t = -0.107$, $P = 0.915$, df = 577). The groups showed different medians of moderate activities ($P \leq 0.01$), but similar medians in total activity ($P = 0.066$), sitting ($P = 0.208$), walking ($P = 0.609$) and vigorous activities ($P = 0.115$). In addition, the groups presented a proportion of noncompliance similar to that of the total unsupervised pattern (45.8% and 44.2%, respectively) and the same proportion reported for medical recommendation to walk (81.8% in each group) (Table 5).

Internal consistency analysis will be performed for the different scales using the Cronbach's α coefficient. Path analysis will be conducted to identify the relative weights of attitudes, perceived norms and perceived behavioral control in the prediction of the behavioral intention (path coefficients). Furthermore, we will test the role of the fear of movement, pain and FM impact. Spearman and Pearson correlations and cross-tabulation analysis (depending on the variables) will be used to explore the agreement of the behavioral measurements.

Phase II (second and third years)

As our main outcome is a binary variable, backward stepwise logistic regression analysis will be applied. This method will allow us to investigate whether the experimental condition is associated with the acquisition of the walking pattern. Analysis will be performed for each time measure. Changes in walking behavior over time will be analyzed by applying a Cox proportional hazards regression model for recurrent events. Using this methodology, we will estimate the hazard function of the outcome measure (the likelihood of walking over time). We will analyze differences between groups by introducing the experimental condition as a predictor of the moment in the longitudinal study when women maintained the walking pattern.

Randomization results will be checked to ensure that groups are comparable at the beginning of the study in terms of their distribution of potential confounding factors (walking pattern, IPAQ, FIQ, pain, age, emotional status and behavioral intention). The potential confounders will be selected according to previous analyses at baseline by applying confusion criteria (associations with exposition: $P \leq 0.20$ and correlation coefficients >0.10; associations with the main result in CG: OR < 0.67 or OR > 1.5). Statistical adjustment to control for the impact of confounders on effect estimation will be applied by introducing them into the analyses (if changes in OR are greater than 10%). Effect modifiers of basal walking pattern will also be tested.

Multiple regression analysis will be performed for each secondary outcome variable. Baseline data will be introduced in the predictive model for each time measure. We will test the mediating effects of the behavioral intention and of implementation intentions in the total sample using path analysis.

DISCUSSION

The benefits of physical activity associated with FM patients' health status are well established. Exercise programs have been applied in isolation or together with other interventions in multidisciplinary treatments. There is evidence of clinical

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benefits of aerobic exercise for FM patients [3]. Most exercise programs are supervised in professional contexts, but the reported adherence to these programs is not encouraging [8-12]. Walking represents a similar problem. Although some authors have reported satisfactory compliance rates for walking [14], the exercise was performed in specific conditions, with walking poles and in group sessions with a monitor, which might contribute to an increase in adherence.

Walking is recommended to people with FM [4] and to adults in general [63]. It is easily accessible, cheap and popular, and it helps promote self-regulation and self-efficacy [10]. Our study will endorse these features because, although unsupervised, participants will be expected to walk for a minimum time under specific conditions. This minimum is easily reached by sedentary FM participants, and each participant can increase it gradually (at least up to the recommended pattern for FM patients [31]) or maintain the minimum level established in the study. In fact, because our intervention promotes participants' self-regulation, we also expect that they will set their own goals, which may include longer walking times. In addition, the study will allow us to test whether different basal walking patterns have differential benefits by analyzing the effect modifier of the relationship between experimental conditions and main results. For example, the effect of interventions might be higher in participants who do not walk at all than in participants who do.

To the best of our knowledge, this study is the first to address adherence to unsupervised walking patterns of FM patients by combining motivational and volitional strategies with strong theoretical foundations in health psychology. This combination has shown good results in the general population [16, 18, 19], but to our knowledge it has not been used in FM patients.

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TPB is the selected theoretical model for the design of the motivational intervention. It has allowed us to identify the modal salient beliefs (behavioral, normative and control) in a previous elicitation study with a sample of the study population (MAP, SLR, YS, CP, LV, MC, AL and CE, unpublished manuscript). As soon as the predictors of the behavioral intention are assessed in phase I, we will address the specific beliefs of FM participants, which should be modified or strengthened in the motivational intervention. By adding to these intervention implementation intentions, we expect to enhance the selected walking behaviors and to raise adherence. Both strategies have been recommended elsewhere [5]. Furthermore, using implementation intentions encourages each participant to carry out their own action plans (based on the established minimum), taking into account their personal circumstances.

The initial data have allowed us to identify the characteristics of the study population. In addition, the preliminary results have shown differences between members of the FM population who meet the inclusion criteria in this study (eligible population) and those who do not (noneligible) in total, moderate and walking activities. These results support the appropriateness of these criteria with regard to walking patterns. The activities and demographic characteristics of the participants who refused to participate, as well as the nonresponders from the eligible population, were similar to those of the participants. Although participants were different in regard to moderate intensity activities, the median values were the same and only a slightly higher percentage of FM participants took part in moderate activity as compared to nonparticipants. These results also support the representativeness of the study sample. We are aware of the difficulties of the research because the targeted population is sedentary. However, the effect of exercise interventions has been substantial in this type of patient.

The study has some limitations, which are mainly related to the voluntary participation of the FM participants from the several FM associations. First, we should mention the selection bias. It is possible that these participants were more active than other FM patients who do not belong to an association. This fact could influence both their physical activity and their motivation to exercise, and it could limit the effect of the intervention on walking behavior. However, this problem can be corrected by the possible variability in the behavioral intentions and the selected target population, who are all sedentary people. Furthermore, in Spain, the majority of FM patients belong to an association because their treatment needs are not covered by the public health system. Joining a FM patient association substantially decreases the expenses related to the illness [64]. Therefore, the variability of the members might be considered similar to the variability of people with FM.

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Second, the recruitment of participants from among members of FM associations does not allow us to monitor the diagnostic criteria. The clinical confirmation of the FM diagnosis is not part of our study protocol. However, American College of Rheumatology criteria [65] have been widely used by Spanish physicians, because they are the criteria for FM diagnosis recommended by the Spanish Ministry of Health [66, 67] and the Spanish Society of Rheumatology [68]. Moreover, a screening questionnaire [34] was introduced into the study as an inclusion criterion.

Third, we do not know the participants' level of education regarding exercise in FM. However, they will receive the same information about the benefits of physical exercise and walking, specifically as a component of the intervention.

Fourth, the primary tool we will use to assess physical activity habits has not been validated in FM, but our interest is focused on the performance of a specific walking pattern, which is not measured by standard questionnaires. The IPAQ results will be used mainly to support our population selection based on self-reported walking behavior.

It is important to underline that as soon as the final 274 participants agree to participate, strategies to avoid having participants dropping out will be implemented. In that sense, we will contact the 180 women who failed to attend the evaluation session but did not refuse to participate in the study. Because the participants belong to FM associations which conduct other activities for their members, we may have problems with the masking process. Participants might talk among themselves about the activities performed in each intervention group. However, nobody knows which intervention group is expected to be more successful. Participants will sign a commitment of confidentiality, and, furthermore, we will also assess the shaping of implementation intentions in the control group.

In spite of these limitations, the study addresses an important need: the enhancement of self-management in the treatment of FM. It focuses on increasing adherence to a strategy which has been shown to be effective (physical exercise, specifically walking). Furthermore, the results are expected to show the effectiveness of a short intervention which is easily applicable with a minimum of training and cost and that can be incorporated into routine clinical practice.

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APORTACIÓN INDIVIDUAL DE LA DOCTORANDA EN ESTE TRABAJO:

- Participación activa en la elaboración de los materiales de evaluación
- Gestión del contacto con participantes a través de carta, e-mail y teléfono
- Recepción de las cartas con los materiales de evaluación cumplimentados
- Contribución en la elaboración de la base de datos
- Introducción de los datos (n= 972 participantes)
- Participación en el tratamiento de los datos
- Participación en la redacción final del trabajo

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5.2. Estudio 2: Revisión sistemática y meta-análisis de la adhesión a andar.

Artículo 2

Do people with fibromyalgia adhere to walking for exercise programs to improve their health? Systematic review and Meta-analysis

AUTHORS

Yolanda Sanz-Baños[a], María-Angeles Pastor[a], Ana Lledo[a], Sofía Lopez-Roig[a], Cecilia Peñacoba[b], Julio Sánchez-Meca[c]

[a]Department of Health Psychology, Miguel Hernández University, Postal Address: Avenida de la Universidad, s/n, 03202, Alicante, Spain

[b]Department of Medicine and Surgery, Public Health, Psychology and Immunology and Medical Microbiology, Rey Juan Carlos University, Madrid, Spain, Postal Address: Av Atenas, S/N, 28922 Alcorcón, Madrid, Spain

[c]Department of of Basic Psychology and Methodology, Murcia University, Postal Address: Faculty of Psychology, Espinardo Campus, University of Murcia, 30100-Murcia, Spain

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ABSTRACT

Background: Walking is recommended for fibromyalgia but the rate of adherence to this exercise is not known. Poor adherence to physical exercise can limit the effectiveness in health benefits.

Objectives: To examine adherence to interventions that include walking for fibromyalgia and to explore its moderators among the characteristics of patients, of the walking prescription and of the interventions.

Data sources: References from 2000 to 2015 have been collected through PubMed, PsycINFO, CINAHL, SPORTDiscus, Cochrane and Teseo.

Study selection: We considered randomized and quasi-randomized controlled trials in adults with fibromyalgia that included walking for exercise.

Data extraction*:* Data were independently extracted by two assessors. Methodological quality of the studies was assessed using an *ad hoc* scale.

Data synthesis: Nineteen trials, with 27 experimental groups, recruited a total of 908 participants (96.44% women) with mean ages between 45.20 and 55.90. Adherence to the intervention program was reported in 19 of 27 experimental groups and ranged, on average, from 73 to 83.20% depending on the type of assessment. Moderators of adherence were the recruitment of participants through physicians (p = .002) and the duration of sessions (most studies approximately 60 minutes) (p = .043).

Conclusion: Adherence rates to programs with walking were high. However, a lack of information prevents us from knowing whether participants sustained walking between sessions or after the treatment. Further work is required to examine in greater depth such contextual variables of interventions as the professional-participant

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relationship or to explore other possible moderators such as patient expectations of the treatment.

Keywords: systematic review; meta-analysis; fibromyalgia; walking; adherence

INTRODUCTION

Fibromyalgia is a chronic condition characterized by widespread pain, cognitive symptoms, non-restorative sleep, fatigue, and other somatic symptoms [1] that lead to a reduced quality of life [2] and limitations in daily-life activities [4, 5]. The worldwide prevalence in the general population is 2.7% and it is more frequent in women (4.1%) than in men (1.4%) [6].

Along with pharmacological and psychological treatment, physical exercise is an important mainstay of the recommended and effective treatment in fibromyalgia [7, 8]. Regular exercise decreases the intensity of pain and fatigue, enhances physical function, psychological welfare, and improves quality of life [9-12]. Regarding the most appropriate type of exercise, the latest reviews have shown that aerobic exercise of slight to moderate intensity, with or without accompanying strengthening or flexibility exercises, improves health status in people with fibromyalgia [13, 14]. Among the variety of aerobic exercises, walking is a moderate intensity activity, easy and adaptable to the self-management of fibromyalgia [15]. Its relatively low impact and positive health outcomes has made it widely recommended for chronic pain problems in general and particularly in fibromyalgia [16-19].

Although it is well known that poor adherence to physical exercise can limit the effectiveness in long-term health benefits [22-24], adherence data have not always been accessible [19, 21]. Nevertheless, in some exercise interventions in fibromyalgia, reported adherence ranged between low and moderate [13, 19-21]. Accordingly, management of adherence conditions is an issue that requires increased attention [19-22] and therefore, data on the adherence to walking protocols in fibromyalgia could be vital.

The objectives of this review were (1) to identify the adherence to the interventions that include walking for treatment in fibromyalgia and (2) to explore their moderators among (a) the characteristics of patients, (b) the characteristics of the walking prescription and (c) the characteristics of the interventions.

MATERIALS AND METHODS

This systematic review and meta-analysis is reported according to the Preferred Reporting Items for Systematic Reviews and Meta-Analyses for Protocols 2015 (PRISMA-P 2015) statement [25] and its former version of 2009 [26]. Eligibility criteria for studies are detailed according to the PICOS framework as shown below [25].

Search methods for identification of studies. The information was collected between the months of March and October 2015, through searches of the PubMed (including Medline), PsycINFO, CINAHL (Nursing Resources from EBSCO Health), SPORTDiscus (EBSCO) y Cochrane databases, as well as of grey material (theses) in Teseo. In order to include as many publications as possible on the subject, the combination of managed keywords we used was*:* Fibromyalgia, Walking AND Exercise (OR = Physical Exercise, Physical Activity, Physical fitness). The search strategy in PubMed (see Appendix 1) was performed with the terms approved by the Mesh in English with the help of a database technician of the University of Miguel Hernandez, adapting the syntax and subject headings to the different databases. The literature search was limited to the last 15 years, English and Spanish and adult samples with fibromyalgia. To ensure a saturation of literature, we analyzed the reference lists of included studies and relevant reviews identified through the search. We also searched personal files of authors to ensure that all relevant material had been found.

Eligibility criteria. We considered all 1) interventions containing walking as the only exercise, or combined with other exercises, or as a component of a multidisciplinary program in any setting: hospital, clinic, university or community association, 2) randomized controlled trials (RCT) and quasi-experimental trials, 3) studies with patients with a fibromyalgia diagnosis according to the criteria of the American College of Rheumatology [1, 27] aged ≥ 18.

We excluded studies of only men because of the increased frequency in women and single-case and crossover clinical trials.

Selection of studies. Two authors of this review independently screened titles and abstracts against the inclusion criteria through a list drawn from *Refworks*. Then the full text shortlisted works were reviewed by at least two authors and the reasons for rejection were recorded. Disagreements were resolved by discussion. In cases where the record provided insufficient information (only title or abstract), we contacted the study authors to clarify study eligibility. Where there was no answer, the study was discarded (n = 2) (see Appendix 2).

Data extraction and management. Prior to the independent coding, a pilot was performed with a coding protocol to refine the procedures and codes. Two authors of this paper extracted study data using a pre-designed data extraction form with lists of data validation to ensure greater objectivity. Disagreements were resolved through discussion and consultation with a third researcher with extensive knowledge in fibromyalgia. The following details were recorded: 1) study design, methodological and contextual variables (year and country of publication; due to the high variability, the studies were later grouped by continent), 2) characteristics of study participants (age, sex, duration of disorder, diagnosis criteria), clinical setting and recruitment, 3)

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characteristics of prescription: duration, frequency and intensity of walking and other physical exercises that were conducted along with walking, 4) characteristics of interventions: supervision of walking and other exercises, combination or not with psychological treatment (cognitive-behavioral, educational, self-management or goal-setting) conducted besides walking or other exercise, 5) adherence to the program: either from the number of participants in attendance at the beginning and at the end of study or from data provided by authors in several forms such as (i) the percentage of participants who met a previously established criterion; for instance, attending a minimum number of sessions or performing a minimum amount of exercise (adherence percentage) (ii) the average of the percentage of attendance of each participant (mean adherence), or (iii) the number of participants attending each session; 6) adherence to the prescribed exercise: through log data at or between exercise sessions (self-reporting or pedometers) and 7) adherence to the exercise during follow-up (self-reporting or pedometers).

Assessment of methodological quality. We assessed the quality of included studies through an *ad hoc* tool based on another review related to prevalence data [28]. Fourteen items for quality of adherence data were evaluated (see Appendix 3) and the sum of their scores yielded an overall score of methodological quality (from 0 to 14). Furthermore, with this scale, we obtained a classification as high (≥ 10), medium (from 5 to 9.99) and poor quality (<5) (see Appendix 4: Supplementary Table A).

Statistical analysis. Studies were analyzed and described according to the recommendations of Sánchez-Meca and Botella [29]. Descriptive characteristics of the individual studies were extracted in order to examine their potential influence as moderator variables on walking adherence. Thus, qualitative data were collected using tables to compile information on intervention variables and methodological and adherence measures (see Appendix 4: Supplementary Tables A and B). The proportion of patients that attended treatment was obtained from each individual study. These proportions were the dependent variables in the meta-analysis. To normalize the distribution of these proportions, they were translated by means of the logit function: $L_p = Log_e[p/(1-p)]$, p being the proportion of adherence to walk, Log_e the natural logarithm, and L_p the logit adherence proportion. The sampling variance of the logit adherence proportion is given by: $V(L_p) = 1/np + 1/n(1-p)$, with n being the sample size of the study. This variance is important because in meta-analysis each proportion is weighted by its inverse variance when the statistical analyses are conducted. In order to make the interpretation of the results easier, the mean logits and their 95% confidence limits were back-transformed to the proportion metric by means of: $p = e^{Lp}/(e^{Lp}+1)$, with e being the base of the natural logarithm.

The statistical analyses were accomplished by assuming a random-effects model. It is reasonable to apply this statistical model when the existence of heterogeneity is suspected among the adherence proportions due to the influence of differential characteristics of the studies [30]. A forest plot was constructed to illustrate graphically each individual adherence proportion as well as the pooled adherence rate obtained from the studies. The heterogeneity exhibited by the adherence proportions was assessed by means of the Q statistic and the I^2 index. To analyze the moderating variables related to the methodological, participant and intervention characteristics of the studies, we performed subgroup analyses (weighted ANOVAs) for qualitative variables, and simple meta-regressions on continuous variables. Q_B for weighted ANOVAs and Z statistics for meta-regressions were applied in order to test the statistical significance of each moderator variable on the adherence proportions. The proportion of variance explained by the moderator variable was estimated by means of R^2. In addition, the model misspecification was assessed with Q_W and Q_E statistics for ANOVAs and meta-regressions, respectively. Moderator analyses were accomplished by assuming a mixed-effects model [30]. In order to be analyzed, a moderator variable required to be reported in at least 10 studies, as moderator analyses with less than 10 studies are not appropriate [31]. All statistical analyses were carried out with the statistical program *Comprehensive Meta-analysis 3.3* [32].

RESULTS

Selection process. The searches identified 1,103 publications. Sixty-one of these were examined in full text, of which 19 studies (20 papers) met the inclusion criteria [33-53] (Figure 1). One of the 20 papers was a follow-up of another study [47]. Excluded studies with the specific reasons are listed in Appendix 2. The main reasons for excluding articles from the 593 potentially eligible articles were:

1) the sample was mostly men (n = 5)
2) they were based on heterogeneous samples with other diagnoses besides fibromyalgia (n = 19)
3) the sample age was under 18 or exclusively elderly (n = 10)
4) they were studies on the physical effects of exercise in fibromyalgia but not programs or trials (reviews, laboratory situations or questionnaires) (n = 286)
5) they included programs of aerobic exercise but without walking (n = 252), the type of exercise was not specified in the full text (n = 14) or it was not possible to obtain the full text in order to find out the exercise performed (n = 4)

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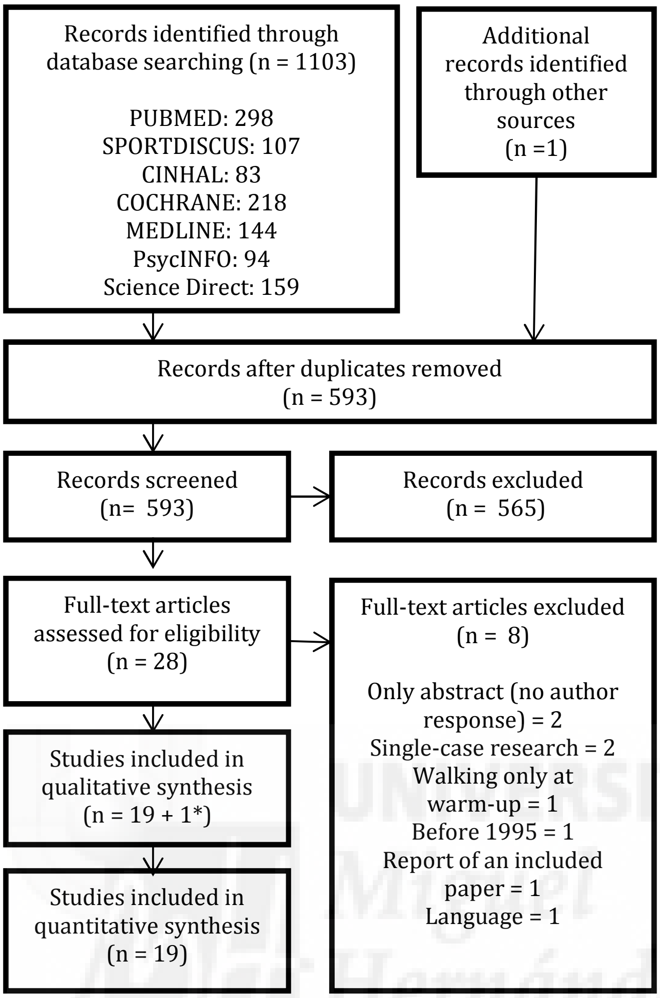

* A follow-up of one of these trials [46, 47]

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Figure 1. Flow diagram [26].

Methodological quality. The analysis of reliability of the coding by two reviewers of study characteristics and adherence rates was satisfactory. Cohen's kappa coefficients calculated for qualitative variables varied between .64 and 1, while intra-class correlations calculated for continuous variables ranged between .86 and 1. Of the 19 studies selected, 16 were randomized controlled trials, two quasi-experimental studies [34, 52] and one pilot [44]. Most used simple randomization (n = 8) [35, 39-42, 50, 51, 53] but many did not report the randomization process (n = 9) [33, 34, 37, 38, 43-45, 49, 52] and one reported problems of randomization. [52]. Ten studies did not report masking [33, 34, 37, 38, 40, 44, 45, 48, 49, 52] and the other studies used blinded evaluation to assess results. The studies were published in 10 different countries of which Spain (n = 5) was the most frequent. Most studies did not report differences analysis between participants who completed the treatment and those who did not (n = 11). Of the remaining studies fewer than a half found differences (n = 4): Non-completers showed more pain intensity and pain disability [37, 40, 44] and lower values in vitality and social functioning [40], were older than completers [35] and most were single [35].

Description of included studies. The 19 trials, with 27 experimental groups, recruited a total of 908 participants (96.44% women) with mean ages between 45.20 and 55.90 and an average duration of disorder of 7.74 years (see Table 4). There was a wide variability among the 27 experimental groups in exercise prescription: duration of walking exercise (from 5 to 45 minutes), intensity of activity (from 55 to 80% of different ways to measure Heart Rate), duration of sessions (from 25 to 180 minutes), frequency (from 1 to 4 times per week) and total time of treatment (from 6 to 24 weeks). There were programs in which the treatment lasted one week, with sessions of 180 minutes [43] or two weeks with daily sessions [44]. Concerning the characteristics of interventions, given that each experimental group was taken as an independent unit of analysis (N = 27), it was pertinent to observe these data in each experimental group (see Table 1).

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Table 1. Characteristics of interventions.

1- One-component: walking

Study	EXPERIMENTAL GROUPS		Freq Wk	Tot Wk	Main PE	Walking form (% Total session)	M Min Session	M Effort intensity	PE super-vised (% Sessions)	W-up	Cold down
Meyer et al 2000a [33]	1- High Intensity Exercise Program		3	24	Walking	(100%)	23.63 ↗	78.75% ↗ HRrest age	N/NR	N	N
Meyer et al 2000b [33]	2- Low Intensity Exercise Program		3	24	Walking	(100%)	23.63 ↗	54.63% ↗ HRrest age	N/NR	N	N
Meiworm et al 2000 [34]	1- Self-management training program	2- Waiting list CG	3	12	Aerobic (cycling, swimming, jogging or walking)	(100%)	42.06 ↗	NR	N/NR	N	N
King et al 2001a [35]	1- Supervised Aerobic Exercise Program (SAEP)	2- SAEP & Education 3-Education 4- Waiting list CG	3	12	Aerobic (walking, pool-based, or low-impact activities)	Outdoors (NR)	30 ↗	67.50% HRmax age	PE instructor & Phys-Ther. (100%)	Y	Y
Richards & Scott 2002 [36]	1-Individualized Exercise program + info leaflet	2- Active CG	2	12	Aerobic (walking or cycling)	Treadmill (100%)	60 ↗	NR ↗	PE instructor (100%)	N	N
Valim et al 2002 [37]	1- Walking program	2- Stretching	3	20	Walking	(66.67%)	45	HR prior anaerobic load	Phys-Ther. (100%)	Y	Y
Bircan et al 2008 [38]	1- Aerobic exercise program	2- Strength	3	8	Walking	Treadmill (71,43%)	35 ↗	65% ↗ HRmax age	N/NR	Y	Y
Mannerkorpi et al 2010a [39]	1- Nordic Walking		2	15	Walking	Nordic Walking (100%)	42,50	13 Borg/RPE	Phys-Ther. & Trained leaders (100%)	N	Y
Mannerkorpi et al 2010b [39]	2- Low Impact Walking		1	15	Walking	Outdoors (100%)	42,50	9,50 Borg/RPE	Phys-Ther. & Trained leaders (100%)	N	Y
Kayo et al 2012 [40]	1- Walking program	2- Active CG 3- Strength	3	16	Walking	(75%)	60 ↗	51,88% ↗ HRrest	Phys-Ther. (100%)	Y	Y

2- Multi-component: walking and other exercises

Study	EXPERIMENTAL GROUPS		Freq Wk	Tot Wk	Main PE	Walking form (% Total session)	M Min Session	M Effort intensity	PE super-vised (% Sessions)	W-up	Cold down
Gowans et al 2001 [46]	1- Exercise Program	2- Waiting list CG	3	23	Aerobic (walking & pool-based)	Indoor (32.75%)	30	77% HRmax age	PE instructor (NR)	Y	Y
Rooks et al 2007a [48]	1- Aerobic and flexibility exercise AE	4- Education	3	16	Aerobic & flexibility	Treadmill (45.10%)	60 ↗	NR ↗	YES NR (66.67%)	Y	Y
Rooks et al 2007b [48]	2- Strength, aerobic & flexibility (ST)	4- Education	3	16	Strength, aerobic & flexibility	Treadmill (33.33%)	60 ↗	NR ↗	YES NR (66.67%)	Y	Y
Rooks et al 2007c [48]	3- Fibromyalgia self-help (FSHC) & ST	4-Education	3	16	Strength, aerobic & flexibility	Treadmill (33.33%)	60 ↗	NR ↗	YES NR (66.67%)	Y	Y

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Etnier et al 2009 [49]	1- Physical activity program	2- Waiting list CG	3	18	Walking & strength	(25%)	60	60% HRmax	Research (NR)	N	N
Sanudo et al 2010a [50]	1- Aerobic exercise	3- Usual care CG	2	24	Aerobic	Walking with arm movements (33.33%)	52,50	70% HRmax age	N/NR	Y	Y
Sanudo et al 2010b [50]	2- Combined exercise	3- Usual care CG	2	24	Aerobic, strength & flexibility	Walking with arm movements (33.33%)	52,60	67.50% HRmax age	N/NR	Y	Y
Sanudo et al 2011 [51]	1- Exercise program	2- Usual care CG	2	24	Aerobic, strength & flexibility	Walking with arm movements (25%)	50	65% ↗ HRmax age	N/NR	Y	Y
Latorre et al 2013 [52]	1- Physical training	2- Usual care CG	3	24	Aerobic (walking & pool-based) & strength	Indoor (12.5%)	60 ↗	Borg/RPE ↗	Phys-Ther. (100%)	Y	Y
Paolucci et al 2014 [53]	1- Rehabilitation program	2- Usual care	2	5	Low-impact aerobic (walking & steps), strength & flexibility	Indoor (NR)	60	60% HRmax age	Phys-Ther. (50%)	N	N

3- Multidisciplinary: one or multicomponent plus other intervention

Study	**EXPERIMENTAL GROUPS**		**Freq Wk**	**Tot Wk**	**Main PE**	**Walking form (% Total session)**	**M Min Session**	**M Effort intensity**	**PE super-vised (% Sessions)**	**W-up**	**Cold down**
King et al 2001b [35]	2- SAEP & Education	1- SAEP 3- Education 4- Waiting list CG	3	12	Aerobic (walking, pool-based, low-impact activities)	Outdoor (NR)	30 ↗	67.50 HRmax age	PE instructor & Phys-Ther. (100%)	Y	Y
Lemstra et al 2005 [41]	1- Multi-disciplinary rehabilitation treatment	2- Usual care CG	NR	6	Walking & Strength	Treadmill (NR)	NR ↗	50 ↗ VO2max	Phis-Ther. & Rheum. (NR)	Y	Y
Lera et al 2009a [42]	1- Multi-disciplinary treatment (MT)		1	14	Aerobic (walking or cycling) & Stretching	Treadmill (33.36%)	60	N/NR	Phys-Ther. (66.67%)	N	Y
Lera et al 2009b [42]	2- MT + cognitive and behaviour treatment		1	14	Aerobic (walking or cycling) & Stretching	Treadmill (33.36%)	60	N/NR	Phys-Ther. (66.67%)	N	Y
Hamnes et al 2012 [43]	1- Self-management programme	2- Waiting list CG	5	1	Aerobic (walking & pool-based)	Outdoor & Nordic Walking (6.67%)	180	N/NR	Ocu-Ther. (40%)	N	N
Harden et al 2012 [44]	1- Home-based aerobic conditioning program		7	12	Aerobic (walking, cycling or swimming)	(NR)	NR ↗	75,00 ↗ HRmax	N/NR	Y	Y
Casanueva-Fernandez et al 2012 [45]	1- MT	2- Active CG	1	8	Aerobic (walking & cycling)	Treadmill (8.38%)	60	N/NR	N/NR	N	N

CG: Control Group; PE: Physical exercise; Phys-Ther.: Physiotherapist; Rheum.: Rheumatologist; Ocu-Ther.: occupational therapist; Y: Yes; N: No; N/NR: No or not reported; W-up: warm-up; Tot Wk: total weeks of intervention; Freq Wk: week frequency of intervention; M: medium; Min: minutes; Ses: session; ↗: time or intensity progressive along the program.

There were three types of intervention depending on the elements that made up the treatment delivered: 1) one-component experimental groups (n= 10) which included only walking as exercise, with three exceptions in which patients were allowed to choose among several physical activities [34, 36] or which prescribed the exercise according to the season: walking outdoors in summer and pool-based exercise in winter [35]; 2) multi-component experimental groups (n =10) which included walking together with other types of exercise (see Table 1) and of which two also incorporated elements related to self-management of symptoms [48] and educational sessions of motor habits (10% of sessions) with instructions to continue exercise at home for 12 weeks [52] and 3) multidisciplinary experimental groups (n = 7), which included diverse elements besides the exercise: psychosocial support through problem-solving, instructions or goal-setting for exercise [42, 44], cognitive-behavioral treatment, educational sessions and self-management [35, 41], and even sessions of rheumatology, physiotherapy, psychology, dietary advice, thermal therapy or massage therapy [41, 42, 45] and the attendance of partners or close relatives of participants [43]. In the multidisciplinary experimental groups, walking was combined with other exercises (see Table 1) and in two experimental groups, patients had to choose from among different types of aerobic exercise [41, 44]. Of all the experimental groups, 15 included the progression of exercise in either time or intensity; in 15 experimental groups the development of the exercise was supervised; in 19 groups warming and cooling, or one of the two, were included within the sessions (see Table 1) and in one experimental group, exercise in different bouts was prescribed with a rest between them [37].

There were only two experimental groups that clearly had adherence to the program as a target. In one, a physiotherapist was responsible for monitoring and improving the attendance of participants by "creating a social, non-intimidating environment for the

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patients" and achieved an adherence of 90.56% [40]. In the other study, during the first six weeks, the prescription was exercise in a warm therapy pool in sessions of 30 minutes and walking, in two of the three weekly sessions, was not performed until the seventh week [46]. This progressive prescription was performed with the explicit aim of improving adherence and achieved a rate of 67%.

Of the studies that reported rates of adherence to the program (19 of 27 experimental groups), six studies reported a percentage of participants who kept an established criterion of accomplishment (e.g. attending a minimum number of exercise sessions), and 13 studies reported the average of the percentages of attendance of each participant. Some of the remaining studies reported criteria used to classify participants as compliant or non-compliant with the treatment (see Appendix 4: Supplementary Table C). In eight experimental groups the percentages of attendance at the program were not reported and were calculated for this review from the number of participants at the beginning and at the end of the study (see Appendix 4: Supplementary Table A). Only one experimental group reported the attendance of participants at each session [36]. None of the included studies specified adherence to exercise in sessions or between them. Although there were four studies that mentioned using self-reports [33-35, 44], these data were not reported in the outcomes. In some studies monitors or pulsometers were worn exclusively to measure heart rate [37, 38, 40, 44]. Despite the fact that 11 studies performed follow-up assessment, only two of them evaluated the adherence to exercise after completing the intervention [41, 46] (see Appendix 4: Supplementary Table B).

With regard to the attrition causes, 15 of the 19 studies reported the reasons for dropout in addition to the number or the percentage of participants who justified their withdrawal. Of the 27 experimental groups, the most frequent causes were: family,

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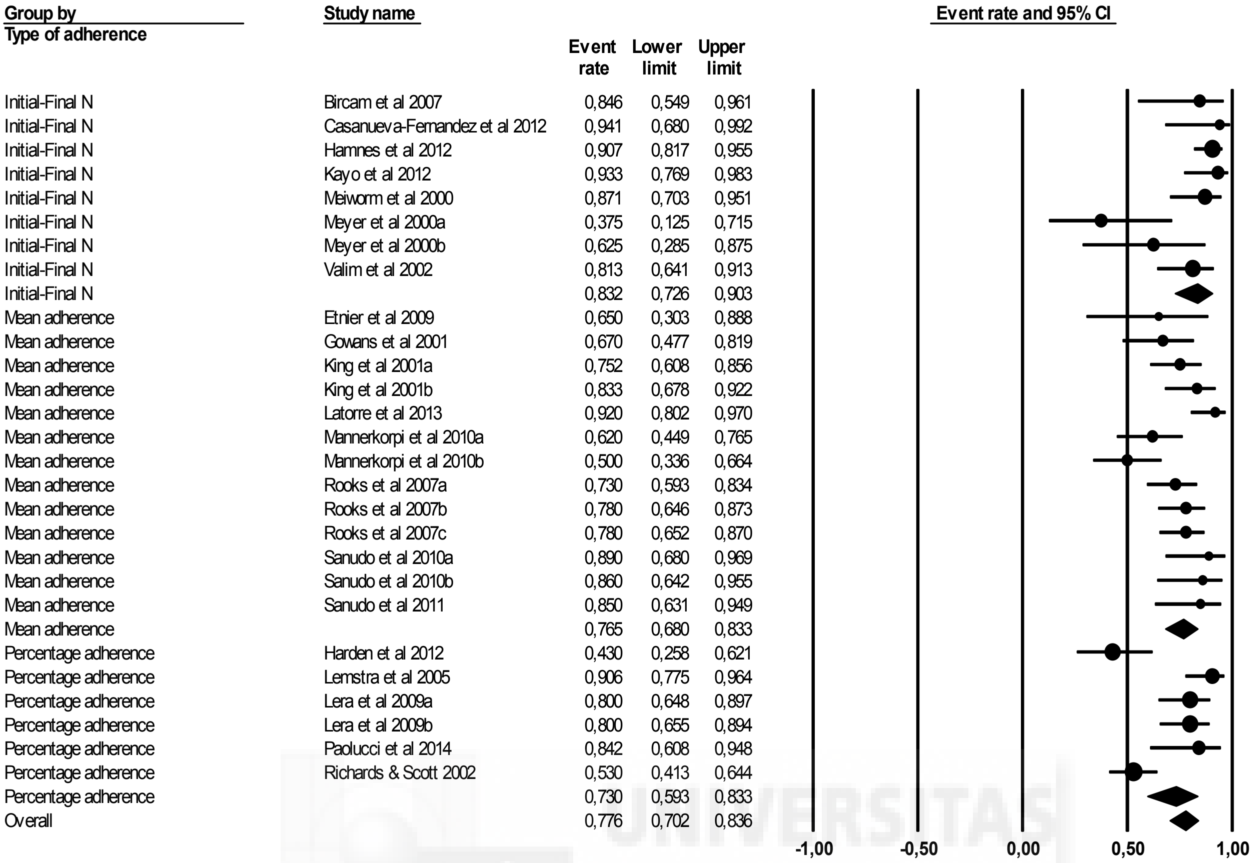
work, time, or travel issues (n = 14); health problems or pain (n = 12); and rejection/no interest (n = 6). In only a few cases was noncompliance of a minimum or the non-accomplishment of the objectives of the intervention (n = 3) [34, 46, 52] indicated as a cause for dropping-out. Finally, only two studies indicated participants' difficulties or inability to continue treatment [44, 50].

Meta-analyses. Although our aim was to perform a meta-analysis with the three types of adherence: 1) program attendance, 2) carrying out the prescribed exercise between sessions and 3) carrying out the exercise during follow-up, it was not possible in the two last criteria because no study reported the second type of adherence and the third was only reported in two studies.

In the first type (program attendance), no significant differences were found between the three measures of program attendance reported previously ($Q_B(2) = 1.97$, $p = .37$; $R^2 = .100$) and, on average, the adherence rates obtained were: 83.2% (95% CI = 72.6% and 90.3%) for the studies in which we calculated rates for this meta-analysis (initial-final n), 73% (95% CI = 59.3% and 83.3%) for those studies that reported the percentage of participants who sustained an established criterion and 76.5% (percentage adherence) (95% CI = 68% and 83.3%) for those studies that provided the average of the percentages of attendance of each participant (mean adherence). Tests for within-category heterogeneity were statistically significant ($Q_W(24) = 73.581$, $p < .001$) and I^2 indices were above 50%. That fact indicated the presence of high heterogeneity between the estimates of adherence of the 27 studies included (Figure 2) and justified the analysis of moderator variables of adherence.



Group by Type of adherence	Study name	Event rate	Lower limit	Upper limit
Initial-Final N	Bircam et al 2007	0,846	0,549	0,961
Initial-Final N	Casanueva-Fernandez et al 2012	0,941	0,680	0,992
Initial-Final N	Hamnes et al 2012	0,907	0,817	0,955
Initial-Final N	Kayo et al 2012	0,933	0,769	0,983
Initial-Final N	Meiworm et al 2000	0,871	0,703	0,951
Initial-Final N	Meyer et al 2000a	0,375	0,125	0,715
Initial-Final N	Meyer et al 2000b	0,625	0,285	0,875
Initial-Final N	Valim et al 2002	0,813	0,641	0,913
Initial-Final N		0,832	0,726	0,903
Mean adherence	Etnier et al 2009	0,650	0,303	0,888
Mean adherence	Gowans et al 2001	0,670	0,477	0,819
Mean adherence	King et al 2001a	0,752	0,608	0,856
Mean adherence	King et al 2001b	0,833	0,678	0,922
Mean adherence	Latorre et al 2013	0,920	0,802	0,970
Mean adherence	Mannerkorpi et al 2010a	0,620	0,449	0,765
Mean adherence	Mannerkorpi et al 2010b	0,500	0,336	0,664
Mean adherence	Rooks et al 2007a	0,730	0,593	0,834
Mean adherence	Rooks et al 2007b	0,780	0,646	0,873
Mean adherence	Rooks et al 2007c	0,780	0,652	0,870
Mean adherence	Sanudo et al 2010a	0,890	0,680	0,969
Mean adherence	Sanudo et al 2010b	0,860	0,642	0,955
Mean adherence	Sanudo et al 2011	0,850	0,631	0,949
Mean adherence		0,765	0,680	0,833
Percentage adherence	Harden et al 2012	0,430	0,258	0,621
Percentage adherence	Lemstra et al 2005	0,906	0,775	0,964
Percentage adherence	Lera et al 2009a	0,800	0,648	0,897
Percentage adherence	Lera et al 2009b	0,800	0,655	0,894
Percentage adherence	Paolucci et al 2014	0,842	0,608	0,948
Percentage adherence	Richards & Scott 2002	0,530	0,413	0,644
Percentage adherence		0,730	0,593	0,833
Overall		0,776	0,702	0,836

Figure 2. Forest plot of the adherence rates to the program classified as a function of the type of adherence reporting.

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Moderator variables of adherence to the program. Regarding the **methodological quality** of the studies, there was no significant relationship with the rates of adherence (p > .05) (see Appendix 4: Supplementary Table D). In regard to other variables related to the methodology (see Table 2), the type of design reached statistical significance, but the small number of studies limits the scope of these results.

Table 2. Results of the subgroup analyses for methodological and contextual moderator variables.

Moderator variables (qualitative)	***k***	$\boldsymbol{P_+}$	**95% CI**		**ANOVA results**
			$\boldsymbol{P_L}$	$\boldsymbol{P_U}$	
Continent:					$Q_B(2)=3.573, p=.168$
Europe	17	.796	.723	.853	$R^2 = 0.0$
North America	8	.691	.552	.803	$Q_W(24)=81.898, p<.001$
South America	2	.874	.667	.960	
Design type:					$Q_B(2)=7.405, p=.025$
RCT	24	.773	.714	.822	$R^2 = .240$
Quasi-experimental	2	.898	.746	.964	$Q_W(24)=67.086, p<.001$
Pilot study	1	.430	.158	.751	
Random assignment:					$Q_B(2)=5.067, p=.079$
Simple	12	.795	.727	.850	$R^2 = .300$
Restrictive	1	.530	.288	.759	$Q_W(14)=30.817, p=.006$
Stratified	4	.745	.623	.837	
Masking:					$Q_B(2)=0.070, p=.966$
Not reported	13	.774	.676	.848	$R^2 = 0.0$
Assessors and patients	2	.800	.567	.924	$Q_W(24)=84.408, p<.001$
Assessors only	12	.773	.679	.846	
Control group:					$Q_B(1)=0.019, p=.890$
Waiting list	6	.802	.655	.896	$R^2 = 0.0$
Standard treatment	11	.812	.706	.886	$Q_W(15)=61.850, p<.001$
Methodological quality:					$Q_B(2)=1.174, p=.556$
Poor (0 – 4.99)	8	.764	.627	.861	$R^2 = 0.0$
Medium (5 – 9.99)	13	.804	.720	.867	$Q_W(24)=84.888, p<.001$
High (10 – 14)	6	.727	.582	.836	

Moderator variables (continuous)	***k***	$\boldsymbol{b_j}$	**Z**	***p***	$\boldsymbol{Q_E}$	**R²**
Methodological variable:						
Total quality score (0 – 14)	27	0.006	0.09	.925	87.34***	0.0
Contextual variable:						
Publication year	27	0.051	1.42	.156	82.72***	.010

RCT = randomized controlled trial. *k* = number of studies in each category. P_+ = mean adherence rate for each category. P_L and P_U = lower and upper limits of the 95% confidence interval around the mean adherence rate for each category. Q_B = between-categories statistic to test the mean adherence rates. Q_W = total within-category statistic to test the model misspecification. R^2 = proportion of variance explained by the quality item. b_j = regression coefficient of the moderator variable. Z = statistical test of b_j. Q_E = residual heterogeneity statistic to test the model misspecification. *** $p < .001$. R^2 = proportion of variance explained by the moderator variable.

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In relation to the **characteristics of the participants** (see Table 3), only recruitment of participants was a moderator variable of adherence to the program ($Q_B(3) = 15.02$, $p = .002$; $R^2 = .520$), with the highest average rate of adherence when recruitment was through physicians ($P_+ = .85$) and the lowest rate was from the use of advertising ($P_+ = .57$).

Table 3. Results of the subgroup analyses for participants' moderator variables.

Moderator variable (continuous)	***k***	***b***	**Z**	***p***	**Q_E**	**R²**
Participant characteristics:						
Gender (% women)	26	0.031	1.19	.233	76.70***	.090
Mean age (in years)	26	0.046	0.86	.391	84.17***	0.0
SD of the age (in years)	22	0.033	0.34	.737	50.00***	0.0
Mean duration of disorder (years)	19	-0.058	-1.32	.187	64.64***	0.0
SD of the duration of disorder	18	-0.069	-1.43	.152	47.46***	0.0

Moderator variables (qualitative)	***k***	**P_+**	**95% CI**		**ANOVA results**
			P_L	**P_U**	
Participant origin:					$Q_B(3)=1.028$, $p=.795$
Associations	5	799	.627	.903	$R^2 = .010$
Community	2	780	.484	.931	$Q_W(22)=76.569$, $p<.001$
Primary Care	9	734	.621	.823	
Specialized Care	10	796	.702	.865	
Participant recruitment:					$Q_B(3)=15.026$, $p=.002$
Physician	6	858	.784	.910	$R^2 = .520$
Advertisement	5	574	.434	.703	$Q_W(16)=32.524$, $p<.001$
Physician + Advertisement	4	752	.630	.843	
Researchers	5	768	.662	.848	

k = number of studies. b_j = regression coefficient of the moderator variable. Z = statistical test of b_j. Q_E = residual heterogeneity statistic to test the model misspecification. *** $p < .001$. R^2 = proportion of variance explained by the moderator variable. P_+ = mean adherence rate for each category. P_L and P_U = lower and upper limits of the 95% confidence interval around the mean adherence rate for each category. Q_B = between-categories statistic to test the mean adherence rates. Q_W = total within-category statistic to test the model misspecification. R^2 = proportion of variance explained by the quality item.

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Analyses conducted on moderating variables related to the **characteristics of interventions** (see Table 4) showed that only the duration of sessions had a statistically significant association with adherence rates (p = .043) with 16% of explained variance. The longer duration of sessions yielded the higher rates of adherence. The mean of length of sessions was, in general, between 25 and 60 minutes, with the exception of an experimental group where sessions lasted 180 minutes on average [43].

Table 4. Results of the subgroup analyses for intervention moderator variables.

Moderator variables			**95% CI**		
(qualitatives)	***k***	P_+	P_L	P_U	**ANOVA results**
Type of intervention:					$Q_B(2)=3.559$, p=.169
One-component	10	.701	.589	.794	R^2 = .160
Multi-component	10	.804	.715	.871	$Q_W(24)=69.896$, p<.001
Multidisciplinary	7	.817	.714	.888	
Progressive time:					$Q_B(1)=0.189$, p=.664
No or not reported	13	.789	.699	.857	R^2 = 0.00
Yes	14	.764	.675	.834	$Q_W(25)=86.107$, p<.001
Progressive effort:					$Q_B(1)=0.422$, p=.516
No or not reported	15	.791	.712	.853	R^2 = 0.0
Yes	12	.754	.655	.832	$Q_W(25)=84.040$, p<.001
Physical training supervised:					$Q_B(1)=0.022$, p=.881
No or not reported	9	.768	.640	.861	R^2 = 0.00
Yes	18	.778	.706	.836	$Q_W(25)=87.285$, p<.001
Supervisor training:					$Q_B(3)=3.464$, p=.325
Physical exercise instructor	4	.700	.521	.834	R^2 = .120
Physical therapist	9	.805	.705	.878	$Q_W(11)=42.118$, p<.001
Occupational therapist	1	.907	.671	.979	
Experienced researcher	1	.650	.203	.931	
Psychological treatment:					$Q_B(1)=1.416$, p=.234
No	18	.749	.667	.817	R^2 = 0.0
Yes	9	.818	.723	.886	$Q_W(25)=85.550$, p<.001
Psychological treatment to improve					$Q_B(1)=1.547$, p=.214

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adherence:	26	.768	.707	.820	R^2 = .040
No	1	.906	.649	.980	$Q_W(25)=81.953, p<.001$
Yes					

Moderator variables (continuous)	***k***	b_j	**Z**	***P***	Q_E	**R²**
Treatment characteristics:						
Duration (nº of weeks)	27	-0.025	-0.95	.344	86.05***	0.0
Intensity (nº sessions in a week)	26	-0.081	-0.62	.532	81.95***	0.0
Sessions (total nº of sessions)	26	-0.010	-1.26	.206	80.56***	0.0
Sessions duration (in minutes)	25	0.010	2.02	.043	59.89***	.160
Treatment magnitude (total hours)	25	0.010	0.99	.320	66.06***	.020
Walking magnitude (total hours)	25	-0.021	-1.20	.229	67.07***	0.0
Mean effort	16	0.007	0.66	.506	42.79***	0.0
% of supervised sessions	15	-0.013	-1.54	.123	38.98***	.280

k = number of studies in each category. P_+ = mean adherence rate for each category. P_L and P_U = lower and upper limits of the 95% confidence interval around the mean adherence rate for each category. Q_B = between-categories statistic to test the mean adherence rates. Q_W = total within-category statistic to test the model misspecification. R^2 = proportion of variance explained by the quality item. b_j = regression coefficient of the moderator variable. Z = statistical test of b_j. Q_E = residual heterogeneity statistic to test the model misspecification. *** $p < .001$. R^2 = proportion of variance explained by the moderator variable.

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DISCUSSION

To the best of our knowledge, this systematic review and meta-analysis is the first with the aim to explore the adherence to interventions that include walking as exercise in patients with fibromyalgia. Overall findings showed high rates of adherence to these programs and only the longer duration of the sessions and the recruitment of participants by physicians were relevant among the different moderator variables of adherence collected in this review. The high heterogeneity between the studies could be an explanation of this issue.

With regard to the high rates of adherence in terms of attendance to the program, our findings are coincident with a review of aerobic exercises in fibromyalgia that established a mean of attendance of 78.1% in experimental groups and 83.1% in control groups [11]. These high rates are appropriate to maintain the benefits of physical exercise in a population with chronic muskuloskeletal pain [22] and fibromyalgia [18], as long as people continue to exercise once the program is finished. According to the similarity of adherence rates with other studies of aerobic exercise in fibromyalgia with proven effectiveness, this could mean that walking, an easy, comfortable, and recommended exercise in this population is indeed expedient in sustaining physical activity in these persons. However, adherence to walking in and between exercise sessions is not known because it is not reported in any of the studies included in this review. In addition, in concordance with a recent umbrella study (review of reviews) on exercise interventions in fibromyalgia [54], none of the studies included in our review took advantage of the appliances to monitor heart rates in order to report whether the participants reached the target intensity or the intensity progression. Although 18 of the 27 experimental groups were supervised in-session, we do not know whether participants completed their exercises as instructed. Some authors have suggested the use of scales to supervise performance [55, 56]. Nevertheless, the supervision of exercise performance in-session does not reflect what happens between sessions and after the treatment in an unsupervised environment. Under supervision, the individual does not have the autonomy to choose whether or not to adhere [55]. Therefore, it would be necessary to measure the performance between sessions and after the treatment to know the real adherence by individual choice.

Regarding adherence after treatment, in only two studies was the adherence to exercise reported throughout follow-up. One of these was a multidisciplinary study [41] and as the exercises performed were strength and aerobic exercises, we cannot know what was assessed in the follow-up, but in the other [46], although it was multicomponent, 67% of patients chose walking in the follow-up. The absence of data regarding adherence to physical exercise in fibromyalgia is observed in prior systematic reviews [19, 21]. Specifically, in the context of supervised interventions of walking in samples with chronic diseases including fibromyalgia, information about participants' adherence was also scarce [16].

Longer sessions were associated with better adherence to walking. This is consistent with the outcomes from other systematic reviews that showed that longer exercise interventions (more than 2000 minutes in the whole treatment) yielded the best results in terms of multidimensional and physical function and pain [11, 54]. This highlights the fact that too little exercise could fail to yield benefits [18], but as is well known, too much exercise could also exacerbate symptoms [20]. Given the former, we could establish the range obtained in our studies as a guideline for the duration of sessions: from 25 to 60 minutes because the 180-minute study was an exception and also included several activities besides exercise in only a single week of multidisciplinary intervention [43].

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As regards the second moderator, when the participants were recruited by physicians, either from specialized or primary care, adherence rates to the program were higher. The remaining options of recruitment were generally through the contact of researchers with patients' associations and the voluntary attendance of participants through advertisements. In the context of adherence to drug therapies in fibromyalgia, the therapeutic relationship is influential [57] in the sense that with lower physician-patient discrepancy and longer treatment with the professional, it is more likely that patients adhere to the treatments [58]. Moreover, in a population with chronic fatigue it has been shown that the provider expertise also influences the adherence of participants [59]. Our results are consistent with the above findings and show the relevance of the professionals' behavior in adherence. Compliance with the intervention in programs with walking may also be related to the effect of what could be interpreted as the advice given by a doctor, who is seen as a reference authority and with whom a relationship of trust has been established. In fact, in a previous study, medical advice was the most important predictor of walking (60). This should be taken into account in order to reinforce the persuasiveness of doctors in the communication with their patients also in encouraging physical exercise.

Otherwise, our findings are not consistent with other systematic reviews that reported the improvement of adherence to exercise through the implementation of strategies for enhancing self-efficacy and self-management on samples of chronic pain [22] and fibromyalgia [18-21]. There is evidence of positive effects on adherence including educational or behavioral techniques to encourage accomplishment [23] or incorporating cognitive behavioral therapy, education, or relaxation [19]. In our study, we have classified this type of intervention as multidisciplinary studies but we have not obtained significant results among different types of treatment (one-component, multi-component or multidisciplinary) on adherence, whereas the results of another recent review showed that combining different exercises had higher rates of therapeutic adherence [61]. However, to analyze the moderators of adherence better, more studies that include this aim might be necessary [31]. In this sense and returning to the comments above on the duration of sessions as a moderator, the length of sessions was generally lower in the one-component than in the other interventions. Although we did not obtain the type of intervention as a moderator, we may consider the possibility of better adherence due to the combination with other activities in multicomponent and multidisciplinary programs.

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There are some limitations that should be taken into account in this review. We might be overestimating the adherence to walking exercise through the rates obtained. Apart from the specific lack of information on whether the participants performed walking in and between exercise sessions, we have calculated the estimates of adherence from 27 studies in which 10 included walking as the only exercise. In fact, although high the mean of estimates of the 10 experimental only-walking-exercise groups is slightly lower than the other two. This could suggest that including other activities in itself produces better adherence, but as the type of intervention was not a moderator, more investigation is needed to determine whether this fact is related to the lack of data reported by studies, the mode of codification of data in this review or even, to the still low number of studies of walking in this sample.

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Another limitation could be that, given that only two variables have emerged as moderators of adherence, it is likely that we overlooked other potential moderators. Further research is needed to explain further the variability among adherence rates. Some contextual variables have shown an influence on adherence to treatments in muskuloskeletal pain [62]: patients' expectations of the treatment [63], the therapeutic relationship between professional-participant [64] and the physical environment of the intervention [65]. Alternatively, variables related to the characteristics of patients such as severity of disorder, comorbid conditions and age that could hinder exercise [53] might be relevant as moderators of adherence, since there is growing interest in tailoring the programs not only to improve the exercise adherence in fibromyalgia but also to optimize the benefits of physical activity [18].

Finally, regarding the limitations of the included studies themselves, we discovered a lack of clearness around the criteria used to distinguish the participants who completed the treatment and those that did not. Moreover, it was difficult to find coherence amongst the heterogeneity of terms found in studies referring to the participants who follow or do not follow treatment and that might generate bias in the review [66].

This review has several strengths. On the one hand, we have conducted an extensive search into all interventions of recent years containing walking exercise as treatment in fibromyalgia in any setting, including quasi-experimental trials, rather than limiting inclusion to studies on the basis of experimental design, or because they are only walking-based, or have only one context of intervention. On the other hand, the methodological quality of the assessment of adherence of most of the studies included reached moderate to high quality.

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Conclusions

The studies reviewed showed overall moderate to high adherence rates in programs with walking exercise. Nonetheless, these adherence rates were mostly based only on the attendance at sessions of supervised exercise. So we do not know if participants of these interventions sustained the walking exercise during and after the treatment. Nor do we know the intensity, the duration, or the frequency of the exercise performed between sessions and once the program was finished. Therefore, this review shows the attendance at sessions as a first step in the study of the efficacy of interventions regarding walking adherence. More studies are needed to investigate the assessment of exercise parameters in order to find the proper prescription for better adherence to walking in fibromyalgia.

The meta-analysis of different types of walking interventions showed that physicians may encourage better adherence of people with fibromyalgia, and that the duration of sessions above 60 minutes and combinations with other activities may result in better adherence to walking than those of around 20 minutes. Further research is needed to improve knowledge of the moderator variables in adherence rates to walking.

Meanwhile, we encourage further and better reports on adherence issues and the strategies carried out in trials both to assess and to manage them in order to provide data for future research. To this end, the assessment of both adherence to the frequency and intensity of exercise, and increased fibromyalgia symptoms and adverse events associated with walking need to be systematically documented and reported.

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APORTACIÓN INDIVIDUAL DE LA DOCTORANDA EN ESTE TRABAJO:

- Elaboración de un protocolo del proceso a seguir durante la revisión sistemática
- Búsquedas bibliográficas y selección de los estudios en paralelo a las co-autoras
- Elaboración del protocolo de codificación y un Excel para codificar los datos de cada estudio junto a la co-autora
- Preparación de las tablas del análisis descriptivo de los estudios y la base de datos SPSS para los análisis meta-analíticos
- Elaboración de la medida para la evaluación de la calidad metodológica de los estudios junto al co-autor experto en metodología y las autoras expertas en la materia de fibromialgia
- Redacción final del trabajo junto a co-autor y co-autoras

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APPENDIX 1.

PUBMED SEARCH

Recent queries in pubmed

Search,Query,Items found,Time

#19,"Search (((""Walking""[Mesh]) AND ""Fibromyalgia""[ti] AND Humans[Mesh])) OR ((""Walking""[Mesh]) AND ""Fibromyalgia""[Mesh] AND Humans[Mesh])) OR (""Walking""[ti]) AND ""Fibromyalgia""[Mesh]) Filters: Humans",41,07:15:22

#20,"Search (((""Walking""[Mesh]) AND ""Fibromyalgia""[ti] AND Humans[Mesh])) OR ((""Walking""[Mesh]) AND ""Fibromyalgia""[Mesh] AND Humans[Mesh])) OR (""Walking""[ti]) AND ""Fibromyalgia""[Mesh])",41,07:14:47

#38,"Search (((""Fibromyalgia""[Mesh]) AND ((""Exercise""[Mesh]) OR ""Motor Activity""[Mesh]))) NOT (((((""Walking""[Mesh]) AND ""Fibromyalgia""[ti] AND Humans[Mesh])) OR ((""Walking""[Mesh]) AND ""Fibromyalgia""[Mesh] AND Humans[Mesh])) OR (""Walking""[ti]) AND ""Fibromyalgia""[Mesh])) AND Humans[Mesh]) Filters: Humans",257,05:25:15

#39,"Search (((""Fibromyalgia""[Mesh]) AND ((""Exercise""[Mesh]) OR ""Motor Activity""[Mesh]))) NOT (((((""Walking""[Mesh]) AND ""Fibromyalgia""[ti] AND Humans[Mesh])) OR ((""Walking""[Mesh]) AND ""Fibromyalgia""[Mesh] AND Humans[Mesh])) OR (""Walking""[ti]) AND ""Fibromyalgia""[Mesh])) AND Humans[Mesh])",257,05:25:13

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#37,"Search (""Fibromyalgia""[Mesh]) AND ((""Exercise""[Mesh]) OR ""Motor Activity""[Mesh])",300,05:23:01

#36,"Search (""Fibromyalgia""[Mesh]) AND ((""Exercise""[Mesh]) OR ""Motor Activity""[Mesh]) Filters: Humans",298,05:23:01

#34,"Search (""Exercise""[Mesh]) OR ""Motor Activity""[Mesh] Filters: Humans",134603,05:22:33

#35,"Search (""Exercise""[Mesh]) OR ""Motor Activity""[Mesh]",200231,05:22:33

#33,"Search (((""Exercise/therapeutic use""[Mesh]) OR ""Motor Activity/therapeutic use""[Mesh])) AND ""Fibromyalgia""[Mesh]",0,05:22:03

#32,"Search (((""Exercise/therapeutic use""[Mesh]) OR ""Motor Activity/therapeutic use""[Mesh])) AND ""Fibromyalgia""[Mesh] Schema: all Filters: Humans",0,05:22:03

#30,"Search (((""Exercise/therapeutic use""[Mesh]) OR ""Motor Activity/therapeutic use""[Mesh])) AND ""Fibromyalgia""[Mesh] Filters: Humans",0,05:22:03

#29,"Search (((""Exercise/therapeutic use""[Mesh]) OR ""Motor Activity/therapeutic use""[Mesh])) AND (""Fibromyalgia""[Mesh] OR ""Fibromyalgia""[ti])",0,05:21:38

#28,"Search (((""Exercise/therapeutic use""[Mesh]) OR ""Motor Activity/therapeutic use""[Mesh])) AND (""Fibromyalgia""[Mesh] OR ""Fibromyalgia""[ti]) Schema: all Filters: Humans",0,05:21:38

#26,"Search (((""Exercise/therapeutic use""[Mesh]) OR ""Motor Activity/therapeutic use""[Mesh])) AND (""Fibromyalgia""[Mesh] OR ""Fibromyalgia""[ti]) Filters:

Humans",0,05:21:38
#24,"Search (""Exercise/therapeutic use""[Mesh]) OR ""Motor Activity/therapeutic use""[Mesh] Filters: Humans",173,05:20:28
#25,"Search (""Exercise/therapeutic use""[Mesh]) OR ""Motor Activity/therapeutic use""[Mesh]",489,05:20:28
#18,"Search ""Walking""[Mesh]) AND ""Fibromyalgia""[ti]",39,05:18:06
#17,"Search ""Walking""[Mesh]) AND ""Fibromyalgia""[ti] Filters: Humans",39,05:18:06
#16,"Search ""Walking""[ti]) AND ""Fibromyalgia""[Mesh]",7,05:17:43
#15,"Search ""Walking""[ti]) AND ""Fibromyalgia""[Mesh] Filters: Humans",7,05:17:43
#14,"Search (""Walking""[Mesh]) AND ""Fibromyalgia""[Mesh] Filters: Humans",41,05:16:16
#13,"Search (""Walking""[Mesh]) AND ""Fibromyalgia""[Mesh]",41,05:16:16
#12,"Search ""Motor Activity""[Mesh]",200231,05:11:18
#9,"Search ""Walking""[Mesh]",20646,05:09:40
#6,"Search nonpharmacologic",3151,05:08:59
#4,"Search ""Exercise""[Mesh]",122821,05:08:20
#2,"Search ""Fibromyalgia""[Mesh]",6357,05:07:10

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APPENDIX 2

REFERENCES OF EXCLUDED STUDIES

1. **Reason of exclusion:** Single-case research.

   Kelley C, David L. Comparing the Effects of Aquatic and Land-Based Exercise on the Physiological Stress Response of Women with Fibromyalgia. Ther Recreation J 2008; 42(2): 103-118.

2. **Reason of exclusion:** Language (Portuguese).

   Matsutani LA, Assumpção A, Marques AP. Exercícios de alongamento muscular e aeróbico no tratamento da fibromialgia: estudo piloto. Fisioter mov 2012; 25(2): 411-418. Available from: http://www.scielo.br/scielo.php?script=sci_arttext&pid=S0103-51502012000200019&lng=en. Doi: 10.1590/S0103-51502012000200019.

3. **Reason of exclusion:** Walking only at warm-up.

   Sañudo B, Carrasco L, de Hoyo M, McVeigh JG. Effects of exercise training and detraining in patients with fibromyalgia syndrome: a 3-yr longitudinal study. Am J Phys Med Rehabil 2012; 91(7): 561-9; quiz 570-3. doi: 10.1097/PHM.0b013e31824faa03.

4. **Reason of exclusion:** Cross-over experimental design.

   Holtgrefe K, McCloy C, Rome L. Changes associated with a quota-based approach on a walking program for individuals with fibromyalgia. J Orthop Sports Phys Ther 2007; 37(12): 717-24. doi: 10.2519/jospt.2007.2607.

5. **Reason of exclusion:** Report of an included study (Mannerkorpi et al. 2010).

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Jones KD. Nordic walking in fibromyalgia: a means of promoting fitness that is easy for busy clinicians to recommend. Arthritis Res Ther 2011; 13(1): 103. doi: 10.1186/ar3225.

6. **Reason of exclusion:** Before 1995.

   Nichols D, Glenn T. Effects of aerobic exercise on pain perception, affect, and level of disability in individuals with fibromyalgia. Physl Ther 1994; 74(4): 327-332.

7. **Reason of exclusion:** Abstract / no full text because: 1) denied request in university library and 2) no success in contact with authors.

   Fernandes G, Jennings F, Buosi AL, Nery M, Natour J. Swimming is as effective as walking for treating fibromyalgia: A randomized controlled trial. [Abstract] Available from: http://pesquisa.bvsalud.org/evidences/resource/es/CN-01011513

8. **Reason of exclusion:** Abstract / no full text because: 1) denied request in university library and 2) no success in contact with authors.

   Gul U, Tander B, Bilgici A, Canturk F, Kuru O. Effects of various exercise programs on physical and psychological parameters in women with primary fibromyalgia syndrome. [Abstract] Turkiye Fiziksel Tip ve Rehabilitasyon Dergisi 2011; 182.

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APPENDIX 3

ASSESSMENT OF METHODOLOGICAL QUALITY OF REPORTED ADHERENCE:

INSTRUCTIONS: These items are dichotomous (0: No; 1: Yes, meet the quality criteria) except item 8, that reproduces the proportion of adherence to walk (values between 0 and 1).

A. Design quality	(0)No / (1)Yes
1. The study sample was randomly selected.	
2. Experimental groups have been randomized.	
3. The random assignment procedure is explained.	
4. The randomization procedure is correct.	
5. It has been concealed during the randomization process.	
6. Assessors were blinded	
7. It is a design with a control group and (two or more) pre-post groups.	
B. Data quality	
8. The adherence to the treatment is reported*	
9. The adherence data is specific to the activity of walking.	
10. The number of subjects who do not complete or drop-out the study is reported.	
11. Percentage of adherence.	
12. There is comparative analysis between those who complete and those who do not complete the intervention.	
13. The test result is “no differences”.	
C. Fibromyalgia criteria	
14. An accurate diagnosis is made through ACR criteria (1990, 2010).	

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APPENDIX 4

SUPPLEMENTARY TABLES A, B, C and D

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Supplementary Table A: Adherence data and methodological quality items.

Study reference	Country	EVA1	EVA2	EVA3	EVA4	EVA5	EVA6	EVA7	EVA8	EVB9	EVB10	EVB11	EVA12	EVB13	EVC14	QTOT	CAT
Bircan et al 2008	TUR	0	1	0	0	0	0	0	0	0	1	0.85	0	0	1	3.85	Poor
Casanueva-Fernandez et al 2012	SPA	0	1	0	0	0	0	1	0	0	1	0.94	0	0	1	4.94	Medium
Etnier et al 2009	USA	0	1	0	0	0	0	1	1	0	1	0.65	1	1	1	7.65	Medium
Gowans et al 2001	CAN	0	1	1	1	0	1	1	1	0	1	0.67	1	1	1	10.67	High
Hamnes et al 2012	NOR	0	1	0	0	0	1	1	0	0	1	0.91	0	0	1	5.91	Medium
Harden et al 2012	USA	0	0	0	0	0	0	0	1	0	1	0.43	1	0	1	4.43	Poor
Kayo et al 2012	BRA	0	1	1	1	1	0	1	0	0	1	0.93	1	0	1	8.93	Medium
King et al 2001a	CAN	0	1	1	1	1	1	1	1	0	1	0.56	1	0	1	10.56	High
King et al 2001b	CAN	0	1	1	1	1	1	1	1	0	1	0.41	1	0	1	10.41	High
Latorre et al 2013	SPA	0	0	0	0	0	0	1	1	0	1	0.92	0	0	1	4.92	Medium
Lemstra et al 2005	CAN	0	1	1	1	1	1	1	1	0	1	0.91	1	1	1	11.91	High
Lera et al 2009a	SPA	0	1	1	1	0	0	0	1	0	1	0.80	1	1	1	9.80	High
Lera et al 2009b	SPA	0	1	1	1	0	0	0	1	0	1	0.80	1	1	1	9.80	High
Mannerkorpi et al 2010a	SWE	0	1	1	1	1	1	1	1	1	1	0.85	0	0	1	10.85	High
Mannerkorpi et al 2010b	SWE	0	1	1	1	1	1	1	1	1	1	0.88	0	0	1	10.88	High
Meiworm et al 2000	GER	0	1	0	0	0	0	1	0	0	1	0.87	0	0	1	4.87	Poor
Meyer et al 2000a	USA	0	1	0	0	0	0	0	0	1	1	0.38	0	0	1	4.38	Poor

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Supplementary Table A: Adherence data and methodological quality items (continuation).

Meyer et al 2000b	USA	0	1	0	0	0	0	0	0	1	1	0.63	0	0	1	4.63	Poor
Paolucci et al 2014	ITA	0	1	1	1	0	1	1	1	0	1	0.84	0	0	1	8.84	Medium
Richards & Scott 2002	UK	0	1	1	1	0	0	1	1	0	1	0.53	0	0	1	7.53	Medium
Rooks et al 2007a	UK	0	1	1	1	1	0	0	1	0	1	0.73	1	1	1	9.73	Medium
Rooks et al 2007b	UK	0	1	1	1	1	0	0	1	0	1	0.69	1	1	1	9.69	Medium
Rooks et al 2007c	UK	0	1	1	1	1	0	0	1	0	1	0.69	1	1	1	9.69	Medium
Sanudo et al 2010a	SPA	0	1	1	1	1	1	1	1	0	1	0.89	0	0	1	9.89	Medium
Sanudo et al 2010b	SPA	0	1	1	1	1	1	1	1	0	1	0.86	0	0	1	9.86	Medium
Sanudo et al 2011	SPA	0	1	1	1	1	1	1	1	0	1	0.85	0	0	1	9.85	Medium
Valim et al 2002	BRA	0	1	0	0	0	0	0	0	0	1	0.81	1	0	1	4.81	Poor

SD: Standard deviation; Adh/adh: adherence; EVA1: Randomly selected; EVA2: Random assignment (RA); EVA3: RA described; EVA4: Randomization correct; EVA5: Random allocation; EVA6: Assessors masking; EVA7: Pre-post control group design; EVA8: Adherence reported; EVB9: Adherence to walking; EVB10: number of drop-out reported; EVB11: percentage of adherence; EVB12: dropouts-completers (DC); EVB13: No difference between DC; EVB14: ACR (1990 or 2010) criteria; QTOT: rate of methodological quality design; CAT: category of quality design according to QTOT scores: poor quality (0 – 4.99), medium quality (5 – 9.99) and high quality (10 – 14).

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Supplementary Table B: Patient information, adherence, and follow-up

Study reference	N1	N2	Sex (%W)	Age in years M (SD)	Years of disorder M (SD)	Reported adh (SD or range)	Adh measure	Calcu-lated adh	F-up measures (mo/wk)	F-up adh
Bircan et al 2008	13	11	100	48.3 (5.3)	3.85 (3.31)	NR	-	84.62	NR	-
Casanueva-Fernandez et al 2012	17	16	94.11	47.76 (NR)	NR	NR	-	94.12	1 Mo	-
Etnier et al 2009	8	8	100	54.69 (9.25)	NR	65 (48-80)	Mean adherence	100	NR	-
Gowans et al 2001	27	15	86.66	46.7 (10.3)	11.6 (10.4)	67 (46-84)	Mean adherence	55.56	6. 12 Mo	18/15
Hamnes et al 2012	75	68	92	45.4 (9.4)	7.03 (7.01)	NR	-	90.67	3 Wk	58/68
Harden et al 2012	26	9	76.92	46 (NR)	NR	43	Percentage adherence	34.62	NR	-
Kayo et al 2012	30	28	100	47.7 (5.3)	4 (3.1)	NR	-	93.33	12 Wk	23/28
King et al 2001a	46	21	100	45.2 (9.4)	7.8 (6.1)	75.20 (±21)	Mean adherence	55.56	3 Mo	30/30
King et al 2001b	37	15	100	47.4 (9)	8.9 (7.3)	83.30 (±22.40)	Mean adherence	40.54	3 Mo	26/26
Latorre et al 2013	48	42	100	52.4 (8.01)	9.04 (4.84)	92 (75-80)	Mean adherence	87.5	NR	-
Lemstra et al 2005	43	36	86	49.7 (9.57)	10.14 (10.69)	90.56 (±1.72)	Percentage adherence	83.72	12 Mo	35/36
Lera et al 2009a	40	33	100	51.9 (8.4)	19 (10.5)	80	Percentage adherence	82.5	6 Mo	30/35
Lera et al 2009b	43	35	100	50.4 (9)	14 (10.7)	80	Percentage adherence	81.4	6 Mo	31/33
Mannerkorpi et al 2010a	34	29	100	48 (7.8)	11 (5.4)	62 (0-100)	Mean adherence	85.29	6 Wk	28/29
Mannerkorpi et al 2010b	33	29	100	50 (7.6)	12 (5.3)	50 (0-93)	Mean adherence	87.88	6 Wk	26/29
Meiworm et al 2000	31	27	92.59	45 (10)	NR	NR	-	87.1	NR	-
Meyer et al 2000a	8	3	100	49.5 (6.3)	13.1 (15.5)	NR	-	37.5	NR	-
Meyer et al 2000b	8	5	100	49.5 (6.3)	13.1 (15.5)	NR	-	62.5	NR	-
Paolucci et al 2014	19	16	NR	50.1 (8.90)	NR	84.2	Percentage adherence	84.21	12 Mo	-
Richards & Scott 2002	69	57	89.85	48 (NR)	6.5 (NR)	53	Percentage adherence	82.61	6. 12 Mo	-
Rooks et al 2007a	51	35	100	48 (11)	5 (4)	73	Mean adherence	68.63	6 Mo	-
Rooks et al 2007b	51	35	100	50 (11)	6 (4)	78	Mean adherence	68.63	6 Mo	-
Rooks et al 2007c	55	38	100	50 (11)	6 (6)	78	Mean adherence	69.09	6 Mo	-
Sanudo et al 2010a	22	18	100	55.9 (NR)	NR	89 (43-48)	Mean adherence	81.82	NR	-
Sanudo et al 2010b	21	17	100	55.9 (NR)	NR	86 (41-48)	Mean adherence	80.95	NR	-
Sanudo et al 2011	21	18	100	55.48 (7.14)	NR	85	Mean adherence	85.71	NR	-
Valim et al 2002	32	26	100	47 (10)	NR	NR	-	81.25	NR	-

Q: rate of methodological quality design; N1: number of participants at the beginning of the study; N2: number of participants at the end; W: women; Adh: adherence; M: medium; SD: Standard deviation; F-up: follow-up; Mo: months; Wk: week.

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Supplementary Table C. Criteria for adherence in reviewed studies

	Percentage adherence	**Mean adherence**
COMPLETER	Participants who "attended over a third of the classes" [35] "to complete the intervention with no one below 80% attendance adherence (not formally measured)" [40] A patient was a *completer* if "completed the program and post assessments" [41]	Subjects had "to attend 45% of the exercise sessions" [45]
	Studies that did not report adherence rate	**Mean adherence**
NO COMPLETER	*Dropouts* were: "patients who missed more than nine treatment sessions (20%), missed more than three consecutive sessions and/or had been evaluated 10 days after the scheduled appointment" [39] "patients did not fulfil the required training, executing either too-short training sessions or with inadequate intensity (HR <100/min)" [33]	A participant was *non-complier:* "when missing three consecutive sessions or 12 of the 36 sessions of exercises [34]

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Supplementary Table D. Results of the subgroup analyses for the dichotomous quality items.

Quality item	k	P_+	95% CI P_L	95% CI P_U	ANOVA results
EVA2. Random assignment (RA):					$Q_B(1)=0.255$, $p=.613$
No	2	.722	.453	.891	$R^2 = 0.0$
Yes	25	.780	.717	.832	$Q_W(25)=85.837$, $p<.001$
EVA3. RA described:					$Q_B(1)=0.021$, $p=.886$
No	10	.781	.670	.863	$R^2 = 0.0$
Yes	17	.773	.697	.834	$Q_W(25)=85.562$, $p<.001$
EVA5. Random allocation:					$Q_B(1)=0.265$, $p=.607$
No	15	.761	.672	.833	$R^2 = 0.0$
Yes	12	.791	.702	.858	$Q_W(25)=86.372$, $p<.001$
EVA6. Assessors masking:					$Q_B(1)=0.369$, $p=.544$
No	16	.760	.675	.829	$R^2 = 0.0$
Yes	11	.795	.703	.865	$Q_W(25)=85.861$, $p<.001$
EVA7. Pre-Post control group					$Q_B(1)=1.780$, $p=.182$
design:	10	.724	.608	.815	$R^2 = 0.0$
No	17	.805	.731	.862	$Q_W(25)=87.179$, $p<.001$
Yes					
EVA8. Adherence reported:					$Q_B(1)=1.778$, $p=.182$
No	8	.832	.727	.903	$R^2 = .120$
Yes	19	.753	.683	.812	$Q_W(25)=76.899$, $p<.001$
EVA9. Adherence for walking:					$Q_B(1)=8.633$, $p=.003$
No	23	.803	.748	.848	$R^2 = .230$
Yes	4	.540	.352	.717	$Q_W(25)=69.736$, $p<.001$
EVB12. Dropouts-Completers					$Q_B(1)=0.009$, $p=.922$
(DC):	14	.778	.688	.849	$R^2 = 0.0$
No	13	.773	.686	.841	$Q_W(25)=85.491$, $p<.001$
Yes					
EVB13. No difference between					$Q_B(1)=0.001$, $p=.981$
DC:	19	.775	.699	.836	$R^2 = 0.0$
No	8	.776	.665	.859	$Q_W(25)=85.115$, $p<.001$
Yes					

k = number of studies in each category. P_+ = mean adherence rate for each category. P_L and P_U = lower and upper limits of the 95% confidence interval around the mean adherence rate for each category. Q_B = between-categories statistic to test the mean adherence rates. Q_W = total within-category statistic to test the model misspecification. R^2 = proportion of variance explained by the quality item. Item 1 (random sampling) was excluded from the analyses because all studies scored 0. Items 10 (dropouts reported) and 14 (diagnosis by ACR) were excluded from the analyses because all studies scored 1. Item 4 (correct random assignment) was excluded from the table because it presented identical results to those of item 3 (random assignment described). Item 11 (adherence proportion) was excluded from this table because it was a continuous variable.

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5.3. Estudio 3: Prevalencia de la pauta de andar y sus predictores.

Artículo 3

Prevalence and predictors of unsupervised walking and physical activity in a community population of women with fibromyalgia

AUTHORS

Sofía* López-Roig PhD, María-Ángeles* Pastor PhD, Cecilia** Peñacoba PhD, Ana* Lledó PhD, Yolanda* Sanz, Lilian**Velasco PhD.

*Department of Health Psychology, Miguel Hernández University. San Joan d'Alacant.
**Department of Medicine and Surgery, Public Health, Psychology and Immunology and Medical Microbiology, Rey Juan Carlos University, Madrid.

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ABSTRACT

Objectives*:* This study was designed *to estimate the prevalence* of unsupervised walking for *exer*cise in women with fibromyalgia and whether they meet selected walking criteria; to describe their level of physical activity; and to identify the predictors of walking and physical activity among socio-demographic, symptom perception characteristics, and medical advice to walk.

Method*:* The 920 women in the sample (all members of fibromyalgia associations) completed the International Physical Activity Questionnaire-Short Form and self-reported scales to assess symptom perception, walking, medical advice to walk and physical comorbidity.

Results*:* Of the sample, 30.8% reported walking regularly for physical exercise. Walking was predicted by medical advice (odds ratio, OR): 1.876, 1.365 – 2.577) age (OR: 1.021, 1.005 – 1.036) and fatigue intensity (OR: 0.912, 0.850– 0.978). The prevalence of high intensity activity was 16%, moderate 40%, and low 44%. Predictors of low versus moderate and high physical activity were pain intensity (OR: 1.171, 1.075 – 1.275) and fatigue impact perception (OR: 1.076, 1.020 – 1.137). Symptom perception and socio-demographic characteristics were weak predictors.

Conclusions*:* Evidence suggests that FM shows low levels of unsupervised walking and physical activity. The results indicate the importance of doctors´ advice. Further work is required to examine other determinants of these low levels.

Keywords: Fibromyalgia, Unsupervised walking, Physical activity, Medical advice, Cross-sectional survey, Predictive analyses

INTRODUCTION

Fibromyalgia is a chronic condition characterized by widespread musculoskeletal pain, fatigue and sleeping problems among other symptoms. The importance of physical exercise is recognized as a component of the evidence-based guidelines for treatment of fibromyalgia [1]. Moderate aerobic exercise has shown improvements in pain intensity, physical function, depression, fatigue, and quality of life [2, 3]. Walking is a low-moderate intensity exercise, easily adaptable to a patient´s situation, which has been recommended in fibromyalgia [4-9]. However, only moderate adherence has been reported. In general, adherence to low intensity walking programs ranges between 50% and 62.5% and in moderate or high intensity walking programs is more variable [8,10-12]. In supervised exercise programs the percentage of adherence was between 70 and 80%. [7, 9, 13-15]. In summary, studies show that between 20 and50% of fibromyalgia patients do not complete exercise programs which include walking.

The studies we have reviewed show a recommendation variability regarding duration of walking, of 20 to 45 minutes [7-10], two or three times a week [7-9] over 8 to 24 consecutive weeks [7,9,10]. Resting periods are not factored into the walking exercise although some authors suggest including them in order to avoid fatigue and to ensure persistence. One recommendation for fibromyalgia is to walk between 2 and 4 times a week, about 50 minutes, in bouts of 15 to 20 minutes, with a small rest between bouts, over a minimum of six consecutive weeks [16]. Most of these studies involve supervised walking routines in combination with other exercises [13-15] or as the only exercise [7-10]. Consequently there is still a lack of knowledge concerning walking in a natural context as unsupervised physical exercise. Thus, it is important to know the implementation of unsupervised walking exercise in women with fibromyalgia as well as in clinical practice in terms of medical advice. Physicians should play a significant role in promoting walking, but again there is a lack of studies that explore this issue.

Women with fibromyalgia show a low level of everyday physical activity. Although physical activity has a significant impact on health and should be promoted [17, 18], the few recent studies we have found that have focused on it, show a lack of conclusive data [19-22].Thus further studies are needed.

In summary, taking into account the recommendation of exercise in fibromyalgia guidelines [17] and the health benefits of physical activity, it is important to investigate these issues for clinical interventions and exercise rehabilitation. Thus, in a population of women with fibromyalgia, the current study aims are: 1) to estimate the prevalence of unsupervised walking for exercise and the frequency of medical advice to walk; 2) to describe their level of physical activity; 3) to identify predictors of walking and physical activity among patients´ characteristics along with medical advice.

METHODS

Study design and participants

This was a cross-sectional survey performed in people with fibromyalgia belonging to patients’ associations. A questionnaire with self-reported measures was sent by ordinary mail (n= 2227). It was tested previously for comprehension and duration with 10 women suffering from fibromyalgia.

A total of 920 people from Alicante (ADEFA: *n* = 46), Elche (AFEFE: *n* = 201), Madrid (AFIBROM: *n* = 489) and Talavera de la Reina (AFIBROTAR: *n* =184) returned questionnaires and met the inclusion criteria: women, aged 18-70 years old, who fulfill the London-4 criteria for fibromyalgia [23]. Participants were diagnosed either by rheumatologists (77%) or by primary physicians (9.2%). However, as we do not have a second clinical diagnosis confirmation, the London-4 criteria were used to ensure population homogeneity because of its optimal sensitivity (100%) [24]. The entire study has the trial registration number ISRCTN6858489 [25].

Measurements

Variables were assessed in the questionnaire sent by ordinary mail which also included data about participants´ characteristics (age, educational level, occupational status, duration of problem, time since diagnosis).

Pain intensity. The mean score of the maximum, minimum and overall pain intensity over the last 7 days, and pain intensity at the time of completing the questionnaire were assessed with a numerical rating scale (0 = no pain, and 10 = the worst pain you can imagine). Reliability of the scale in this sample was good (Cronbach´s $\alpha = 0.86$).

Fatigue perception and its impact, tiredness at waking, cognitive problem perception and its impact, sleep problem perception impact, were all assessed with a numerical rating scale (0= nothing to 10= totally) referring to the previous week. We chose these symptoms from the fibromyalgia symptom severity criteria developed by Wolfe [26]. They were treated individually, not in a composite score.

Physical comorbidity and its perceived limitation on walking. We asked about other chronic disease diagnoses (yes/no). Participants were asked to select from a list or to write the specific condition if it was not listed. We calculated the total number of diseases in addition to fibromyalgia. Finally, their perceived limitation on walking was assessed on a five point Likert scale (1=never prevents me from walking, 5=always prevents me from walking).

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Medical advice. We assessed whether participants had been advised to walk for exercise by their doctor (yes/no).

Walking for exercise. We explored a specific criterion (*walking at least 30 minutes, in bouts of 15 minutes, with a small rest between bouts, twice a week, over a minimum of six consecutive weeks)* based on previous recommendations [16].

Four items with multiple choice answers were designed to assess each domain of the criterion. All questions referred to the last six weeks and to walking with the specific purpose of physical exercise. We have obtained information reported by patients about: whether they walk or not, and if they do, how many times a week ("once a week,…, more than four times a week"), how long each time ("less than 30 minutes, 30 minutes, 30-60 minutes, more than 60 minutes"), whether they took rests ("yes, before 15 minutes walking, at 15 minutes walking, at 30 minutes walking, no I did not rest"), and how many consecutive weeks they keep up the walking habit ("none at all, 1-2 weeks, 3-4 weeks, 5 weeks, every 6 weeks").

By combining the answers, we were able to classify subjects into two groups: not walking at all and walking. And, secondly, women who walked were classified into "regular walkers" (walking fulfilling the entire minimum specific walking criteria), and "insufficient walkers" (who failed to fulfill one or more components of the walking criteria).

Physical Activity. We used the Spanish version of the International Physical Activity Questionnaire–Short Form (IPAQ-S) [27]. IPAQ-S asks for the time spent in the last week on different activities. We obtained scores for the Metabolic Equivalence (MET) minutes-week spent walking, moderate and vigorous intensity activities, as well as overall physical activity. A sitting score was also calculated as minutes per day. In addition, subjects were classified into one of three physical activity categories (low, moderate and high) following the IPAQ-S guidelines (www.ipaq.ki.se). The IPAQ has been used in different populations with acceptable psychometric properties [28]. Although some authors mention the psychometric limitations of the IPAQ-S in fibromyalgia [29, 30], in a recent review on physical activity instruments, the IPAQ-S showed acceptable psychometric properties [31]. The long form of the IPAQ has been used in Spanish fibromyalgia patients [19, 22], however no studies have been performed with the IPAQ-S.

Statistical analysis

Statistical analysis was conducted using SPSS version 21. Descriptive analyses were performed. A computer program was used to calculate confidence intervals (CI) of prevalence [32]. Comparisons were carried out using Chi-square test for categorical variables, Student's t-tests and one-way ANOVA for quantitative variables. As recommended, IPAQ-S data are reported as median values and inter-quartile ranges, and median nonparametric tests, with χ^2 as statistic, were used for comparisons [27]. Due to the number of comparisons a P value <.01 was accepted for statistical significance.

Univariate and multivariate logistic regression analyses were conducted to identify predictors for walking and physical activity. Binary dependent variables were: walking vs. not walking; walking regularly vs. insufficient walking; low vs. high/moderate levels of physical activity. Odds ratios (OR) and 95% CI were calculated. We examined predictors among socio-demographic variables, symptom perception, comorbidity, duration of problem, time of diagnosis and medical advice. Predictors associated with outcome at *P* (Wald) values <.30 were included in a multivariate logistic model with the backward step LR method.

RESULTS

Table 1. Participants' characteristics

Occupational status	n (%)			Educational level	n (%)
Working	265 (29.0)	Sick Leave	82 (9.0)	Write and read	109 (11.9)
Unemployed	177 (19.3)	Housewife	225 (24.6)	Primary	399 (43.4)
Retired	64 (7.0)	Student	4 (0.4)	Secondary	269 (29.3)
Retired due to pain	98 (10.7)	Sick Leave	82 (9.0)	University	142 (15.5)

	Mean (SD)	Walking [a]	Not Walking [b]
Age (years)[c]		53.3 (8.5)	51.7 (9.2)
Fatigue intensity [c]		8.0 (2.0)	8.4 (1.9)
Pain intensity	6.7 (1.7)		
Fatigue impact	6.9 (2.7)		
Tiredness at waking	8.1 (2.3)		
Cognitive problems	6.9 (2.6)		
Cognitive problems impact	6.5 (2.8)		
Sleep disorder impact	7.0 (2.9)		
Number of other chronic diseases	3.8 (2.4)		

[a] *N* = 545; [b] *N* = 375; [c] significant differences between walking and not walking groups

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Sample characteristics

The mean age of women was 52.6 ± 8.8 years. Mean time since diagnosis was 9.9 ± 5.7 years and duration of problem was 18.0 ± 10.5 years. Of the participants, 81.5% were under medical treatment for fibromyalgia at the time of the survey. Significant differences were observed between participants of the different associations for educational level (χ^2= 0.38; $P < 0.001$), employment status (χ^2= 0.28; $P < 0.001$) and mean time since diagnosis (F=9.85; $P < .000$). Symptom perception and other characteristics are presented in Table 1.

Walking description and predictors

Regarding walking, 30.8% were regular walkers according to our target behavior. Of the entire sample, 77.5% reported having received medical advice to walk, 15.3% did not walk and reported comorbidity impediments and doctor's advice for walking, and 19.5% did not walk and had no impediments (Table 2).

Table 2. Prevalence of selected walking behavior in entire sample.

Walking	*n*	Prevalence (%) [95% CI]	**Medical advice to walk**	
			NO (%)	**YES** (%)
Not walking, comorbidity [a] and no medical advice to walk	55	6.0 [4.6 - 7.7]	55 (100)	0
Not walking, comorbidity and medical advice to walk	141	15.3 [13.1 - 17.8]	0	141 (100)
Not walking and no impediments to walking	179	19.5 [17.0 - 22.1]	53 (29.8)	125 (70.2)
NOT WALKING	**375**	**40.8** [**37.6 - 44.0**]	**108 (28.9)**	**266 (71.1)**
Walking once a week	37	4.0 [2.9 - 5.5]	5 (13.5)	32 (86.5)
Walking not continuously	155	16.8 [14.6 - 19.4]	31 (20.0)	124 (80.0)
Walking under 30 minutes	53	5.8 [4.4 - 7.5]	15 (28.3)	38 (71.7)
Walking, resting before 15 minutes	17	1.8 [1.2 - 2.9]	2 (11.8)	15 (88.2)
'INSUFFICIENT WALKING'	*262*	*28.5* [*25.5 - 31.5*]	*53* ***(20.2)***	*209* ***(79.8)***
Walking without needing rest	146	15.9 [13.7 - 18.4]	27 (18.5)	119 (81.5)
Walking meeting the selected criteria	137	14.9 [12.7 - 17.3]	19 (13.9)	118 (86.1)
'REGULAR WALKING'	*283*	*30.8* [*27.9 - 33.8*]	*46* ***(16.3)***	*237* ***(83.7)***
WALKING	**545**	**59.2** [**56.0 - 62.4**]	**99 (18.2)**	**446 (81.8)**
Total	**920**	**100**	**207 (22.5)**	**712 (77.5)**

[a] comorbidity= perception of comorbidity prevents them for walking

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Walking and not walking groups showed significant differences in age (t= 2.686; *P* = 0.007), and fatigue intensity perception (t= -2.831; *P* = 0.005) (Table 1). No significant differences in walking groups were observed between patients' associations.

The first logistic regression analysis showed that age (OR= 1.021), medical advice to walk (OR= 1.876) and fatigue intensity perception (OR= 0.912) were predictive of walking versus not walking (Table 3). In the second analysis, we found non-significant predictors of walking regularly versus insufficient walking (Table 3).

Table 3. Multivariate logistic regression analyses of predictors of walking and physical activity.

	Walking vs. Not walking[a]	**Regular walking vs. Insufficient walking**[a]	**Low vs. Moderate/High physical activity**[a]
Predictors[b]	OR [95% CI]	OR [95% CI]	OR [95% CI]
Age	1.021** [1.005 — 1.036]		
Medical advice to walk (vs. not)	1.876*** [1.355 — 2.577]		
Fatigue intensity	0.912** [0.850 — 0.978]		
($\chi^2 = 29.203^{***}$)[c]			
Tiredness at waking		1.072 [0.996 — 1.155]	
($\chi^2 = 3.450$)[c]			
Pain intensity			1.171* [1.075 — 1.275]
Fatigue impact			1.076* [1.020 — 1.137]
($\chi^2 = 34.109^{***}$)[c]			

[a] Each model adjusted for other factors associated with outcome: educational level, occupational status, duration of problem, time since diagnosis, comorbidity, fatigue intensity, sleep disorder impact, cognitive problems and cognitive problems impact;
[b] In table only variables in the equation; [c] Test of model coefficient; * $p < 0.05$ ** $p < 0.01$ *** $p < 0.001$

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Physical activity description and predictors

Table 4 describes the level of physical activity in the entire sample. Women with university (Median = 360) and secondary studies (Median = 300) spent more time in sitting activities than women with primary studies and basic literacy skills (Median = 240) ($\chi^2 = 37.474$, $P < 0.001$). Significant differences in time spent sitting were found between patients' associations ($\chi^2 = 27.977$, $P < 0.001$). Walking and not walking groups showed significant differences in walking activity (χ^2= 36.343, P < 0.001) and total physical activity (χ^2 = 26.449, P < 0.001) (Table 4).

Table 4. Physical activity in entire sample and walking groups.

	Entire sample			**Walking group[b]**			**Not Walking group[c]**		
IPAQ-S measures[a]	**Median**	**[CI 95%]**	**IQR**	**Median**	**[CI 95%]**	**IQR**	**Median**	**[CI 95%]**	**IQR**
Sitting min/day	270.0	[240.5 - 300.5]	240						
Walking MET-min/week	693.0	[660.5 - 743.0]	1089	792	[743 - 990]	891	396	[297 - 462]	1386
Moderate MET-min/week	0.0	[0.5 - 0.5]	480						
Vigorous MET-min/week	0.0	[0.5 - 0.5]	0						
Total MET-min/week	835.0	[793.0 - 991.0]	1815	1053.0	[960 -1272]	1611	495	[396 - 693]	1980

[a] IPAQ-S = International Physical Activity Questionnaire–Short Form; MET = Metabolic Equivalence; min= minutes; IQR= Interquartile Rank; [b] N = 545; [c] N = 375; [b] [c] significant differences between walking groups

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Of the entire sample, 44% reported doing low intensity activities (95% CI: 41 – 47; n = 407), 40% moderate (95% CI: 37 – 43; n= 369) and 16% high intensity activities (95% CI: 13 – 18; n =144). Moreover, 23.2% (95% CI: 20.6 – 26.1; n = 214) met the minimum public health recommendations of at least 150 minutes of moderate to vigorous physical activity per week, and 81.2% performed moderate to vigorous physical activity for at least 30 minutes, 5 days a week (n = 175; 19%).

We conducted logistic regression analyses, grouping moderate and high levels of physical activity in a single category. Results showed that pain intensity (OR, 1.171) and fatigue impact perception (OR, 1.076) were significant predictors of low versus moderate/high physical activity (Table 3).

Table 5. Physical activity in entire sample.

	Median	**[CI 95%]**	**Mean**	**IQ_Rank**
IPAQ-S Sitting min/day	270.0	[240.5 - 300.5]	316.2	240
IPAQ-S Walking MET-min/week	693.0	[660.5 - 743.0]	1021.5	1089
IPAQ-S Moderate MET-min/week	0.0	[0.5 - 0.5]	406.0	480
IPAQ-S Vigorous MET-min/week	0.0	[0.5 - 0.5]	329.3	0
IPAQ-S Total score MET-min/week	835.0	[793.0 - 991.0]	1568.4	1815

IQ_Rank = Mean Interquartile Rank ; IPAQ-S = International Physical Activity Questionnaire–Short Form; MET = Metabolic Equivalence; min = minutes

DISCUSSION

Although walking has been recommended for fibromyalgia and is an accessible exercise with positive effects in health outcomes [5, 33] our main findings indicate that only a small proportion of the fibromyalgia women were regular walkers, according to the minimum selected walking criteria. Most fibromyalgia participants either did not walk or walked less than the minimum. Most reported medical advice to walk for exercise, which indicated a high implementation of this practice by doctors.

In fibromyalgia, studies consider walking as a way of supervised physical exercise [5] but to the best of our knowledge, there are no previous studies showing the prevalence of unsupervised walking in a community population according to a specific criterion. This is based on the most frequent and optimal recommendations for exercise in sedentary women with fibromyalgia [25]. In comparison with previous data, the prevalence of unsupervised walking in this study was similar to rates of adherence to low intensity supervised walking programs (50%-62.5%) [8,10]. If the selected walking criteria is considered as low intensity walking, in our sample fewer women met the minimum than in low intensity supervised programs. In comparison with a non-clinical adult population, the 19.5% of women who did not walk despite the absence of impediments, is similar to the percentage in a non-clinical population who also never walk for physical exercise (21%) [34].

The low percentages obtained in our study are relevant if we consider that moderate aerobic exercise, such as walking can be, is now strongly recommended for the fibromyalgia population [8]. Therefore it is important to know the determinants of this low practice, and to consider walking as an important goal in promoting physical exercise in fibromyalgia. Medical advice increased the probability of walking. However,

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no significant predictors were found for performing walking properly. Thus, taking into account doctors’ influence, how they give instructions for walking becomes clinically relevant: considering all the components and going beyond general advice. It is worth underlining that among all the assessed symptoms and comorbidity, the only "risk factor" for not walking, albeit weak, was fatigue intensity. Thus, instructions for prescribing walking exercise as treatment should consider gradual implementation and rests [35] to avoid fatigue, especially as other authors have shown that fibromyalgia women perceived walking as more tiring than healthy women, even though they walked more slowly [20]. Other health professionals such as nurses and physiotherapists could also reinforce the prescription. In a previous study, doctors, other professionals and colleagues at the associations were significant normative but not descriptive referents. That means that our participants thought that these important referents expected they to walk, yet participants also thought that these referents did not walk themselves [36]. Therefore, health professionals have a key role in promoting walking in these associative contexts, as patients in associations could exercise a positive influence as reference models for walking as exercise in a regular and healthy manner.

When assessing physical activity with IPAQ-S, only a very small percentage reached the general public health recommendations of accumulating at least 150 minutes a week of moderate to vigorous physical activity (preferably 30 minutes daily) [21]. Most of our sample reported doing low or moderate physical activity, which concurs with other studies [17, 21, 22]. Furthermore, the average daily self-reported time spent sitting, about 5 hours, was similar to data from these studies [17, 22]. Although the different systems of measurement limit direct comparisons, taken together, our data agree with current findings that women with fibromyalgia are less physically active compared to age-matched healthy women [17]. Fatigue impact perception and pain intensity predicted low versus moderate to vigorous physical activity. However, their effects were not strong. No associations were found between physical activity and symptoms [17, 21]. These results are important, as fatigue and pain could be anticipated barriers to exercise in fibromyalgia patients, although they actually do not impede physical activity.

Although we used a convenience sample, participants from different patients´ associations and regions, in a previous study we found that they were similar in socio-demographic and symptom characteristics [25]. Furthermore, in the current study, no significant differences were obtained in walking and in physical activity variables. Although we found significant differences in some variables, they were not relevant in predictive analysis. The participants were not recruited in clinical settings, but in Spain most fibromyalgia patients belong to an association as membership substantially cuts the illness-related expenses [37]. Therefore, the variability of the members might be considered similar to the variability of people with fibromyalgia in the general population [25]. The clinical confirmation of the fibromyalgia diagnosis was not part of our study protocol. However, all participants had clinical diagnosis by doctors following the American College of Rheumatology criteria [38] recommended by the Spanish Ministry of Health [39]. Finally, IPAQ-S tends to overestimate the amount of physical activity reported [8, 22, 29] and some systematic reviews have criticised this because of the criteria used for validity and stability [30]. In this study, the difference obtained between groups in walking activity and total activity measured with the IPAQ-S supports its convergent validity.

In summary, the study shows that a small proportion of women with fibromyalgia were regular walkers and most of them reported mainly doing low or

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moderate physical activity. Symptom perception and socio-demographic characteristics were weak predictors for unsupervised walking and physical activity. However, receiving medical advice to walk was strongly associated with walking but not with walking regularly. Hence these results underline the advisability of assisting the doctors and other health professional in prescribing walking for exercise in fibromyalgia.

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APORTACIÓN INDIVIDUAL DE LA DOCTORANDA EN ESTE TRABAJO:

- Participación activa en la elaboración de los materiales de evaluación
- Gestión del contacto con participantes a través de carta, e-mail y teléfono
- Recepción de las cartas con los materiales de evaluación cumplimentados
- Contribución en la elaboración de la base de datos
- Introducción de los datos de los cuestionarios enviados por carta (n= 972)
- Participación en el tratamiento de los datos
- Participación en la redacción final del trabajo

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5.4. Estudio 4: Identificación de creencias sobre la conducta y elaboración de cuestionario de evaluación TAP.

Artículo 4

To walk or not to walk: insights from a qualitative description study with women suffering from fibromyalgia.

AUTHORS

Yolanda Sanz-Baños[a], PhD, María-Angeles Pastor[a], PhD, Lilian Velasco[b], PhD, Sofía Lopez-Roig[a], MD, PhD, Cecilia Peñacoba[b], PhD, Ana Lledo[a], PhD, Charo Rodriguez[c], MD, PhD,

[a]Department of Health Psychology, Miguel Hernández University, Spain

[b]Department of Medicine and Surgery, Psychology, Preventive Medicine and Public Health and Medical Microbiology and Immunology, Faculty of Health Sciences, King Juan Carlos University, Spain

[c]Department of Family Medicine, Faculty of Medicine, McGill University, Canada

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ABSTRACT

Introduction: Walking improves health outcomes in fibromyalgia; however, there is low adherence to this practice. The aim of this research was to explore the beliefs of women suffering from fibromyalgia towards walking, and the meaning that they attribute to the behavior of walking as part of their fibromyalgia treatment.

Methods: Qualitative description research. Forty-six (46) women suffering from fibromyalgia and associated with local fibromyalgia associations located in four different Spanish cities (Elche, Alicante, Madrid and Talavera de la Reina) participated in focus group discussions in the summer 2012. Thematic content analysis was performed in transcribed verbatim from interviews.

Results: Participants perceived several inhibitors for walking even when they had positive beliefs towards its therapeutic value. Whereas participants believed that walking can generate improvement in their disease and their health in general, they did not feel able to actually do so given their many physical impediments. Furthermore, participants struggled with social isolation and stigma, which was lessened through the conscious support of family. Advice from family doctors was also a very important facilitator to participants.

Conclusions: In a healthcare delivery context that favors person-centered care, and in order to foster adherence to walking-based fibromyalgia treatments, it is recommended that therapeutic walking programs be tailored to each woman' individual circumstances, and developed in close collaboration with them to help them increase control over their health and their condition.

Keywords: Behavior management in rheumatic diseases,Patient perspective, Fibromyalgia, Walking, Qualitative description, Primary health care.

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INTRODUCTION

Fibromyalgia is a health disorder characterized by generalized and diffused musculoskeletal pain lasting more than three months and associated, among other symptoms, with fatigue, sleeping disorders, anxiety and depression [1]. It is a rather common condition as its worldwide average prevalence is estimated 2.7% in the general population, with a greater prevalence in women (4.1%) than in men (1.4%) [2]. Fibromyalgia affects many aspects of daily life and has serious personal and social implications [3, 4].

Though the treatment for fibromyalgia is still controversial, current evidence strongly suggests that the most effective intervention combines physical exercise, pharmacological treatment, and cognitive-behavioral therapy [5]. More specifically, it has been demonstrated that physical exercise is highly beneficial in: (1) the management of pain; (2) the reduction of stiffness, fatigue, and depression; and (3) the adoption by patients of a more positive attitude towards the disease [6-8]. Walking, in particular, is a moderate-intensity exercise easily adaptable to any personal situation [9] and with corroborated positive health outcomes in patients suffering from this disorder [10].

However, patients with fibromyalgia have a low adherence to available therapeutic interventions [11-14], included walking [15-18]. Some authors have explored the beliefs and attitudes of patients suffering from chronic pain towards physical activity [19], but the literature is remarkably silent in regard to the reasons behind the decision to walk or not to walk of patients with fibromyalgia. Our aim in this study was to fill this knowledge gap in order to ultimately improve therapeutic interventions and increase adherence to walking as a foundation of these interventions in patients suffering from fibromyalgia. More specifically, we stated the questions that guided this investigation as follows: (1) What are the beliefs that women suffering from fibromyalgia have towards walking in relation to their health condition? (2) What meaning do they attribute to the behavior of walking as part of their fibromyalgia treatment?

Theoretical Framework

We decided to focus on examining beliefs of patients as this psychological construct represents the deepest level of cognition involved in understanding and explaining individual behavioral changes. Congruently, we adopted the theory of planned behavior by Fishbein and Ajzen [20](henceforth TPB) as a theoretical framework in this study. TPB states that beliefs, which refer to the perceptions people have about performing a particular action, are the starting point to changing behavior. Interestingly, TPB has already been used to predict intentions and actions of people with respect to walking [21-23].

Fishbein and Ajzen [20] identify three types of beliefs underlying any human behavior, namely behavioral, normative and control beliefs. In the context of this study, behavioral beliefs correspond to the attitude of patients towards walking following their positive or negative evaluation of the expected consequences thereof; normative beliefs refer to perceived social pressure, i.e. to the perception of patients of what others want them to do and to their motivation to meet those expectations; and control beliefs relate to walking facilitators and inhibitors perceived by patients along with the assessment of power of each control belief to inhibit or facilitate performance of the behavior. These intermediate constructs give shape to the intention of patients to walk, which is the proxy determinant of the action to walk. The perception of control that patients have can also directly influence how they behave. It is also important to note that, according to TPB, relevant beliefs are those most easily accessible and salient to the subject. Therefore, identifying and understanding *salient beliefs* of patients will be necessary in order to improve interventions and better affect their *intention* and *behavior* of walking (see Figure 1).

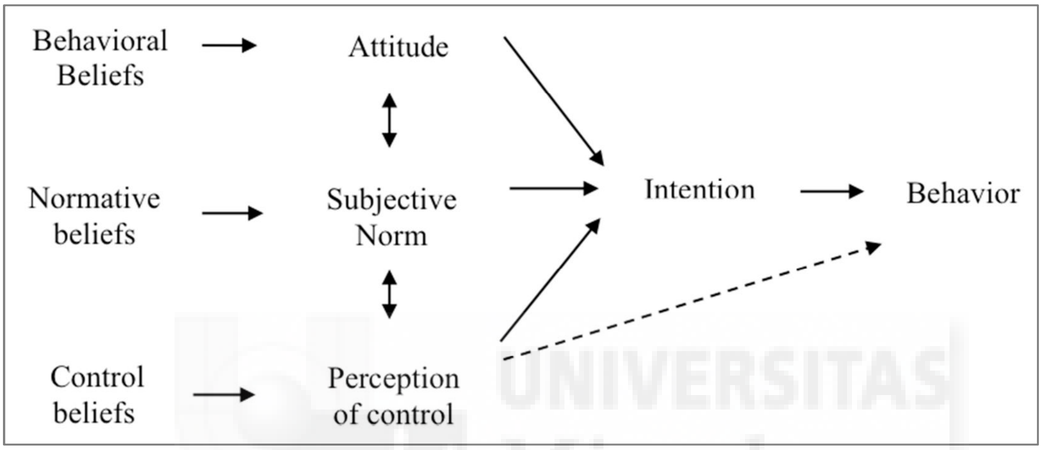

Figure 1. Theory of Planned Behavior

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METHODS

Study Design

This is a qualitative description study [24] conducted in the summer of 2012 as part of the first phase of a larger experimental research program aimed to increase treatment adherence in women with fibromyalgia. The study was approved by the ethical board of the Miguel Hernández University, Elche, Spain (DPS-MPM-001-11).

Participants

We identified a sample of participants through the joint use of probabilistic and purposive sampling techniques [25]. First, following a convenience sampling strategy, women from four Spanish fibromyalgia associations located in four different urban settings (Elche: AFEFE, Alicante: ADEFA; Madrid: AFIBROM; Talavera de la Reina: AFIBROTAR) were targeted (N=2438). Then we determined that, to be eligible, women had to have received a diagnosis of fibromyalgia (this is compulsory to get membership). The diagnosis criteria were those recommended by the Spanish Ministry of Health by the time of the recruitment of participants, which follow the 1990 guidelines of the American College of Rheumatology [26,27]. Also, they had to have between 18 and 70 years old, to not practice walking as a form of exercise, andto present no comorbidities preventing them from walking (n=582) [28].We defined the risk α as 5% and the study power as 80%. The minimum magnitude of the expected effect (in relation to the effect on Control Group, of the above mentioned experimental study) was 10% for Experimental Group 1 and 30% for Experimental Group 2, which is equal to 345 participants. We added a 30% dropout rate as a reasonable calculation, which resulted in a sample size of 449 women with fibromyalgia.

Taking TPB criteria into account, the recommended number of participants for a pilot study of this type is between 25 [29, 30] and 30 people [20]; as our selected sample belonged to four different associations,we then randomly selected 10 participantsfrom three of these associations,and 20 from the largest one (n=50).Each of these 50 women, who respected the study selection criteriaand came from the aforementioned pool of 449 women, were contacted by mail or phone and invited to participate in the study.

Key informants

Ultimately, 46 participants (92%) attended the focus groups sessionsin their respective fibromyalgia associations where fieldwork was conducted in June and July of 2012. These women were mainly middle-aged (54.2 years; SD= 8.9). They experienced

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symptoms for an average of 17.10 years (SD= 12.90) and the diagnosis was made 9.69 years ago (SD= 6.82). Most of them were married or living with a partner (79.52%), 6.8% were single and 13.6% were divorced. 27.3% were working and 18.2% were housewives. The 27.3% were unemployed. The rest were retired (9.1%; due to pain 11.4%) or temporary sick leave (6.8%). Participants had, at least, primary (43.2%) or secondary studies (29.5%); only 13.6% had university studies or had basic education (read and write) (11.4%).

Data collection and analysis

Focus groups were undertaken immediately after women completed a 10-item questionnaire that allowed us to conduct an *elicitation study* whose results havebeen published elsewhere [28, 31]. As our objective was to go further in the description and understanding of the beliefs of the participants towards walking, the questions included in the semi-structured group interview guidelines mirrored the open-ended items included in the questionnaire (see Table 1).

Five focus groups were moderated by the second (MAPM) and fifth (CP) authors with experience conducting focus groups, they did it with the assistance of the first (YSB) and fourth (LV) authors taking notes. Groups of discussion were composed by 8-10 participants (AFEFE: 10; ADEFA: 9; AFIBROM1: 10; AFIBROM2: 9; AFIBROTAR: 8) and lasted one hour on average. With the permission of participants, they were recorded with tape recorder and then it was transcribed verbatim. Qualitative data was analyzed following a content thematic analysis [32] using QRS Nvivo 10 software. Sample characteristics were analyzed by IBM SPSS 21. Under the supervision of the last author (CR) with wide expertise in qualitative research, the first and third authors (YSB and LV) performed preliminary coding separately, and then met several times to discuss divergences and establish initial themes. Final themes and data interpretation resulted from several in-depth discussions among all co-authors. This manuscript constitutes part of the first author's (YS) doctoral dissertation. With regard to academic training, except the first, all authors are PhDs; furthermore, SLR and CR are MD as well, and the rest are psychologists. All the authors contribute with their expert theoretical supportand significantly contributed to the writing of this manuscript and approved the last version of the paper.

Table 1 – Items about Salient Beliefs towards Walking

Questionnaire	**Semi-structured interview guidelines**
BEHAVIORAL BELIEFS	
- What advantages or positive consequences do you see to walking for at least 30 minutes, in bouts of 15 minutes, with a small rest between bouts, twice a week over a minimum of 6 consecutive weeks?	- Regarding this particular behavior, what advantages are there in performing it?
- What are the disadvantages or negative consequences?	- What negative consequences might there be? What disadvantages?
- Are there any further consequences that come to mind when you think of performing such behavior?	- Are there any additional consequences that you think of?
NORMATIVE BELIEFS	
- Which people or groups would approve of or would be in favor of you walking?	-Who would be in favor of you performing this behavior?
- What people or groups would disapprove or would be against you doing so?	- Who would be against you doing so?
- Is there any other person or group with whom you want to talk or consult if you're planning on walking within the parameters we have proposed?	- What other people are important to you with respect to this particular behavior?
- Please indicate which people or groups, if they had the same problem as you, would walk.	- Who else, if they were in the same situation as you, would perform this behavior?

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- Please indicate which people or groups, if they had the same problem as you, would not.	- Who would not, despite being in the same situation as you?
- When you think of walking the way we are proposing it, make a list of people or groups who would guide you in this behavior.	- Is there any person or group that would serve to guide you in this particular behavior?
CONTROL BELIEFS	
- What things would make it easier or would help you to do so?	- What other things, activities or any other factor would help or motivate you to perform this behavior?
- What things would make it difficult or wouldn't help you to do so?	- What things, aspects, difficulties, obligations, or activities, may make it difficult for you to perform this behavior?

RESULTS

From the hybrid semantic thematic analysis achieved, we foundfouroverarching themes related to what women with fibromyalgia think of walking as a treatment for their disease. Of these themes, threewere deductively set out according to the three types of beliefs involved in TPB, i.e., behavioral, normative and control beliefs about walking; the fourth, more inductive, we labeled psychosocial repercussions of living with fibromyalgia.

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Behavioral Beliefs

Women with fibromyalgia participating in the study disclosed several perceptions of both the negative and positive consequences of walking. Participants who complained about walking were unable to contemplate any positive aspect to this behavior, and only regarded the impossibility ofwalking: “Walking does not help fibromyalgia, that is, it is not beneficial as, I do not know… Maybe, for instance, to me I see more benefits lying in bed than walking”.These women reported experiencingphysical discomfort (e.g., suffocation, heat, dizziness, strain and swelling) as well as cognitive and emotional discomfort when walking, which discouraged them from walking in the future. They also explained that, in the past, fibromyalgia-related symptoms such fatigue and pain increasedwhen walking: “I feel short of breath, and I do not sufferfrom a lung disease or anything, but I have to stop”. Furthermore, participants talked about complications associated with walking, both physical (e.g., tendinitis, need of foot surgery) and cognitive (e.g., accentuation of bad memory or loss of concentration), which had a negative emotional impact on them, to the point of making them cry. For some women, walking caused immobility after exercise, which could last from a few hours to several days. Participants also mentioned that walking prevented them from performing tasks of daily life, as they had spent all their energy walking.

That being said, several women also expressed positive views on walking. Some women said that walking offered them the opportunity to move and improve their health condition in several ways: muscle strength and agility, better rest and increased pain relief, lower blood sugar and cholesterol levels, improved appetite, better breathing, and improved peripheral circulation. These participants considered that walkingwas a challenge as well, which thereforepresented an opportunity for thriving: “I feel more comfortable with myself”.What is more, improvements in self-esteem empowered these womento manage fibromyalgia more effectively: “I feel that I canface the disease”.Another positive assessment of walking pertained to the fact that this behavior facilitates exposure to positive stimuli, either social or environmental: sunbathing, breathing fresh air,seeing the landscape. In addition, walkingwas qualified a behavior that one can performeither with others or alone (see also Table 2).

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Table 2 – Behavioral Beliefs

Subthemes	**Quotations**
Complaints aboutthe behavior	For me walking has no advantages.
Physical, cognitive and emotional discomfort	And then, above all, exhaustion, tiredness, fatigue. When I get home, I do not feel like doing anything, I have to go to rest ...
	As happens to my colleagues ... knee pain, foot pain, low back pain and a lot of hip pain...
	If I did not feel lousy after walking, it would be great for me...
Overload consequences	Walking is great because it seems that you are rusty and when you start you feel like the battery is being super-charged.
	For me, the disadvantage is the great effort you make, because, really, it is always an effort...
Improved physical condition, symptoms and health	Because it helps us to not be stiff, to not stand there ... and you will become increasingly stiff, in a heap.
	As you start walking you start to heat up the muscles and it is like removing the pain.
	To lose weight, because there are people who have a tendency to gain weight with this disease.
Self-esteem and well-being	You're distracted, you're talking, besides I have to go with someone else, but if I have to go alone, I really do not want to go out. But then, you are talking, you are distracted and I feel like I forget about the pain, the fatigue and all.
	The first [advantage] is that I go out, I have that time for myself.

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Normative Beliefs

Participants disclosed having important referentsfor walking. First of all, women stated that they respected the opinion of neighbors, acquaintances, and especially friends in regard to this behavior. Secondly, relatives –in particular husbands, partners and children – werealso cited as important people with respect to approving of and supportingparticipantsin walking: “Basically, on this, my backing is my 22-year old daughter". Importantly, participants recognized that they greatly take into consideration the recommendations and support of health providers, especially family physicians:"My family doctor is... above all... all I could say is nothing compared to how important he is to me". Participants also reportedthat other people suffering from fibromyalgia were referents for walking as well. However, womendid not always cite other people as supportivetowards walking, and some participantsstated that they had to encourage themselves (see also Table 3).

Table 3 – Normative Beliefs

Subthemes	**Quotations**
Environment	A friend of mine, yes she would do that ... if she were in the same situation as me, yes.
	…a neighbor who is very sporty.
Family	My husband is always encouraging me to walk.
	…on vacation, a sister and a brother. And they support me, they cheer me up to come out to walk.
Health professionals	My doctor supports me and tells me: "You have to go out, also for your Chondromalacia patella, even 10 minutes but you have to walk".
	My psychologist supports me in that, too...
	Doctors from Pain Relief Unit where I have been going for many years, advise me to walk.
People with fibromyalgia	People like us who have the same disease.
	My friend, who also has fibromyalgia.
Myself	No, I think I would do it by myself.
	Only I approve of it.

Control Beliefs

Participants in the study reported several facilitators and inhibitors towalking. Internal motivation to accomplish the behavior of walking as part of their treatment for fibromyalgia was one of the facilitators that emerged from group discussions: “It is very difficult for me to walk, but tell myself to do it, and I have to go”. In contrast, when participants did not feel such internal motivation, for example, when they reported feeling lazy or an overwhelming sense of obligation, walking was much harder to do. Also, thespecific walking program proposed was itself perceived by some as an inhibitor, e.g., the need to accomplish the walking time recommended, or the scheduled rests that could prevent them resuming their walk. The feeling of being unskilled at walking was an additional inhibitor, as well as the presence of pain and fatigue: “And when I arrive at home at 15:00, I arrive broken, shattered, exhausted... Physically, I am not a person; and mentally, not much... Whereupon, who is able to walk?” Women also attributed associated physical impairments such as spinal problems and other comorbidities to their inability to walk. Moreover, they claimed having less ability to walk if they did not take their prescribed medication.

For most participants,it was necessary to feel well and balanced to be able to walk (“…because if you are in good mood, you cheer yourself but if you are not, even if you say ‘this is holy glory’…”). In the same vein, they considered that it was very difficult to make the decision to walk if they had cognitive or mood problems, such as those resulting from a family dispute. Likewise, poor management of stress could hinder walking: “For me, organizing the day is stressful... I am already stressed in the morning”. Poor management of time was also an inhibitor to walk, and some women declared that they would walk if they had more time to themselves, for example by being retired.

Whereas the accomplishment of domestic tasks was reported as a walking inhibitor, the specific task of taking the dog out was viewed as a facilitator. Participants asserted that feeling supported by the family and walking in their company was uplifting. On the other hand, some women reported that they preferred walking alone:

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"I find more motivation in that moment of solitude..." Accessory elements such as carrying a backpack or crutches were considered walking inhibitors, whilst wearing comfortable clothes, leaning on a cane, or listening to music on headphones were viewed as facilitators. Finally, location and weather were also important considerations: places with stairs or inclines as well as and rainy, windy, very sunny or very cold days being considered inhibitors (see also Table 4).

Table 4 – Control Beliefs

Subthemes	**Quotations**
Adherence to a fixed program	And the fact of having the obligation to go out and walk also causes me some anxiety and distress and makes me feel bad.
	For me it is better to rest because at some point my feet do not respond.
	It is more difficult to start over again.
Low self-efficacy	...thinking you will not be able to do certain things, because you are unable to, with what you are; then you also create stress for yourself.
	In general, I think that the group doesnot feel like that, like we can not walk...
Physical and emotional problems	Things that can beat me down, of course, pain can beat me down, of course. That is undeniable.
	It is that you can not do it ... unless, of course, you take the medication again and in fact, I am already saturated with so much medication, really...
	Well I think mood is very important for this, because if you do not feel in the mood at that time...
Daily responsibilities	I have my parents, who are older, who are sick, I always have to go see them. You have to go home and you have your housework to do.
	With a disease like this and to have to work or even take care of

	family ... it's impossible! Sure walking is great, of course, it is great doing some therapy... Extraordinary! But can we?
	Being retired. That would give you more time and you can already say: “I will now dedicate myself to me and do these things that this lady is doing”.
Environmental support	If I have someone to push me, it is easier for me.
	I'd like to be understood by society, not to be seen like a strange person, that your children and your relatives be well-informed.
	I prefer to go alone, because sometimes I do not feel like talking.
Ideal circumstances for walking	For me... wearing a pair of good shoes for walking.
	The foothold it is very important.
	I can not stand slopes.
	That the weather is good...

Psychosocial Repercussions of Living with Fibromyalgia

Under this overarching theme, we regrouped ideas of women other than beliefs that could have an influence on their decision to walk or not to walk, which mainly concerned their being in theirsituated contexts (see also Table 5). In this regard, participants talked about the misunderstanding they felt from others, as well as their inability to work because of the disease. They wereparticularly concerned about the social isolation caused by their condition: “Thus, this entails that you are shutting yourself in your own world... youare giving up meeting people because, the truth is that not everyone understands the situation we are in”. At the same time, participants broughtup the need to think of themselves as a means of better managing their condition: “What happens is that if I am tired, I am now dedicating to me. I was dedicated to everybody before. Now, I am dedicated to me... to my disease”. Finally, the support given to the participants by their respectivefibromyalgia association wasalso stressed:

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> "When a new member arrives, I say to her: 'To me, the best medicine given to me was to come to the association'. When I came, I first said 'I will not come anymore'. It gives you a shock. But when we are all equal, we understand eachother… A new member comes and you throw yourself into her because she suffers what you have suffered".

Table 5 – Psychosocial Repercussions of Living with Fibromyalgia

Subthemes	Quotations
Disease consequences	And there comes a time where if nobody will take away the pain, then I take it away myself somehow... I gained 15 kilos in two years.
	I have been without medication many times in my life: pregnancy, delivery, postpartum, etc. Even sometimes voluntarily because sometimes the medication has more side-effects than benefits.
Reassertion	...Because you overcome, if you learn, you are taking a different way, but you have to be a little selfish... First you and then you and then you.
	I've taken my life like this: first Me and Me; because if not ... learning to say "no" first, for me...
Other physical activity	To me, yoga brings me peace and, above all, stretching is great, stretching is great for me.
	I go to the gym, that, you can't imagine how I throw body into it, that's like a weight we carry, but I push it.
Association support	We support each other a lot. Until I met the association, I was isolated, alone and very depressed and as a result of knowing the association, seeing young people, people who have been there, experiencing people who have children, who have the same problems as me, I felt supported and this is the people who can encourage and help us, not only to walk, but in general...

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DISCUSSION

The present study aimed to describe and understandthe beliefs towards walking as a treatment strategy for fibromyalgia. Physical pain and fatigue were the most important behavioral beliefs identified that, as emphasized by women during the discussions, would generatephysical and psychological discomfort when walking. Moreover, women also anticipated exhaustion due to the effort involved in walking.Such a negative assessment of walking as a behavior may reflect what has been defined as the “fear of movement” that provokes behavior avoidance [33].If women walked in the past, theyanticipated immobility and the feeling of being overwhelmed, beliefs that would prevent the performance of future walking behavior. This result is consistent with current evidence that points to incorrect subsequent performance due to a “great demand”for behavior accomplishment [34, 35].

The third set of more prevalent behavioral beliefstowards walking was however positive, with women referring to “feeling better” and to improving health in general. During the discussions, participants further highlighted the advantages of walking such as pain relief, increased strength and mobility, improved appetite, weight loss, lower blood sugar and cholesterol levels, as well as increased independence, self-esteem and wellbeing. These findingsare aligned with those obtained in previous studies with people suffering from chronic musculoskeletal pain [36] and from fibromyalgia specifically [6, 37].

In regard to normative beliefs, the results of this study highlight the important influence of close family and social environment on walking, with the interesting nuance that doctors and other health providers conveyed more injunctive beliefs as women perceived them as people who want them to walk but that would not necessarily do so themselves, whereas family and friends would (descriptive norm).

Importantly, women being their own guide were a finding that emerged during the discussions, but was not identified in the survey study.

With respect to control beliefs, the studypoints out that the adherence to a fixed walking programworksas a facilitator for some women [9] but as an inhibitor for others. This result suggests that in order to foster facilitator beliefs, it would be recommended to elaborate an individually-tailored walking program adapted to each particular situation of each woman [8, 38].

Once the walking program is initiated, it isparamount to maintain women's adherence to it. It therefore appears necessary to decrease or eliminate the set of very frequent physical and psychological inhibitors identified by women participating in this study. Again, tailoring walking programs in close collaboration with women themselves would be one way to support their confidence and facilitate their feeling of control over the physical activity that they are performing [37, 39, 40]. In addition, this approach would help overcome the "lack of time"barrier as women would be able to plan events and better manage theirtime, thus increasing their ability to walk [4, 37, 41]. The fact that these women consider the recommendations of their family doctor to be especially important is also highly relevant. Clinicians should be aware and take advantage of this finding to help patients identify their facilitators and inhibitors through a more in-depth assessment with greater personalized communication.

As demonstrated in prior works [6, 17], companionship acts as an important facilitator to walkingfor womensuffering from fibromyalgia. However, an important contribution of this study is the revelation that "walking alone" may also be a facilitator for certain womenfor whom walking instantiatesa desire for self-management [4] and is an opportunity to take some timefor themselves by engaging in a pleasant activity [42].

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Through the TPB lens, data gathered in this study emphasize the psychosocial repercussions of living with fibromyalgia that could also play a role in walking behavior of women. In this regard, isolation resulting from their disease, no longer is being able to carry out the same social activities as before the disease [4] was a common complaint among participants. They also reported that people, even loved ones, had a low awareness and understanding of the disease, and that they experienced social stigma due to theirreduced functional capacity andweight gain [4]. The combination of all these negative perceptions made them feel misunderstood and as though they lacked credibility [4, 6]. In this context, participants perceived the need to take time for themselves and to make themselves a priority could be seen as a springboard for them to foster self-management [41], and in turn encourage walking behavior. Likewise, the psychosocial support that participants reported receiving from their fibromyalgia associations helped them overcome social isolation and stigma, and become more active in the self-management of their condition while decreasing health expenditures associated with overuse of medical care [6, 43].

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As with any other empirical research, and despite its undeniable important contributions, this study presents a number of limitations. The number of participants included in the investigation was limited due to the fact that it was considered as a first phase of a larger experimental study, which is currently in progress. Also, even though sampling strategies were rigorous and congruent with the research design adopted, the need for these women to express the negative physical, emotional and social consequences of their health condition could inflate the real experience of the symptoms. Moreover, the negativity and eagerness of participants to complain could also havebeen influenced by the group discussion situation. Finally, the fact thatthis study was conducted in Spain – with its specific social and cultural characteristics in terms of its healthcare delivery system and the organization of fibromyalgia associations by provinces – may also have influenced the results obtained.

In sum, even though some of the women with fibromyalgia participating in this study believed in the positive impact of walking, the majority of participants anticipated symptoms such as fatigue, pain, exhaustion, and discomfort from walking. These behavioral beliefs could generate what has been labeled the "fear of movement", which ultimately prevents them from adhering to a fibromyalgia treatment based on the walking. Social support from family, friends, health providers and fibromyalgia associations appeared as important driving forces for participants to overcome the anticipated negative consequences, and a number of women even found that walking was anexcellent opportunity for them to manage their health condition by themselves.

Our findings strongly suggest that physical and psychological inhibitors to walking would be diminished, and facilitators fostered, if walking programs, rather than being standardized,were insteadtailored to each woman's individual circumstances and developed in close collaboration with them, i.e. avoidingtoo generalprescription"you should go walking"and specifyingtheplanofwalkingwith them(when, how and how much),which would supporttheir intention to walk as a means of increasing their perceived control over their disease. The need to overcome social isolation and stigma, and the conscious support from family physicians and fibromyalgia associations, would further catalyze a more active role in the self-management of their condition.

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APORTACIÓN INDIVIDUAL DE LA DOCTORANDA EN ESTE TRABAJO:

- Contacto telefónico y electrónico (e-mail) con las participantes, organización y gestión de espacios de los grupos focales de Elche y Alicante
- Participación en los grupos focales, tomando notas de las sesiones y realizando la grabación y transcripción de las mismas
- Participación en la elaboración de materiales de evaluación y base de datos
- Codificación preliminar de las transcripciones, primero por separado y después, junto a una co-autora (LV)
- Discusión de divergencias y establecimiento de temas iniciales y temas finales junto a la co-autora (LV) bajo la supervisión de las co-autoras con experiencia en investigación cualitativa (CR) y fibromialgia (MAP)
- Interpretación de los datos tras varias discusiones en profundidad entre todas los co-autoras (YSB, LV, MAP, SLG, CR, AL).
- Redacción final del trabajo junto a las co-autoras

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Artículo 5

Walking as physical exercise in Fibromyalgia: An elicitation study from the Theory of Planned Behavior

AUTHORS

Mª Angeles Pastor, Sofía López-Roig, Yolanda Sanz, Cecilia Peñacoba*, Margarita Cigarán*, Lilian Velasco*, Ana Lledó & Carmen Écija*

Departamento de Psicología de la Salud. Universidad Miguel Hernández

*Departamento de Medicina y Cirugía, Psicología, Medicina Preventiva y Salud Pública e Inmunología Microbiología Médica. Universidad Rey Juan Carlos de Madrid

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ABSTRACT

Introduction: This study is the first phase of the formative research recommended in the Theory of Planned Behavior for the development of an intervention. Our aims are to identify modal beliefs about the performance of an exercise pattern in people with fibromyalgia, to test the items designed for direct evaluation of the predictive constructs and to explore their relationships with the behavior.

Method: We assessed 46 women with fibromyalgia.

Results: Content analysis showed more positive than negative consequences related to the performance of exercise guidelines (behavioral beliefs). Families and friends are the important referents (normative beliefs) and we identified facilitating and inhibiting factors in the performance of exercise behavior related to aspects of fibromyalgia (control beliefs) such as pain, fatigue and emotional state. The subjective norm scale showed the lowest internal consistency ($\alpha = .78$). The results confirmed the sedentary lifestyle of the participants (previous behavior: Mean = 3.67; rank = 1-7) although they also suggested that participants intended to perform the behavior (Mean = 5.67).

Conclusions: The relationships between constructs are coherent with the theory, and support the relevance of applying it to the selected behavior and population.

Keywords: walking; beliefs; fibromyalgia; theory of planned behavior; formative research.

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INTRODUCTION

Fibromyalgia is a syndrome of unknown aetiology, which is defined by generalized musculo-skeletal pain that is present for more than three months, along with tiredness, sleep disorders, anxiety and depression amongst other symptoms (Wolfe et al., 1990). In Spain the estimated prevalence in general population is of 2.37%, being more frequently in women (4.2%) than men (0.2%) (Carmona et al., 2001). In a more recent study carried out in 5 different European countries, Spanish prevalence in general population was found to be higher than in the previous mentioned study (total: 4.0%; men: 2.7%; women: 5.2%) although the gender difference remains. Nevertheless, in the latter, prevalence was estimated using a questionnaire that was answered over the phone (Branco et al., 2010). Rheumatology services estimate that the average yearly cost per fibromyalgia patient is 9982 Euros, and 35% of these costs are attributed to direct or health costs (Rivera et al., 2009). In primary care, the yearly average extra cost per patient with fibromyalgia, in comparison to patients with other chronic disorders, is of 5010 euros (Sicras-Mainar et al., 2009).

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Treatment for fibromyalgia constitutes one of the most controversial aspects; this is due to the large variety of therapeutic options, their moderate efficacy, the variability in therapeutic response and the poor adherence shown by the patients (Dobkin, Sita & Sewitch, 2006; Rivera, Alegreb, Nishishinyac & Heredad, 2006; Schachter, Busch, Peloso & Sheppard, 2003). Currently, there is evidence that the most efficient interventions are the ones that include physical exercise in conjunction with pharmacological treatment and cognitive-behavioural therapy (Häuser, Thieme &Turk, 2010).

Low- to moderate-intensity physical exercise, such as walking, when carried out gradual and regularly, reduces pain, tiredness, depression and other functional limitations in patients with fibromyalgia, as well as increasing perceptions of self-efficacy in managing the problem (Busch, Schachter, Overend, Peloso & Barber, 2008; Häuser, Klose et al., 2010; Richards & Scott, 2002; van Koulil et al., 2007). Performing physical activities, such as walking regularly, are a simple recommendation that can be self-managed by the patients. In opposition to other types of exercise that are managed by professionals in rehabilitation contexts or in gyms, walking depends exclusively on individual motivation that needs to be maintained for the longer term. Furthermore, it means that the patient is involved in a therapeutic task and will therefore increase self-management (Rooks et al., 2007). From an economic perspective, walking is a health tool that is inexpensive, and if the patient maintains it, is efficient even when compared to pharmacological treatment, therefore reducing socio-sanitary public spending associated to fibromyalgia (Richards & Scott, 2002). Nevertheless, some studies have shown that patients tend to present poor adherence to different exercise recommendations, even walking (Dobkin, Abrahamovicz, Fitzcharles, Dritsa & Costa, 2005; Dobkin, Da Costa et al., 2006; Meyer & Lemley, 2000; Schachter, Busch, Peloso & Sheppard, 2003).

Walking, as a way to exercise, is a self-regulated behaviour, and therefore, is susceptible to being explained by the current psycho-social models. Physical activity has been associated to the intention to carry it out (Hagger, 2010). Theory of Planned Behaviour (TPB) (Ajzen, 1985, 1991; Ajzen & Madden, 1986; Fishbein & Ajzen, 2010) has been shown to be able to predict intentions and behaviours associated to physical exercise in general (Hagger, Chatzisarantis & Biddle, 2002; Symons-Downs & Hausenblas, 2005) and to walking in particular (Darker, French, Eves & Sniehotta, 2009; Galea & Bray, 2006; Rhodes, Brown & McIntyre, 2006). Also, it is one of the most popular psychosocial models in the literature about prediction of social behaviours

(Ajzen, 2011). In opposition to other models that have also shown good predictive power about health behaviours, this is the one that is most frequently used to study walking behaviour (at least in non-clinical populations). In relation to the intentions to carry out physical exercise, the average of explained variance by the three predictive constructs of TPB is 44.5% (Hagger et al., 2002) and in relation to the intention to walk, in some studies conducted on populations with health problems, the explained variance is of 67% (Galea & Bray, 2006). Nevertheless, in spite of its predictive potential, there is little research using this theory in the context of people with health issues related to chronic pain. In the literature we have reviewed about its application in fibromyalgia, we found no studies that use it to predict the intention and the carrying out of walking behaviours. Thus, as part of a larger study which aims to increase this behaviour in people with fibromyalgia combining motivational and volitional intervention, we have chosen to work with the TPB due to its parsimony and potential in predicting intention (motivational intervention) of performing behaviours associated to physical exercise, amongst them, walking.

TPB (Figure 1) proposes that the immediate determinant of the performance of a behavior is the intention that the person has to do it (behavioural intention). Intention is determined by the attitude towards the behaviour (global assessment of the positive and negative consequences associated to carry out the behaviour), the subjective norm (social pressure perception to carry out the behaviour) and perception of control (perceiving that the behaviour is under control). The perception of control can also have a direct effect on the behaviour, not needing to be mediated by intentions.

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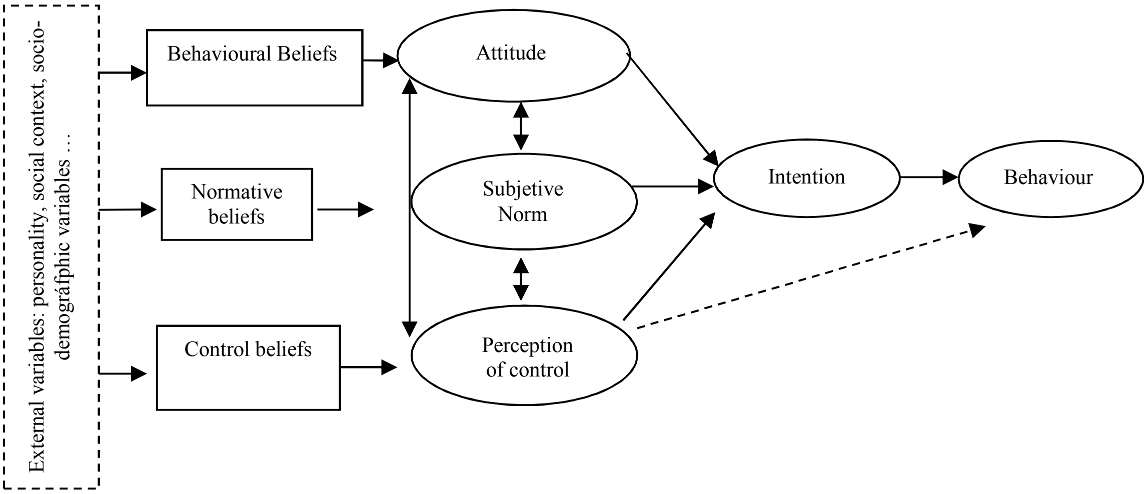

Figure 1. Theory of planned behaviour

In the recent formulation of the model (Fishbein & Ajzen, 2010), the authors consider that there are two aspects that are associated to the perception of social pressure or social norm, which they have named ‘injunctive norm’ and ‘descriptive norm’. The first aspect involves the more classical perspective of the construct (the perception that the important referents think that the person should or should not carry out the behaviour) and the second adds the idea that observation of the behaviour of models with which the person identifies with is another way of perceived social pressure.

The attitude, the subjective norm and the perception of control are determined, respectively, by behavioural beliefs (expected consequences of carrying out behaviour along with the positive or negative assessment it), normative beliefs: injunctive (the perception that important referents want the person to carry out the behaviour along with the motivation to comply with them) and descriptive (the perception that the referents are carrying out the behaviour as well as the degree in which person identifies with the referent) and, finally, the control beliefs (facilitators and inhibitors of the accomplishment of the behaviour, along with the assessment of their facilitating or inhibiting power). Salient beliefs are the ultimate determinants of intention and behaviour, and they influence through attitude, subjective norm and control perception. Therefore, they are the target of the interventions to generate behavioural change.

To implement an intervention based on TPB, it is necessary to have two previous phases of 'formative research' (Fishbein & Ajzen, 2010). The first phase consists of undertaking a pilot study with four aims: to identify beliefs (using a qualitative study), to know the status of the sample in relation to the behaviour the intervention is aimed at, to test the items designed to measure attitude, subjective norm, control perception and intention and to test the relationships between the predictive constructs and the previous behaviour as an indicator for future behaviour (quantitative study) (Fishbein & Ajzen, 2010, pp 326-328). Based on these results, a questionnaire is designed in the second phase, which is applied to a representative sample of the target population.

In spite of the importance that identification of beliefs has in this theory, most of the studies about physical exercise concentrate on the predictive relationships that attitude, subjective norm and control perception have on intention and behaviour, without having analysed the underlying beliefs (Darker, French, Eves & Sniehotta, 2009; De Bruijn & Rhodes, 2011; Hagger et al., 2002; Symons-Downs & Hausenblas, 2005). In fact, some authors have called attention on the lack of studies in this area (Darker, French, Longdon, Morris & Eves, 2007; Symons-Downs & Hausenblas, 2005). When TPB is used as a reference model in order to promote behavioural change, it is imperative to develop a study to identify beliefs about the target behaviour in the population of interest. In first place, due to them being the target of the intervention, and in second place, because specificity is being assumed, and thus, variability based on the two previously mentioned elements, behaviour and population (Ajzen & Fishbein, 1980;

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Fishbein & Ajzen, 2010). In spite of this, in the research we have found about walking, we found few studies indentifying beliefs following the TPB model (Darker, French et al., 2007; Rhodes et al, 2006) and another where a phenomenological analysis has been performed (Darker, Larkin & French, 2007). In all three studies, participants were taken from general population. As already mentioned, we do not find any studies that apply TPB to predict walking as exercise in patients with fibromyalgia or chronic pain.

One of the most important aspects in TPB is the specification of the behavioural criterion. To achieve this, the authors suggest that there should be four elements included: action, aim, context and time. The behaviour, defined considering the previously mentioned elements, should remain without any modifications during the assessment of all constructs of the theory (the principle of behavioural compatibility). In relation to walking, one of the recommendations for fibromyalgia patients is that they should do it between 2 and 4 times a week, for about 50 minutes, in bouts of 15 to 20 minute (with a small rest between bouts to allow patients delay fatigue and continue the activity) for a minimum of 6 consecutive weeks (Gusi, Parraca, Adsuar & Olivares, 2009). Following these recommendations about the prescription of exercise in fibromyalgia (Jones & Liptan, 2009; Mannerkorpi & Iversen, 2003; Meyer & Lemley, 2000) we reduced the minimum time established in the previously described recommendation. Therefore, the target behaviour for our study is, with the aim to exercise for own health care, ‘to walk for at least 30 minutes, in bouts of 15 minutes, with a small rest between bouts, twice a week for a minimum of 6 consecutive weeks’.

The current study is the first stage of the formative research as indicated by TPB and developed with a pilot study. Our aims are: 1. To identify the behavioural, normative and control beliefs about the carrying out of the chosen behaviour (‘elicitation study’). 2. To analyse the items created to directly assess the attitude,

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subjective norm, perception of control and the behavioural intention, 3. To explore the relations between the constructs and 4. To get better knowledge of the situation of the sample in relation to the chosen behaviour.

METHOD

Participants

We contacted 50 women from four fibromyalgia associations from Alicante, Elche, Madrid and Talavera de la Reina. 46 of the women attended the assessment groups (92%). Average age was 54.2 year (*SD*= 8.9; CI 95% [54.21, 51.47]) and average score on pain intensity was 6.7 (*SD*= 1.3; CI 95% [6.28-7.08]). Most of them were married or lived with a partner (79.5%), had primary studies (44.2%) and working status was quite variable (Table 1).

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Table1. Socio-demographic variables

	*N**	%
Marital status		
Married	35	79.5
Single	3	6.8
Separated/divorced	6	13.6
Educational level		
Reading and writing	5	11.4
Primary studies	19	43.2
Secondary studies	13	29.5
University studies	6	13.6
Working status		
Working	12	27.3
Unemployed	12	27.3
Retired	4	9.1
Retired due to pain	5	11.4
Away from work due to illness	3	6.8
House-wife	8	18.2

*: *N*= 44 missing data

47.8% (*n*= 22) of the participants did not walk and the rest do it incorrectly, according to our specifications (Gusi et al., 2009): once a week (*n*= 3; 6.5%), not regularly (*n*= 9; 19.6%), with a break after 15 minutes (*n*= 1; 2.2%) and with no breaks (*n*= 3; 6.5%). Eight people (17.4%) had changed their walking habits in the past three months (see procedure) and did walk correctly. We decided to maintain them in the study due to the intra-individual variability in the fibromyalgia presentation of symptoms. The 75% reported having received medical recommendations to walk.

Variables and instruments

Pain intensity: We assessed for highest, lowest and average pain intensity for the week before assessment, as well as the pain intensity during assessment. All four items were answered using a scale of 11 points (0=no pain; 10=the highest pain you can imagine). This scale has shown good psychometric properties in patients with fibromyalgia (Martín-Aragón et al., 1999; Lledó, Pastor, Pons, López-Roig, Rodríguez-Marín & Bruehl, 2010). Internal consistency for this sample was alpha= .77.

Exercise: Using five multiple answer items, we asked about the number of days the person was walking as exercise, the amount of time this was done continually, the time dedicated to the activity each time it was carried out and the rests taken. The answers available included the different elements of the walking behaviour we aimed to study. Finally, using a dichotomic response, we asked about the existence or not of medical recommendation to exercise. This scale was only used to identify eligible participants (see procedure).

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TPB: beliefs

So as to identify the beliefs about the carrying out of the behaviour we designed eight questions with open answers following the recommendations of the authors (Fishbein & Ajzen, 2010). Questions used are presented in Appendix 1, pp 7-10.

Behavioural beliefs: We designed questions about the advantages and disadvantages of carrying out the behaviour and also another general question (*"Is there any consequence that comes to mind when you think about …?"*).

Normative beliefs: We designed three questions for each norm, seeking information about the person's important referents, either because they believed that they would support or not the behaviour being carried out (injunctive norm; i.e.: *"What people or groups would be in favour of you walking…?"*) or either because they thought they would do the behaviour if they were in their place (descriptive norm; i.e.: *What people or groups would walk if they had the same problem as you …?"*).

Control beliefs: We created two questions to identify the perceived facilitators and inhibitors in relation to the carrying out of the behaviour *(what things would help …? What things would make it harder…?*).

All questions could be answered on a maximum of six lines, but if necessary the respondents could continue their answers on the back of the page.

TPB: previous behaviour, intention, attitude, subjective norm, perception of control

All five of the following variables were assessed using the average scores on each of the scales. They were all answered on a seven point scale, in which the extremes (1-7) varied depending on the content of the item (Appendix 1). Internal consistency data for the scales are reported in the results section.

Behaviour: Using four items we assessed previous behaviour (i.e.: “*In the past month and a half how often have you walked at least...?’).* Higher scores indicate higher performance of the behaviour.

Behavioural intention: We designed five items (i.e.:“*I intend to walk at least…”*) so as to assess the intentions. In spite of the controversy between behavioural expectation, intention and disposition to act, we considered the different formulations as ways to measure a single construct (Fishbein, 2008; Fishbein & Ajzen, 2010). A higher score indicates a stronger intention to walk in the terms we had specified.

Attitude towards the behaviour: We designed nine pairs of bipolar adjectives that considered instrumental (i.e.:*“Good-Bad”*) and experiential aspects (i.e.: “*Nice-nasty”*) about the attitudinal assessment of the behaviour. We re-coded the necessary answers so that a higher score indicated a favourable attitude.

Subjective Norm: Using three items we assessed injunctive norm (i.e.: “*Most people whose opinions I appreciate think that I should walk…”*) and with three additional ones we assessed descriptive norms (i.e.: “*Most people with this health problem walk…”*). We obtained three average scores, one for each type of norm and one for the total. In all three, a higher score indicated a stronger perceived social pressure.

Perceived behavioural control: This scale included a larger number of items (*n*=11) because, as well as the ones associated to the global assessment of perceived control (i.e.:*“Walking depends completely on myself…”*), we also included others that assessed self-efficacy perception, considering the possible inhibiting factors that are associated to fibromyalgia that could be influencing real control, such as fatigue, pain or mood (i.e.: *“In spite of my pain, if I really want to, I can walk …”*). With this we attempted to get a better picture of control in relation to the behaviour. A higher score indicated a stronger control perception.

Procedure

This study is part of a larger one that aims to design an intervention using TPB to increase unsupervised physical exercise (walking) in people with fibromyalgia. The current study is the first stage of the formative research of TPB, and was developed using a pilot study in the population at whom the intervention is aimed. The eligible population (n=582) was previously selected amongst the total population associated (N=2438) according to our selection criteria: female, between the ages of 18 and 70, that fulfils the London-4 criteria (White, Harth, Speechley & Østbye, 1999; Branco et al., 2010) and that does not walk for exercise despite being able to do so (there is no comorbid problem that hinders the ability to walk or they have been medically recommended to do so) or in spite of walking they do not fulfil some of the criteria established in the behaviour selected for the study.

In TPB the recommended number of participants for a pilot study of this type is between 25 (Francis et al., 2004; Godin & Kok, 1996) and 30 people (Fishbein & Ajzen, 2010); as our sample belonged to four different associations, we selected 10 people randomly from three of them and 20 from the largest (Madrid), over the phone to meet. Therefore we included a total of 50 women that fulfilled the criteria mentioned above to be part as they were from the eligible population.

During the assessment session they all signed informed consent forms, including an authorization to film their group discussions. First, the participants answered their questionnaires individually and later, in a group, they discussed their answers to the open questions. In this manner, as Fishbein & Ajzen (2010) recommend, we were able to identify individual beliefs and we avoided having some people influence other's response's accessibility and creation. Furthermore, in the group discussion, we reinforced the assistance by exchanging their opinions on the matter and we used the

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transcripts to increase understanding of certain ambiguous answers given on the individual response sheets.

Creation and application of the instrument

The questionnaire contained two sections: one with 35 items designed to assess the predictive constructs and the other with 8 open answer questions to identify beliefs (Appendix 1). In relation to this second section, we followed the recommendations set by Fishbein & Ajzen (2010) so first we presented the questions to identify behavioural beliefs, followed by the normative and control beliefs; this was because it has been shown that there is no effect of order on the number and type of beliefs identified (Darker, French et al., 2007).

As for the other questions, two researchers from the Alicante team, who are well versed in the theory and its applications in health, designed a total of 35 items following the recommendations and indications in the available literature (Ajzen, 2006; Francis et al., 2004; Fishbein & Ajzen, 2010). Following this, the questions were revised by the rest of the team in Madrid (all of whom have ample clinical and research experience in fibromyalgia) and in a group session all suggestions were put together. All four researchers that assessed the items had access to a written abstract about research in TPB authored by the head researcher as well as access to the content of the constructs. Their task was to assess if the items that had been suggested correctly reflected the corresponding construct, if the writing was understandable and if the scale provided to answer was adequate. As a result, the writing on some of the items was modified, so as to be simplified, and the coding for some answers also changed, it was changed from -3 to +3 to a scale from 1 to 7, due to the difficulties encountered by the researchers involved in other studies with fibromyalgia when using the former format. No items were deleted.

In summary, the questionnaire designed in this phase, contained 8 questions with open-format answers to identify beliefs and 35 questions to assess previous behaviour, intention, attitude, subjective norm and control perception.

Content analysis for identification of beliefs

We selected the modal beliefs (beliefs most frequent in a population) using a content and frequency analysis of each. We maintained the separation between associations up to the moment of the final selection of beliefs that were going to be part of the final questionnaire (result of this study). In this way, we could identify the specificity or not of the belief, and as we will present, use it as a deciding criterion. The sequence of the analysis was as follows:

1. Literal transcription of the answers to the open questions of the questionnaire and the recordings.
2. Grouping and registration of frequencies of answers with similar content but with different grammatical formulations, considering also their valence (i.e.: '...*I would return less tired...', '...I would return more tired...', 'I would be more exhausted').* When the answers with opposing valence were voiced by the same individual we decided to count them in only once in the most numerous group of valence of the answers.
3. Grouping and recording the frequency of answers with related content (i.e.: '*my mood would improve', 'I would feel happier', 'my psychological health would improve').* We counted the frequency of each group (adding up of the number of individual beliefs that form it), maintaining the frequency of each valence

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separate and tagging the group with a phrase that represents the individual beliefs that were contained in it. To do this, we considered the grammatical formulation of valence most frequently used in the block and we attempted to recreate the language used by the participants in the session.

4. Selection of the modal beliefs that will be included in the final questionnaire following a frequency criterion (25% of the sample: n=11). With beliefs below this number, we considered a second criterion of clinical and theoretical relevance, based on our knowledge of fibromyalgia and supported by the transcripts of the discussion groups; based on this criterion, the belief also had to be present in at least three of the associations included.

Three researchers organized and revised the information following these steps; after this, the material was sent to the rest of the team to identify their degree of agreement (100%).

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Statistical analysis for the study of the items that assess the remaining constructs

We performed an item analysis by studying the floor effect (percentage of response below 5%) and ceiling effect (percentage of response above 95%), we applied this to the groups of extreme response values for each item; we also analysed the discriminating validity and internal consistency of the scales (Fishbein & Ajzen, 2010). We deleted the items that reduced internal consistency of the corresponding scale; after this, with the items of the scales that assess the constructs at a predictive level (behavioural attitude, subjective norm and perception of control) we studied the correlations between the items that remained in the scale with the total corrected score for each and as well as with the other scales that assess the mentioned constructs.

Those items that had higher significant correlations with the total score on a scale which they did not belong were removed. In this last analysis we did not consider the scales for intention or behaviour as these are constructs that are to be predicted by the others, and according to the theory, it is expected to find high significant correlations with them. Although the theory also admits certain relations between the three constructs above mentioned, these are not expected to be high. Finally, we explored the relations between the constructs of the theory (except the beliefs). Using SPSS version 21, we performed the descriptive, internal consistency (Cronbach's Alpha) and relations analysis (Pearson's correlation).

RESULTS

Identification of beliefs

Behavioural Beliefs

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Four people from one association found no advantages to carrying out the behaviour and 11 from different associations only found advantages. The average number of beliefs obtained per person was 5.8 (*SD*= 2.95; ranging from 1-12; Median= 6; Mode= 7). Out of the 30 beliefs identified we selected 15, following the criterion described in the previous section (Table 2).

Normative Beliefs

We identified a larger number of referents in favour of the person with fibromyalgia doing the behaviour (90.4%) and that, also, the patient perceives that they would carry out the behaviour if they were in their place (74.2%). The average number of normative beliefs of both types per person was 8.63 (*SD*= 3.76; ranging from 0-16; Median= 8.5; Mode: 8). We selected 8 referents for each type of normative belief (Table 3).

Table 2. Behavioural beliefs

N=15/30*	*n*
I will feel more pain in my feet, knees, hips…all over my body.	31
I will be more tired, wearier.	29
I will feel better, my health will improve.	19
My mood will be better, I will feel in a better mood, more relaxed.	18
I will be more in contact with people.	17
I will be moving about, I will feel more active and agile.	16
I will feel bad if I have this obligation and I don't carry it out.	16
I will feel more positive, happier with myself and feel more accomplished.	15
My circulation will improve.	13
I will lose weight.	11
I will be good to distract me and to clear my mind.	10(4)**
It will strengthen my muscles and will improve my joints.	10(3)
It will reduce, alleviate my pain.	8(4)
I will feel more contracted and with more stiffness.	7(3)
I will lose time for other things.	6(3)

*= Amount selected/identified; ** in the brackets: number of associations with that answer.

Table 3. Normative beliefs.

Normative beliefs: Injunctive (8/16)*	*n*
My doctors.	29
My husband or partner.	28
My friends.	26
My children.	24
My family.	15
My siblings.	11
Other professionals.	10(4)**
My colleagues at the Association.	10(3)
Normative beliefs: Descriptive (8/29)*	
My husband or partner.	39
My friends.	39
My children.	21
My siblings.	18
My parents.	14
My co-workers	13
My neighbours	10(4)
Other family members (in-laws , grandchildren)	10(3)

*: Number selected/identified; **in brackets: number of associations giving this answer.

Control Beliefs

The average number of beliefs obtained per person was 4.84 (*SD*= 2.48; ranging from 0-12; Median= 5; Mode= 5). 50% of the answers selected were behavioural facilitators (Table 4).

Table 4. Control beliefs

N=12/27*	*n*
Tiredness.	30
Being in pain.	28
Bad weather (heat or cold, rain).	26
My mood (sad, stress, worries).	21
Having someone for company	16
Feeling bad, having a bad day.	14
Have someone to motivate me.	12
Not having time.	11
The land being flat, no hills or stairs	8 (3)**
Having the right clothes and shoes.	6 (3)
Having done the housework.	6 (3)
Having a walking stick	5 (3)

*: Number selected/identified; **in brackets: number of associations giving this answer.

Item Analysis

We found only one floor effect for one item in the injunctive norm scale (*'Most of the people important to me think...')* where response frequencies to alternatives 1 and 2 added up to 4.6%.

The items on the behaviour scale had answers on all 7 response options, 6 in the case of the subjective norm, control and intention and 5 for attitude. We obtained certain asymmetry for two items on the intention scale ('*I will make an effort to walk...'*=-1.6 and '*I am prepared to walk...'*=-1.5), one for control (*'It depends completely on me ...'*=-1.5) and three for subjective norm (the largest asymmetry: *'The people whose opinions I appreciate think that I should...'*=-1.7). We found asymmetry in all attitude items, with the largest being for the 'Harmful-Beneficial' pair (-2.2).

Except for intention and subjective norm (descriptive), in the other scales internal consistency increased deleting one item (Table 5). Values oscillated between alpha=.78 (subjective norm) and alpha=.94 (injunctive norm and perception of control). All correlation coefficients of item-total were above .50, except for the deleted items (except in the case of item 3 from the injunctive norm: r=.57).

Table 5. Descriptive and internal consistency analysis

	M [CI95%]	*SD*	r_{I-T}	α
Attitude (2.75-7)*	5.73[5.36,6.10]	1.22		.89
Ac1: Good-bad	6.16	1.13	.78	.88
Ac2: Pleasant-unpleasant	5.55	1.67	.79	.87
Ac3: Damaging-beneficial	6.11	1.45	.69	.88
*Ac4: Interesting-boring***	5.11	1.74	.44	*.90*
Ac5: Useful-useless	6.05	1.25	.76	.88
Ac6: Negative-positive	6.08	1.30	.82	.87
Ac7: Uncomfortable-comfortable	4.50	1.93	.60	.89
Ac8: Healthy-unhealthy	6.26	1.11	.59	.89
Ac9: Stressful-relaxing	4.97	2.06	.68	.88
Subjective Norm (1-7)	4.98 [4.60,5.36]	1.26		.78
INJUNCTIVE: most people…	5.94 [4.60,5.36]	1.45		.85
Ns1: …that are important to me…	5.88	1.47	.86	.67
Ns2: …whose opinions I appreciate…	5.95	1.53	.76	.76
Ns3: …that I respect and admire…	5.81	1.67	.57	*.94*
DESCRIPTIVE: most people …	4.35 [3.86,4.84]	1.61		.82
Nd1: …with this disorder…	4.81	1.92	.61	.81
Nd2: …from my Association…	4.09	1.74	.70	.72
Nd3: …like me…	3.95	1.88	.70	.81
Perception of control (1.30-7)	4.91 [4.43,5.38]	1.58		.92
PC1: I feel able…	5.55	1.73	.56	.92
PC2: It completely depends on me…	5.84	1.74	.68	.91
PC3: In spite of my pain…	4.91	2.13	.76	.91
PC4: For me it's easy…	4.61	2.05	.68	.91
PC5: If I really want to, I can…	5.02	1.98	.84	.91
PC6: In spite of being tired…	4.47	2.11	.86	.90
PC7: Completely under my control	4.98	2.05	.80	.91
PC8: In spite of my mood….	4.89	1.89	.81	.91
PC9: Just how sure am I…	4.57	1.97	.85	.90
PC10: How much control do I have…	4.23	2.02	.53	.92
PC11: Things that are out of my control…	3.95	1.99	.20	*.94*

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Intention (1.80-7)	5.67 [5.31,6.03]	1.88		.87
I intend to …	5.50	1.52	.60	.87
I am prepared to …	5.77	1.38	.84	.81
I will walk…	5.48	1.72	.74	.84
I will make the effort …	5.84	1.41	.64	.86
I plan to walk …	5.77	1.22	.73	.84
Behaviour (1-7)	3.67 [3.02,4.31]	2.12		.80
In the past month and a half I have walked …	3.73	2.34	.73	.67
Before the fibromyalgia I used to walk …	4.32	2.67	.28	*.91*
In the past month and a half, how often...?	3.50	2.24	.74	.69
In the past month and a half, did you walk…?	3.77	2.31	.78	.66

r_{I-T} = Correlation item-total corrected; *= In the brackets the possible range; **= In italics the item was eliminated

In the correlation analysis of the items with the total corrected score (eliminating the item) we expected higher correlations with the score on the scale the item belongs to. We deleted the item '*Healthy-Unhealthy*' from attitude and '*How much control do you have over walking...?*' from the perception of control, because they presented higher correlations with total scores of control and attitude scales, respectively (Table 6). Internal consistency of the scales remained within the initial values.

We found significant correlations between previous behaviour and intentions (r= .34, p<.03) and perception of control (r= .32, p<.04). Intention was associated significantly to perception of control (r=.70, p<.000), attitude (r= .56, p< .000) and total subjective norm (r= .45, p<.002).

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Table 6. Correlations between items and corrected totals

	Attitude	Subjective Norm-I	Subjective Norm -D	Control Perception
Ac1	**.73**	**.63**	.27	**.41**
Ac2	**.77**	**.63**	**.40**	.27
Ac3	**.73**	**.46**	**.43**	**.61**
Ac5	**.75**	**.44**	**.41**	.34
Ac6	**.84**	**.52**	**.41**	**.49**
Ac7	**.56**	.36	**.48**	.18
*Ac8**	***.63***	***.46***	*.38*	***.67***
Ac9	**.63**	**.49**	**.47**	**.51**
Ns1	**.63**	**--**	.29	**.47**
Ns2	**.70**	**--**	.25	**.46**
Nd1	.25	.19	**.61**	**.47**
Nd2	.30	.08	**.72**	**.37**
Nd3	**.48**	**.42**	**.72**	**.37**
PC1	.28	.20	**.48**	**.57**
PC2	.32	**.43**	.18	**.68**
PC3	.13	**.39**	.21	**.76**
PC4	**.40**	.28	**.49**	**.68**
PC5	.32	**.46**	**.52**	**.84**
PC6	.19	**.38**	**.44**	**.87**
PC7	.32	**.37**	.26	**.78**
PC8	.28	**.38**	.31	**.81**
PC9	**.44**	**.40**	**.40**	**.86**
*PC10**	***.54***	***.49***	*.35*	***.51***

Bold= significant correlations (p≤05); *= Italics item removed; Ac_n=Attitude items; Ns_n= Items about injunctive norm; Nd_n= Items about descriptive norms; PC_n= Items about control perception; I= Injunctive; D= Descriptive

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DISCUSSION

This study is the first phase of a formative research as recommended by Fishbein & Ajzen (2010) to design and apply an intervention based on TPB. Thus, our aims have been to identify behavioural, normative and control beliefs about the carrying out of our target behaviour, to test the items designed for the assessment of the theoretical constructs and explore their relations, as well as to gather knowledge on the situation of our sample in regards to walking behaviour. All this has been done as an indicator of pertinence for applying the theory to this population and the selected behaviour.

As we have previously mentioned, beliefs constitute accessible information that is relevant to the behaviour that we are planning to implement and on which we will be targeted to produce behavioural change. This study identifies the most frequent in the population selected (modal beliefs). It is the first of its type in people with fibromyalgia and that, also, uses a type of exercise recommended for them. As for the behavioural beliefs, most of the perceived consequences associated with walking, according to our criteria, are positive and refer to global functioning physical and psychological aspects. Nevertheless, the two most frequently detected consequences are negative and refer to two of the main problems of fibromyalgia: pain and fatigue. We should point out that the increase of pain as a negative effect refers to different body parts where pain can be produced as a result of walking. Nevertheless, when pain relief appears as a positive consequence of walking, it refers to general fibromyalgia pain and its frequency is low. This means that with the carrying out of the recommended exercise, the people we assessed do not expect to have positive effect on the main problem of their disorder.

We obtained a majority of referents (normative beliefs) in favour of the person doing the exercise, with the most relevant being partners and friends, who appear as such in both injunctive and descriptive normative beliefs. Doctors and other professionals are only referents for injunctive norms, which is logical, and also supports content validity. Nevertheless, it is interesting that the colleagues from the association are referents only for injunctive norms. This means that the people assessed in this study, do not believe that their colleagues, who share the same disorder, are going to carry out the behaviour, although they would be in favour of them carrying it out.

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Finally, in the case of control beliefs, we have obtained a similar proportion of facilitating and inhibiting factors for the carrying out of the behaviour. As it was expected, except for external conditions such as the weather, the most frequently perceived inhibitors are related to problems of the fibromyalgia, such as fatigue, pain and mood. The most frequently found facilitators are associated to social support, but not associated to any specific referents (*someone comes with me, someone motivates me*).

In general terms, our results coincide with those obtained by other authors about walking in general population (Darker, French et al., 2007; Rhodes et al., 2006) or about other types of physical exercise in different populations (Symons-Downs & Hausenblas, 2005). In our study, the tendency to show a higher number of positive beliefs than negative about these behaviours is confirmed, our findings about the average number of behavioural, normative and control beliefs is similar to that found in other populations (Symons-Downs & Hausenblas, 2005). It should be highlighted that in spite of the clear differences between samples (in our case a population with a health problem) the increase in physical and psychological health is on the of most frequently pointed out positive consequences, different members of family and friends are important referents for these behaviours and not having time available or weather are elements that hinder the carrying out of the behaviour (Darker, French et al., 2007; Rhodes et al., 2006; Symons-Downs & Hausenblas, 2005). Nevertheless, the presence of pain (in different parts of the body) has been the most frequent negative behavioural belief found in our study. Also, the other most frequent inhibitors have been pain and fatigue (control beliefs). These results are in accordance with the review authored by Symons-Downs & Hausenblas (2005) where pain, physical ill-being and other physical problems were the most frequently identified behavioural and control beliefs. It should be pointed out that these authors included studies in ill populations in their study (i.e.: oncological and cardiovascular problems) whilst Darker, French et al. (2007) and Rhodes et al (2006) only included general population. Because of this, it is of great importance to identify the specific beliefs a target population has, because differences are expected based on their characteristics and experiences. In this sense, in the case of chronic pain patients, factors such as pain catastrophizing, fear of pain and coping mechanisms, which have all been associated to pain perception (Ramírez, Esteve & López, 2001) could be influencing the carrying out of the behaviour. Nevertheless, their action is always mediated through the configurations of certain beliefs about the relevant symptoms, such as pain and fatigue.

In relation to the quantitative study, a clear limitation is sample size; nevertheless, it is above the minimum size requirements needed to attain the aims of this phase (Fishbein & Ajzen, 2010; Francis et al., 2004). The items analysis results have concluded with the deletion of six of them and have proven the adequacy of the remaining. Most of them have obtained answers in all or almost all the possible options and do not present any floor or ceiling effects. Discriminant validity was adequate, with correlations with selected items with the corrected total of the scales of .50 and above the ones obtained with the scales that assess a different construct. Internal consistency was very good for all scales (Bisquerra, 1987). Although initial alpha values were high, we deleted items that increased them so as to shorten the questionnaire and reduce completion time, which is an important aspect in this population due to the presence of physical symptoms such as pain. All scales remained configured with the minimum number of items suggested by Fishbein & Ajzen (2010) with the exception of the one assessing injunctive norm, which only had two. Nevertheless, considering internal consistency data, and that the authors recommend using unitary constructs (total

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subjective norm, without components) for the predictive analysis, it is recommended that a single scale is created to assess subjective norm with all five items.

Other aims of this phase of the study are to assess behavioural intention, obtain preliminary estimations about their relation to previous behaviour (considering it as a measure proxy to future behaviour) and to explore the relations to the other constructs according to the theoretical proposals (Fishbein & Ajzen, 2010). In general, taking into account the average scores, these people have the intention to carry out the behaviour, their attitude is favourable and they perceive a certain amount of social pressure to do it. The lowest average scores are for perception of control and the perception that other people in their same situation do the behaviour (descriptive norm). This is relevant to perception of control as it is the construct most strongly related to the intention to walk, which is in accordance to previous studies in general population (French, Darker, Eves & Sniehotta, in press) and clinical population (Galea & Bray, 2006). Nevertheless, in Hagger et al (2002) review about general physical activity in populations with no health problems, attitude was the most important construct for intention. These preliminary relationships will be tested in the study population eligible for intervention. Finally, it should be pointed out that the configuration of the relations obtained in our study support its theoretical coherence; this, along with the carrying out of the selected behaviour, indicates the importance of working in fibromyalgia with the proposed theory.

In summary, the results support the application of this theory on the chosen behaviour and population. Also, we have been able to identify modal beliefs about a certain type of exercise in people with fibromyalgia that do not currently carry it out, so as to be included as items in the final questionnaire, and finally, we have proven the items and refined the scales that assess the remaining constructs. Thus, this study has allowed the creation, based on evidence, of an instrument that includes all constructs of the selected theory, so as to be applied to the chosen population.

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APORTACIÓN INDIVIDUAL DE LA DOCTORANDA EN ESTE TRABAJO:

- Contacto telefónico y electrónico (e-mail) con las participantes, organización y gestión de espacios de los grupos focales de Elche y Alicante
- Participación en los grupos focales, tomando notas de las sesiones y realizando la grabación y transcripción de las mismas
- Participación en la elaboración de materiales de evaluación y base de datos
- Introducción de datos de los cuestionarios de todos los grupos focales realizados
- Contribución en el tratamiento de los datos de todos los grupos focales realizados participando activamente en el análisis de elicitación de creencias modales de andar
- Participación en la redacción final del trabajo

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APPENDIX 1.QUESTIONS FROM TPB

Por favor conteste todas las preguntas que le presentamos rodeando con un círculo el número que mejor describe su opinión. Recuerde que nos interesa saber qué opina sobre que ***usted ande al menos 30 minutos, con un pequeño descanso a los 15 minutos, al menos dos veces por semana durante el próximo mes y medio como mínimo*** con el objetivo de hacer ejercicio físico para mejorar su salud**.** Aunque le parezca que algunas preguntas son similares, todas tratan cuestiones diferentes. Lea detenidamente cada pregunta antes de contestar y al hacerlo piense en la realización de la conducta completa, tal y como se la planteamos.

Antes de contestar, fíjese bien en los extremos de cada respuesta.
RECUERDE contestar todas las preguntas y poner solo un círculo en cada respuesta.
Gracias por su colaboración.

1. Para mí, ***andar al menos 30 minutos, con un pequeño descanso a los 15 minutos, al menos dos veces por semana durante el próximo mes y medio como mínimo*** sería:

Bueno	1	2	3	4	5	6	7	**Malo**
Agradable	1	2	3	4	5	6	7	**Desagradable**
Perjudicial	1	2	3	4	5	6	7	**Beneficioso**
Interesante	1	2	3	4	5	6	7	**Aburrido**
Útil	1	2	3	4	5	6	7	**Inútil**
Negativo	1	2	3	4	5	6	7	**Positivo**
Incómodo	1	2	3	4	5	6	7	**Cómodo**
Sano	1	2	3	4	5	6	7	**Insano**
Estresante	1	2	3	4	5	6	7	**Relajado**

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2. La mayoría de personas importantes para mí piensan que yo debería ***andar al menos 30 minutos, con un pequeño descanso a los 15 minutos, al menos dos veces por semana durante el próximo mes y medio como mínimo:***

De acuerdo	1	2	3	4	5	6	7	**En desacuerdo**

3. La mayoría de personas cuyas opiniones valoro piensan que yo debería ***andar al menos 30 minutos, con un pequeño descanso a los 15 minutos, al menos dos veces por semana durante el próximo mes y medio como mínimo:***

De acuerdo	1	2	3	4	5	6	7	**En desacuerdo**

4. La mayoría de personas que respeto y admiro piensan que yo debería ***andar al menos 30 minutos, con un pequeño descanso a los 15 minutos, al menos dos veces por semana durante el próximo mes y medio como mínimo:***

De acuerdo	1	2	3	4	5	6	7	**En desacuerdo**

5. La mayoría de personas con esta enfermedad ***andan al menos 30 minutos, con un pequeño descanso a los 15 minutos, al menos dos veces por semana durante el próximo mes y medio como mínimo:***

De acuerdo **1** **2** **3** **4** **5** **6** **7** **En desacuerdo**

6. La mayoría de personas de mi asociación ***andan al menos 30 minutos, con un pequeño descanso a los 15 minutos, al menos dos veces por semana durante el próximo mes y medio como mínimo:***

De acuerdo **1** **2** **3** **4** **5** **6** **7** **En desacuerdo**

7. La mayoría de personas como yo ***andan al menos 30 minutos, con un pequeño descanso a los 15 minutos, al menos dos veces por semana durante el próximo mes y medio como mínimo:***

De acuerdo **1** **2** **3** **4** **5** **6** **7** **En desacuerdo**

8. Me siento capaz de ***andar al menos 30 minutos, con un pequeño descanso a los 15 minutos, al menos dos veces por semana durante el próximo mes y medio como mínimo:***

De acuerdo **1** **2** **3** **4** **5** **6** **7** **En desacuerdo**

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9. Depende totalmente de mí ***andar al menos 30 minutos, con un pequeño descanso a los 15 minutos, al menos dos veces por semana durante el próximo mes y medio como mínimo:***

De acuerdo **1** **2** **3** **4** **5** **6** **7** **En desacuerdo**

10. A pesar de mi dolor, si realmente quiero hacerlo, puedo ***andar al menos 30 minutos, con un pequeño descanso a los 15 minutos, al menos dos veces por semana durante el próximo mes y medio como mínimo:***

De acuerdo **1** **2** **3** **4** **5** **6** **7** **En desacuerdo**

11. Para mí, es fácil ***andar al menos 30 minutos, con un pequeño descanso a los 15 minutos, al menos dos veces por semana durante el próximo mes y medio como mínimo:***

De acuerdo **1** **2** **3** **4** **5** **6** **7** **En desacuerdo**

12. Si realmente quiero hacerlo, puedo ***andar al menos 30 minutos, con un pequeño descanso a los 15 minutos, al menos dos veces por semana durante el próximo mes y medio como mínimo:***

De acuerdo **1** **2** **3** **4** **5** **6** **7** **En desacuerdo**

13. A pesar de mi fatiga, si realmente quiero hacerlo, puedo ***andar al menos 30 minutos, con un pequeño descanso a los 15 minutos, al menos dos veces por semana durante el próximo mes y medio como mínimo:***

De acuerdo 1 2 3 4 5 6 7 En desacuerdo

14. ***Andar al menos 30 minutos, con un pequeño descanso a los 15 minutos, al menos dos veces por semana durante el próximo mes y medio como mínimo,*** está completamente bajo mi control***:***

De acuerdo 1 2 3 4 5 6 7 En desacuerdo

15. A pesar de mi bajo ánimo, si realmente quiero hacerlo, puedo ***andar al menos 30 minutos, con un pequeño descanso a los 15 minutos, al menos dos veces por semana durante el próximo mes y medio como mínimo:***

De acuerdo 1 2 3 4 5 6 7 En desacuerdo

16. Hasta qué punto está segura de que podrá ***andar al menos 30 minutos, con un pequeño descanso a los 15 minutos, al menos dos veces por semana durante el próximo mes y medio como mínimo:***

Muy segura 1 2 3 4 5 6 7 Muy insegura

17. ¿Cuánto control tiene sobre **andar** ***al menos 30 minutos, con un pequeño descanso a los 15 minutos, al menos dos veces por semana durante el próximo mes y medio como mínimo,***

Ningún control 1 2 3 4 5 6 7 Control completo

18. Las cosas que están fuera de mi control y que podrían hacerme difícil **andar** ***al menos 30 minutos, con un pequeño descanso a los 15 minutos, al menos dos veces por semana durante el próximo mes y medio como mínimo,*** son:

Muchas 1 2 3 4 5 6 7 Pocas

19. Tengo intención de ***andar al menos 30 minutos, con un pequeño descanso a los 15 minutos, al menos dos veces por semana durante el próximo mes y medio como mínimo:***

Definitivamente sí 1 2 3 4 5 6 7 Definitivamente no

20. Estoy dispuesta a ***andar al menos 30 minutos, con un pequeño descanso a los 15 minutos, al menos dos veces por semana durante el próximo mes y medio como mínimo:***

Verdadero 1 2 3 4 5 6 7 Falso

21. Andaré ***al menos 30 minutos, con un pequeño descanso a los 15 minutos, al menos dos veces por semana durante el próximo mes y medio como mínimo:***

Probable 1 2 3 4 5 6 7 Improbable

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22. Haré un esfuerzo para andar ***al menos 30 minutos, con un pequeño descanso a los 15 minutos, al menos dos veces por semana durante el próximo mes y medio como mínimo:***

Probable	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**Improbable**

23. Tengo el plan de andar ***al menos 30 minutos, con un pequeño descanso a los 15 minutos, al menos dos veces por semana durante el próximo mes y medio como mínimo:***

De acuerdo	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**En desacuerdo**

24. En el último mes y medio he andado ***al menos 30 minutos, con un pequeño descanso a los 15 minutos, al menos dos veces por semana como mínimo:***

Verdadero	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**Falso**

25. Antes de mi Fibromialgia solía andar ***al menos 30 minutos, con un pequeño descanso a los 15 minutos, al menos dos veces por semana como mínimo:***

Verdadero	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**Falso**

26. En el último mes y medio ¿con qué frecuencia ha andado ***al menos 30 minutos, con un pequeño descanso a los 15 minutos, al menos dos veces por semana?***

Nunca	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**Siempre**

27. En el último mes y medio ***¿Anduvo al menos 30 minutos, con un pequeño descanso a los 15 minutos, al menos dos veces por semana?***

Definitivamente sí	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**Definitivamente no**

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POR FAVOR, NO CONTINUE: ESPERE HASTA QUE INICIEMOS LA SESIÓN DESPUÉS DE UN PEQUEÑO DESCANSO.

A continuación le pedimos que piense en la posibilidad de que para mejorar su salud **usted ande *al menos 30 minutos, con un pequeño descanso a los 15 minutos, al menos dos veces por semana durante un mes y medio como mínimo.*** Necesitamos que piense en **hacer la conducta completa, tal y como se la planteamos**. Le haremos unas preguntas y queremos que nos conteste con los pensamientos que le vengan inmediatamente a la cabeza. Escriba cada pensamiento empezando en una línea diferente. Conteste según le vayan llegando esas ideas. Nos interesa su opinión personal, no hay respuestas buenas ni malas. Sea sincera. Muchas gracias.

En primer lugar le vamos a preguntar por las consecuencias de hacer esa conducta. RECUERDE poner una idea diferente en cada renglón. Si necesita más espacio continúe por la parte de detrás.

¿Qué ventajas o consecuencias positivas ve en que usted ande *al menos 30 minutos, con un pequeño descanso a los 15 minutos, al menos dos veces por semana durante un mes y medio como mínimo?:*

1……………………………………………………………………………………………………

2……………………………………………………………………………………………………

3……………………………………………………………………………………………………

4……………………………………………………………………………………………………

5……………………………………………………………………………………………………

6……………………………………………………………………………………………………

¿Qué desventajas o consecuencias negativas?:

1……………………………………………………………………………………………………

2……………………………………………………………………………………………………

3……………………………………………………………………………………………………

4……………………………………………………………………………………………………

5……………………………………………………………………………………………………

6……………………………………………………………………………………………………

¿Hay alguna consecuencia más que le venga a la cabeza cuando ud piensa en hacer esa conducta?:

1……………………………………………………………………………………………………

2……………………………………………………………………………………………………

3……………………………………………………………………………………………………

4……………………………………………………………………………………………………

5……………………………………………………………………………………………………

6……………………………………………………………………………………………………

Cuando se plantea ***andar al menos 30 minutos, con un pequeño descanso a los 15 minutos, al menos dos veces por semana durante un mes y medio como mínimo*** puede haber personas o grupos que piensen que ud. debería o no debería hacer esa actividad. A continuación le pedimos que piense en ello y que nos dé una lista con las

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personas o grupos que le vengan a la cabeza cuando piensa en quienes aprobarían o no que usted ande como le decimos. Escriba cada una en una línea diferente.

¿Qué personas o grupos aprobarían o estarían a favor de que Ud. ande ***al menos 30 minutos, con un pequeño descanso a los 15 minutos, al menos dos veces por semana durante un mes y medio como mínimo*** ?

1.………………………………………………… 2. …………………………………………………

3.………………………………………………… 4. …………………………………………………

5.………………………………………………… 6 …………………………………………………

¿Qué personas o grupos lo desaprobarían o estarían en contra de que Ud. lo hiciera?

1.………………………………………………… 2. …………………………………………………

3.………………………………………………… 4. …………………………………………………

5.………………………………………………… 6 …………………………………………………

¿Hay alguna otra persona o grupo con la que usted querría hablar o consultar si se planteara andar en los términos que le decimos?

1.………………………………………………… 2. …………………………………………………

3.………………………………………………… 4. …………………………………………………

5.………………………………………………… 6 …………………………………………………

Hay veces que cuando no estamos seguros de lo que hacer miramos a nuestro alrededor y nos fijamos en lo que hacen lo demás. Por favor, escriba qué personas o grupos si tuvieran su mismo problema andarían ***al menos 30 minutos, con un pequeño descanso a los 15 minutos, al menos dos veces por semana durante un mes y medio como mínimo?*** No le pedimos nombres ni apellidos, sólo que indique la relación con las personas en las que usted piensa (pareja, amiga, compañera de trabajo, etc…).

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1.………………………………………………… 2. …………………………………………………

3.………………………………………………… 4. …………………………………………………

5.………………………………………………… 6 …………………………………………………

Por favor, escriba qué personas o grupos si tuvieran su mismo problema no lo harían

1.………………………………………………… 2. …………………………………………………

3.………………………………………………… 4. …………………………………………………

5.………………………………………………… 6 …………………………………………………

Cuando piensa en andar como le estamos diciendo, haga una lista de las personas o grupos cuya conducta podría servirle de guía:

1.………………………………………………… 2. …………………………………………………

3.………………………………………………… 4. …………………………………………………

5.………………………………………………… 6 …………………………………………………

Ahora queremos que piense en todas aquellas cosas que le pueden facilitar o dificultar andar ***al menos 30 minutos, con un pequeño descanso a los 15 minutos, al menos dos veces por semana durante un mes y medio como mínimo.*** *E*scriba una en cada línea.

¿Qué cosas le facilitarían o le ayudarían a hacerlo?

1.………

2………

3………

4………

5………

6………

¿Qué cosas le dificultarían o no le ayudarían a hacerlo?

1.………

2………

3………

4………

5………

6………

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5.4. Estudio 5: Predictores de la intención y la conducta de andar.

Artículo 6

Predicting walking for exercise in women with fibromyalgia: the role of cognitions

AUTHORS

María-Ángeles Pastor[a], Sofía López-Roig[a], Cecilia Peñacoba[b], Yolanda Sanz-Baños[a], Ana Lledó[a], Lilian Velasco[b]

[a]Department of Health Psychology, Miguel Hernández University

[b]Department of Medicine and Surgery, Psychology, Preventive Medicine and Public Health and Medical Microbiology and Immunology, Faculty of Health Sciences, King Juan Carlos University

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EN REVISIÓN.

Notas:

- Ha sido enviado para su revisión a la revista *Disability & Rehabilitation* (Factor de Impacto: 1.985, *Q3*)*;* en Marzo 2016.

ABSTRACT

Purpose: Based on the theory of planned behavior (TPB) this study examined the determinants of walking intention, walking behavior and the intention-behavior gap in women with fibromyalgia. We also took into account specific variables associated to this condition (fear of movement, pain intensity, distress and impact perception).

Method: TPB constructs, walking behavior and the above-mentioned variables were assessed in 274 women at baseline (T1) and seven weeks later (T2) (*n* = 219).

Results: Walking intention showed high scores at baseline and it was predicted by attitude and perceived behavioral control (PBC). The intention-behavior gap, represented 33% of participants and logistic regression analysis showed PBC as a predictor of being a successful intender. Fibromyalgia variables did not contribute to walking intention or behavior.

Conclusions: Women with fibromyalgia were motivated to walk; however they did not act on their intentions and PBC appears as the main explanation. The women who perceived high control in relation to those who perceived low control, increased their likelihood of walking about 3-fold. Thus, fibromyalgia women would benefit if they were helped to act on their intentions using self-regulatory strategies to increase their perceived control and manage potential inhibitors of their walking behavior.

Keywords: Unsupervised walking, fibromyalgia, cognitions, theory of planned behavior, intention-behavior gap.

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INTRODUCTION

Fibromyalgia 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 depression among others symptoms [1]. Also, it is one of the most prevalent causes of chronic pain in the primary care setting and is associated with important perceived health impact and socioeconomic burden [2-4]. The most effective intervention combines pharmacological strategies, physical exercise and cognitive-behavioral therapy [5-8]. In particular, aerobic exercise of low-moderate intensity has shown benefits in fibromyalgia health outcomes [9,10] and is recommended for these patients [8,11]. Walking has low musculoskeletal impact and there is evidence of its efficacy in fibromyalgia by decreasing pain, increasing serotonin levels and improving mobility and function [12-15]. Most studies in relation to both physical exercise and walking have shown low patient adherence, that is, not following the recommended program [16-18]. In general, adherence to walking programs of low intensity is between 50% - 62.5%, with increased variability for the moderate or high intensity walking programs than for low the intensity ones [17, 19]. In other studies, the percentage of patients who finalized the supervised exercise program was between 70-80% [20-23]. Taking into account the benefits, promoting walking as part of the management strategies for fibromyalgia becomes a relevant therapeutic target.

Theory of Planned Behavior (TPB) [24-26] has been shown to be able to predict intentions and behaviors associated to physical exercise in general [27,28] and to walking in particular [29,30]. Also, it is one of the most popular psychosocial models in the literature about prediction of behaviors [31]. TPB proposes that the immediate determinant of the performance of a behavior is the intention that the person has to do it (behavioral intention). Intention is determined by the attitude towards the behavior (global assessment of the positive and negative consequences associated to carrying out the behavior), the subjective norm (social pressure perception to carry out the behavior) and perception of control (perceiving that the behavior is under control). The perception of control can also have a direct effect on the behavior, not needing to be mediated by intentions. Based on this theory there are two main explanations when 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 following their intentions. Despite correlational studies showing the relationship between intentions and physical activity [32] having an intention is not always enough to perform a behavior (that is, there is an "intention-behavior gap") as this has been pointed out by the TPB and by the evidence. Regarding physical activity, Rhodes and De Bruijn [33] identified an "intention-behavior gap" in about 46% of adults in nonclinical settings. Among TPB cognitions, affective attitude and perceived behavioral control (PBC) predicted this gap [34]. TPB states that people will behave as per their intentions only if they perceive to have enough control over performing the specific behavior. This can be a crucial point in fibromyalgia and in other chronic pain conditions, where people have the experience that symptoms persist despite treatments and that their intensity is unpredictable. The inherent uncertainty in this health problem has been recognized, along with the loss of control of the illness as well as of life in general [35]. Therefore, in order to promote walking as exercise in mainly sedentary women with fibromyalgia, TPB can help to identify the cognitions upon which to base an intervention [36].

In chronic health problems, PBC also appears as a key construct for explaining walking limitations [37]. For instance, Johnston et al. [38] found that one year after diagnosis of coronary heart disease, only PBC predicted self-reported exercise and distance walked in the six-minute walking test. In a chronic pain sample, both PBC and intention were significant predictors of walking, along with pain [39]. Galea & Bray [30] found that in people with intermittent claudication (a symptom of recurring leg pain and discomfort that during walking reduces blood flow distally and supplies insufficient oxygen to the working muscles) PBC and attitude predicted intention, and that PBC was the most significant predictor of behavior one week later. In fibromyalgia, TPB constructs have predicted 32% of explained variance of the intention to exercise [40] but we have no data about walking; and TPB establishes that predictions can be different depending on the specific behavior and population.

In the context of physical exercise in fibromyalgia, some authors suggest taking into account symptom severity and function [41]. Moreover, in fibromyalgia, fear of movement and avoidance behavior are highly prevalent and related to patients´ disability levels [42]. All these factors could affect both intention and walking behavior and they should be considered in exploratory approaches.

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This study was performed in women with fibromyalgia, as the prevalence of this condition is 3.4% for women and 0.5% in men and [1]. Specifically, data was obtained from two time points from a larger randomized controlled trial aimed at increasing unsupervised walking in fibromyalgia patients, using an experimental longitudinal approach [36]. The current study belongs to the first phase of identifying motivational processes involved in carrying out a recommended walking pattern in women with fibromyalgia, using the TPB, so that we can design an intervention based on these results in second phase to enhance the short, medium and long-term adherence to a walking program.

This study aimed to explore: 1) the TPB predictors of intention and walking behavior and the contribution of other variables such as fear of movement, pain intensity, distress and fibromyalgia impact to the intention of walking behavior and, 2) the intention-behavior gap in women with fibromyalgia to differentiate between successful and unsuccessful intenders.

METHOD

Participants

Out of 582 women with fibromyalgia belonging to four patients´ associations, those identified as eligible population were: female, between the ages of 18 and 70, fulfilling the London-4 criteria [43,44] and who don´t walk for exercise despite being able to do so or in spite of walking they do not fulfill some of the criteria established in the behavior selected for the study [36]. One hundred and twenty-two refused to participate and 6 were not contacted (contact data was wrong) and 180 failed to attend the evaluation session but did not refuse to participate in the study. Two hundred and seventy-four (47.10%) were contacted and attended the appointment with the interviewers/facilitators (psychologists) at their fibromyalgia association or the university lab. Mean age was 51.85 (95% CI [50.75, 52.93], *SD* = 9.16, *Mdn* = 52.69). Forty-seven percent reported primary education (*n* = 129), 28.10% secondary education (*n* = 77), 12% university education (*n* = 33) and 12.8% were able to read and write (*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. Mean pain intensity perception was 6.70 out of 10 (*SD*= 1.62, range from 0.75 to 10) and mean perceived fibromyalgia impact was 65.95 out of 100 (*SD*= 15.56, range from 18 to 97.5) (table 1). No significant differences were found in socio-demographic and symptom perception variables between participants and those who did not attend the appointment. More specific sample characteristics can be found in a previous study [36].

Measures

All variables were assessed at the first time point (baseline, T1), except behavior and walking behavior (steps), which were assessed at 7 weeks (T2).

Behavior. For fibromyalgia, some authors have recommended walking above 50 minutes, in bouts of 15 to 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 [45]. However, considering that our target population is mainly sedentary and that it is recommended that these patients participate in physical activity in a gradual way [36], 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*'. In accordance to TPB, we used two items rated with a seven point scale (1-7), with the endpoints *True-False* and *Definitively yes-Definitively no* [46]. The internal consistency scores were 0.93 at base line (T1) and 0.91 at seven weeks later (T2). Mean scores were computed considering that higher scores indicated increased behavior. The self-reported measure at T2 has shown significant and moderate correlations with the number of weeks women walked at least 30 minutes twice a week (r = .46, p < .000) assessed using daily logs over the same period (unpublished results).

Steps. Walking was also measured by a pedometer step count (Yamax EX5103D USB pedometer). The pedometer stored the days and steps walked over these weeks. For this study we used the average steps per walking day for exercising.

TPB variables. These variables were measured at T1 following the TPB authors´ recommendations [26]. *Intention* was measured with 5 items regarding the readiness to perform the walking behavior (α = .94), *subjective norm* included 5 items about injunctive (*n*=2) and descriptive norms (*n*=3) of the social pressure perception related to engaging in the behavior or not (α = .76) and *PBC* included five self-efficacy items and four for behavioral control (α = .91). These three components were scored using a 7 point scale and were measured at the same level of specificity of the behavior (principle of compatibility). The anchors of the answer scales were *totally agree-totally disagree*. Finally, attitude was measured with a semantic differential scale. This scale included affective (*n* = 3) and instrumental adjectives (*n* = 4) towards performing the specific behavior of walking (α = .81). The questionnaire was tested in a previous study [46]. Mean scores were computed with high scores representing high intention, positive attitudes, high social pressure perception and high PBC. We also computed separate scores for instrumental (α = .77) and affective attitude (α = .75) due to the role of the latter variable on physical exercise.

Fear of Movement. We used the total score of the Spanish adaptation of the Tampa Scale for Kinesiophobia [47], answered at T1. Higher scores mean high fear of movement. This scale is sufficiently reliable (α=0.78) and valid [47]. Internal consistency for this sample was alpha = .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 patients with fibromyalgia [48,49]. 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 = .87). Higher scores indicate high pain intensity.

Distress. The total score of the Spanish adaptation of the Hospital Anxiety and Depression Scale [50] was used. The scale includes seven items for anxiety and seven for depression. High scores indicate high distress. The questionnaire has a long history of application in psychology and has been well tested in large populations and patient surveys [51] and has been shown to be valid and reliable [50,52]. In our sample, it was used at T1 and the Cronbach α was .88.

Fibromyalgia impact. We used the Spanish adaptation of the Fibromyalgia Impact Questionnaire [53] at T1. It is a 10-item self-report questionnaire that measures the health status of patients with fibromyalgia [54]. The first item focuses on the patient’s ability to perform physical activities. The following two items require the patient 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. The internal consistency for this sample was α = .82.

Procedure

This study represents the first phase of a larger study (trial registration number: ISRCTN68584893). It was approved by the Ethical Committee of the Miguel Hernández University. All women previously identified as eligible population were contacted and given an appointment to attend their fibromyalgia patients’ association or the university lab (T1, *n* = 274). Participants signed the informed consent form and filled out the questionnaires. Participants from two patients` associations also received pedometers at T1 (*n* = 115). Not all the participants received them due to sample accessibility, especially in two of the associations that belong to big cities and where we would not be able to control problems that could arise. It was underlined that there were no differences in sociodemographic variables or fibromyalgia symptoms between associations. Instructions about the use and how to wear the pedometers were given along with written instructions for home. The pedometer was worn by participants only when they walked for exercising, over the period of 6 consecutive weeks. All participants received a new appointment 7 weeks later (T2, *n* = 219) for final assessment and to return the pedometers. Assessment instruments were administered in group settings under the supervision of two researchers.

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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 $p \leq .01$ 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 predictors of intention to walk and walking behavior at T2. Missing data (0.15% of all variables) was estimated by mean imputation procedure. We used ENTER method for TPB variables, behavior at T1 and those variables related to the fibromyalgia condition which correlated to dependent variables. BACKWARD method was applied to obtain regression equation (inclusion criteria: Tolerance > .001; exclusion criteria $p > .10$). 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 walking behavior at T2 so we did a logarithmic transformation but as it did not improve assumptions; we proceed to perform a logistic regression. In this case, the dependent variable was dichotomized considering the top (5-7) and the bottom (3-1) responses [33] and respondents at midscale were excluded (n= 37). Potential predictors were selected in univariate analyses (p < .20). BACKWARD method (LR) and the good fit Hosmer and Lemeshow´ test were applied. We obtained statistics to identify outliers, influential observations and linearity.

RESULTS

No significant differences were found between women who participated in both T1 and T2 (n = 219) and women who did not attend T2 (n = 54; 24.7% of drop-outs) in age, fibromyalgia variables or in TPB measures and behavior.

Percentile 25 for intention was 5.2 and percentile 75 was 7.0. For PBC percentile 25 was 4.3 and percentile 75 was 6.3. For behavior in T1 percentile 25 was 2.0 and percentile 75 was 6.5. For T2 behavior percentile 25 was 3.5 and percentile 75 was 7.0. For steps (pedometer, T2), percentile 25 and 75 were 2483.87 and 5050.59. No significant differences were found in behavior between women using and not using the pedometer, at both times of assessment. Descriptive data and correlations are in table 1.

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Table 1. Descriptive statistics and correlations with walking behavior and intention

	M [95% CI]	*SD*	*Mdn*	1	2	3	4
Behavior							
1.T1	4.22 [3.95, 4.50]	2.30	4.50		**.17**		
2.T2 (week 7)	4.78 [4.52, 5.06]	2.03	5.00				
3.Steps	3922.40 [3594.65, 4250.15]	1726.28	3945.78	--	**.29**		
4.Intention	5.93 [5.76, 6.09]	1.41	6.40	**.24**	.15	.15	
PBC	5.26 [5.09, 5.43]	1.41	5.55	**.35**	**.21**	.19	**.37**
Attitude	5.74 [5.61, 5.87]	1.09	6.00	**--**	**--**	**--**	**.44**
Subjective Norm	4.99 [4.86, 5.13]	1.16	5.00	**--**	**--**	**--**	**.32**
Fear of movement	27.52 [26.67, 28.36]	7.09	27	-.07	-.05	.01	-.04
Pain intensity	6.51 [6.32, 6.70]	1.62	6.50	-.02	.004	.02	**-.16**
Distress	20.39 [19.54, 21.24]	7.16	20.00	-.07	-.03	.06	-.08
Fibromyalgia impact	65.95 [64.10, 67.80]	15.56	68.08	**-.17**	**-.18**	-.12	-.14

In bold *p* ≤ .01; PBC: Perceived behavioral control; --: correlations were not performed because we only did those derived from the relationships established among the TPB constructs

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Behavior and number of steps were correlated at T2 (*p* ≤ .01). Intention was positively correlated with PBC, attitude and subjective norm (*p* ≤ .01). Behavior at T1 was positively related to intention and PBC (*p* ≤ .01) but at T2 was only significantly correlated with PBC. Pain intensity was related to intention and perceived fibromyalgia impact to behavior in T1 and T2 (*p* ≤ .01).

TPB variables accounted for 28% of the explained variance of the intention to walk (table 2). Instrumental attitude and PBC contributed significantly to the model, with the highest beta for attitude (β = .37, *p* < .000).

Table 2. Multiple regression of intention$^{(a)}$

Criterion	Predictors	R^2	F	df	β	B [95%CI]
Intention		.28	28.87***	4, 273		
	Attitude (Instrumental)				.37***	.48[.34, .63]
	PBC				.15**	.15 [.03, .27]
	Subjective Norm				.11	.14 [-.00, .28]
	Behavior at T1				.09	.06 [-.01, .12]

***: $p \leq .001$; **: $p \leq .01$; *: $p \leq .05$; PBC: Perceived behavioral control

[a] Data reported are the ones entered in the regression equation. Fear of movement, pain intensity, distress and impact perception remain out of the equation

Logistic regression analysis with dichotomized behavior showed PBC being the only significant predictor of walking (OR = 1.30, 95% CI [1.02, 1.66], $p = .032$; $\chi^2 = 11.76$, $p = .003$; good fit test: $p = .691$, $n = 182$). 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 show no significant prediction of behavior at T2 for PBC_{50} (OR = 1.33, 95% CI [.58, 3.08], $p = .501$) but significant predictions for PBC_{P75} (OR = 2.83, 95% CI [1.07, 7.52], $p = .037$) and PBC_{P100} (OR = 3.84, 95% CI [1.47, 10.02], $p = .006$) ($\chi^2 = 10.54$, $p = .015$; good fit test: $p = 1.000$). Polinomic contrast analysis confirmed a significant linear trend ($B = 1.071$, $p = 002$).

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In accordance with Rhodes and De Brujin [33,34] we calculated the intention-behavior gap and conducted a logistic regression to identify cognitions, which differentiate between successful and unsuccessful intenders. Intention (T1) was also dichotomized as we did with behavior at T2. The ratio of unsuccessful intenders (intenders who did not perform the behavior; $n = 36$) to successful intenders (those who did carry out the behavior; $n = 109$) was 0.33. Logistic regression analysis showed PBC as predictor for successful intenders. Taking the lowest category (PBC_{P25}) as the reference, results showed significant prediction of the intention-behavior gap for all categories: PBC_{50} (OR = 2.72, 95% CI [1.04, 7.13], p = .042), $\mathrm{PBC}_{\mathrm{P75}}$ (OR = 3.36, 95% CI [1.04, 10.89], p = .043) and $\mathrm{PBC}_{\mathrm{P100}}$ (OR=5.44, 95% CI [1.73, 17.11], p = .004) ($\chi^2 = 10.57$, 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 with fibromyalgia intended to walk according to the target behavior (for at least 30 minutes, in bouts of 15 minutes, with a small rest between bouts, twice a week for a minimum of 6 consecutive weeks), held positive attitudes towards it, and perceived some control and social pressure to perform it. In spite of these findings, they did not behave according to their intentions. Our results suggest that the main explanation for this gap is related to their perceived control, as it has been suggested by previous research [34]. PBC was the unique predictor of the behavior and this is in accordance with the results found in other studies focused on people with health problems [30,38]. However, it is different from the Dixon et al. [39] findings in people with chronic pain. This inconsistency could be explained by differences between samples and target behaviors, according to the TPB assumptions and the evidence about physical activity [32].

The predictive value of PBC in relation to our target behavior was supported by logistic regression analysis. The women who perceived high control in comparison to women with low control, increased their likelihood of walking about 3-fold. This is a relevant finding taking into account that 25% of our sample scored below 4 on PBC, which is low perceived control. In this study, the intention-behavior gap represented 33% of participants, which is lower than the percentage showed by Rhodes & De Bruijn

[33] with non-clinical samples. Among our participants only PBC, and not affective attitude, predicted successful intenders, supporting its role in order to promote unsupervised walking in fibromyalgia.

Intention or PBC were not significant predictors of the pedometer data (steps), in contrast to other studies [55]. In addition, no variables related to the fibromyalgia condition were significant predictors of the two walking measures. This is a main result because pain, distress and fibromyalgia impact were frequent self-reported inhibitors for walking and “to have more pain” was the first expected outcome of performing the behavior in the elicitation study [46]. However, these variables did not significantly contribute to either intention or walking behavior.

Instrumental attitude and PBC accounted for 28% of the explained variance of intention at T1. This result coincides with the findings of Galea & Bray [30] in people with intermittent claudication, but in our sample, the explained variance was lower. In our population, attitude was the strongest predictor of intention, following the PBC and without contribution of the subjective norm, which is consistent with the literature [28] although the low beta of PBC and the absence of prediction by the affective attitude are not in accordance with the same evidence. The main role of instrumental attitude in our participants, instead of affective attitude, is coherent with their situation. Most of them had a medical recommendation to walk and they also received information during the recruitment process about the aims of this study and the benefits of walking.

Behavior in T1 was not a significant predictor either of intention (T1) or behavior (T2), in contrast with the evidence of other prospective studies on exercise [32]. However, our results are in line with the assumptions of the TPB on the role of cognitions (intention and PBC) and previous behavior on the prediction on future

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behavior. TPB states that cognitions are relevant when you engage in a new behavior, but when it is about predicting the maintenance of a behavior, previous behavior will be more relevant. In this study, our participants had to introduce this new behavior (walking for exercise) into their lives, so the fact that behavior at T1 does not play an important role is coherent with TPB. Behavior was higher at T2 than at T1. This change cannot be explained by the pedometer, because it didn´t increase behavior. Some authors have shown that asking about intentions can change the equivalent behavior by increasing attitude accessibility [56]. This could be the case here, taking into account that our population was motivated and received information about the benefits of walking.

This study shows that between the two main reasons for not walking, intention was not the problem. We had a considerable proportion of "unsuccessful intenders" where PBC, which included both self-efficacy and controllability of the behavior, was the only predictor to walk. The main issue would be to help these women to act upon their intentions, increasing perceived control and using volitional strategies to engage in walking, forming plans for managing the perceived inhibitors of this behavior.

This study has some limitations. First, it is possible that the strong intention does not reflect the current situation of the fibromyalgia 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 in fibromyalgia. However, no significant differences were found between participants and non-participants in socio-demographic characteristics and symptom perception. Similarly, there were no significant differences between women who completed this study and those who did not complete at T2. Also, 25% of the sample reported low

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intention according the value of percentile 25. Second, the sample was taken from different geographic areas; however, there were no differences between them based on geographic location in the previous study [36]. Lastly, pedometer data (steps) was an objective measure but it did not fit the compatibility principle with our self-reported measure as TPB authors' state. Despite this, we found a slightly significant correlation between both measures.

Finally, this study has several strengths. First, it is focused on women with fibromyalgia who suffer several debilitating symptoms, which could limit intentions and walking behavior. In fact, women with fibromyalgia are less physically active than age-matched healthy women [57]. Second, this study is the first to explore the determinants of walking in women with fibromyalgia; it is grounded in a well-established theoretical framework and takes into account specific facts related to this complex and incapacitating chronic condition. Third, walking is a purposeful behavior and an easy exercise that has shown positive results on fibromyalgia health outcomes and specific conditions, in our study it is 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 fibromyalgia. 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 of fibromyalgia as pain intensity, distress, functional impact and fear of movement, which showed no relevance on intentions or walking behavior.

In conclusion, our results suggest that in order to promote walking as an intervention strategy (including all elements for performing it properly), health providers should consider increasing perceived control and help patients to comply with their intentions. In this sense, they can offer different strategies for dealing with the primary inhibitors of walking such as implementation of intentions. Moreover, they should know the facilitators of performing this behavior and therefore increase patients' probability of walking. Although most of these women were motivated to walk, attitudes, in terms of expected benefits in health outcomes, should be also considered to strengthen their intentions. Thus a multidisciplinary approach that help patients to overcome their medical condition and cope with the illness difficulties (pain, tiredness, or mood, among others) could be particularly effective for increasing not only the intention of walking but the performing of the behavior that has been proved to be particularly helpful for patients with fibromyalgia.

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APORTACIÓN INDIVIDUAL DE LA DOCTORANDA EN ESTE TRABAJO:

- Gestión del contacto con las participantes a través de e-mail y teléfono
- Organización de las citas de evaluación
- Participación en la elaboración de los materiales de evaluación (cuestionarios auto-administrados) y supervisión de la cumplimentación en los dos momentos de medida
- Tabulación de los cuestionarios y auto-registros de todas las asociaciones, tras la elaboración de la base de datos
- Elaboración de instrucciones de uso y programación de los podómetros entregados a las participantes de las asociaciones de Alicante y Elche
- Participación en la redacción final del trabajo

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6. RESUMEN DE RESULTADOS

En la tabla 1 se resumen los resultados principales obtenidos en relación con los estudios 1, 3, 4 y 5.

Tabla 1. Resumen de resultados

Objetivo 1. Identificar y caracterizar a la población objeto de intervención.

Muestra	**Resultados**	
N = 920 Población de *referencia*	Edad: 52.60 ±8.8; Estudios primarios: 43.4% Casadas: 76.6 % Percepción dolor: 6.7 ±1.7; Fatiga: 6.9 ±2.7 (R: 0-10) Años Enfermedad 18.0 ±10.5; Años Diagnóstico: 9.9 ±5.7; hecho por: Reumatólogo: 77 %; Atención primaria: 9.2% 81.5% en tratamiento médico	
	Md actividad total	Md caminar
Elegible (N = 582)	180.5 min/sem	180.5 min/sem
No elegible (N = 338)	383.5 min/sem	240.5 min/sem
	Md actividades de intensidad moderada	
Participante (N= 276)	210.5 min/sem	
No participante (N = 308)	160.5 min/sem	

Objetivo 3. Identificar la prevalencia de la pauta seleccionada de andar y sus predictores.

Muestra	**Resultados**
N = 920 población de *referencia*	Andan sin supervisión: 59.2% Andan según pauta mínima: 30.8% Predictores de andar: Recomendación médica (OR = 1.876) (77.5% la tienen) Edad (OR = 1.021) Percepción de fatiga (OR = .912)

Objetivos 4 y 5. Identificar las creencias sobre la ejecución individual de la conducta seleccionada y elaborar un cuestionario basado en la TAP.

Muestra	**Resultados**
n = 46	Creencias sobre andar más frecuentes: *Comportamentales*: Mayor número consecuencias asociadas a la mejora de la salud pero las más frecuentes fueron dolor y fatiga *Normativas*: Apoyo del marido, amigos y familia (*descriptiva*) y de médicos (*prescriptiva*) *Control*: Equilibrio facilitadores-inhibidores pero sintomatología FM (malestar psicológico, dolor y fatiga) y mal tiempo fueron las más frecuentes (inhibidores)

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n = 46	Constructos TAP (R: 1-7) $M_{\text{Actitud}} = 5.73$ $M_{\text{Intención}} = 5.67$ $M_{\text{Norma Subjetiva}} = 4.98$ $M_{\text{Percepción Control}} = 4.91$ $M_{\text{Conducta}} = 3.67$ Cuestionario TAP: buena consistencia interna y validez discriminante. Relaciones teóricas con Intención: Percepción de control: $r = .70$*** Actitud: r = .56*** Norma subjetiva: r = .45** Relaciones teóricas con Conducta previa: Percepción de control: $r = .32$** Intención: r = .34**

Objetivos 6 y 7. Identificar y explorar predictores intención y conducta de andar para hacer ejercicio físico considerando los constructos de la TAP y otros relevantes como el estado de salud y el miedo al movimiento

Muestra	Resultados
T1: n = 276 **T2: n = 219** (7 semanas después)	Predictores andar: Percepción de control (OR = 1.30) Predictores intención conductual (28% ve) Percepción de control: $\beta = .37$*** Actitud (instrumental): $\beta = .15$** Norma subjetiva y Conducta T1 (n.s.) No predictores: miedo al dolor ni estado de salud#

N: muestra del estudio; R: rango de puntuaciones; M: media; Md: mediana; min/sem: minutos por semana; OR: Odds Ratio; FM: fibromialgia; *r*: correlación de pearson; T1: medida 1; T2: medida 2; β: beta; ***: $p \leq .001$; **: $p \leq .01$; n.s.: no significativo; #: intensidad dolor, distress, impacto percibido; ve: varianza explicada

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7. DISCUSIÓN

El presente trabajo incluye **cinco estudios** integrados en la primera fase de un trabajo más amplio cuyo objetivo es la incorporación y mantenimiento de una determinada forma de hacer ejercicio físico en mujeres con fibromialgia, utilizando una intervención motivacional y volitiva. En concreto se pretende que estas mujeres *anden al menos 30 minutos con un pequeño descanso a los 15 minutos, al menos dos veces por semana, durante un mes y medio como mínimo*. En la primera fase de este trabajo, nuestros objetivos incluyeron desde identificar y caracterizar a la población sobre la que se va a intervenir hasta identificar y explorar el papel de los predictores tanto de la *intención conductual* como de la *conducta* de andar como forma de ejercicio físico, considerando los constructos TAP, el estado de salud y el miedo al movimiento. Así, con los estudios objeto de esta tesis doctoral, hemos logrado todos nuestro objetivos identificando a la actitud y la percepción de control como las cogniciones sobre las que basar la intervención motivacional. Para ello, en el programa diseñado se trabajará sobre las creencias determinantes de ambas (comportamentales y de control).

La población de estos estudios está compuesta por mujeres diagnosticadas de fibromialgia pertenecientes a asociaciones de pacientes. La mayoría laboralmente activas o amas de casa, con estudios primarios o secundarios y en torno a los 50 años. En general, las mujeres mostraron una alta percepción de la sintomatología de la enfermedad como indicaron las puntuaciones en dolor, fatiga, problemas de sueño y cognitivos (valores entre 6.7 y 8.1 en las escalas con rangos entre 0 y 10 puntos). Resulta relevante comentar que, salvo en el caso de la edad, no obtuvimos diferencias entre asociaciones en las características sociodemográficas, clínicas y de ejercicio y actividad física de las personas participantes. Por otro lado, cabe señalar que las características de nuestra población coinciden con las de otras poblaciones con fibromialgia (Wolfe et al., 2010) procedentes de asociaciones de pacientes (Casanueva et al., 2012, Latorre et al., 2013; Sañudo et al., 2010; Sañudo et al., 2011). Por tanto, sobre la base de la ausencia de diferencias entre las asociaciones y la comparación de los resultados obtenidos con otras poblaciones, podemos afirmar que nuestras participantes representan el perfil habitual de personas con fibromialgia. En nuestra población de referencia, la mayoría de mujeres estaban diagnosticadas en reumatología o en atención primaria, se encontraban en tratamiento médico en el momento de la administración de las pruebas, y tenían la enfermedad aproximadamente 18 años.

En relación con el ejercicio físico seleccionado, en este trabajo solo consideramos aquellas personas que no tenían impedimentos físicos para andar o que, teniéndolos, su médico les había recomendado hacerlo. Descartamos a aquellas con patologías que impidieran realizar ejercicio y sin la recomendación médica de hacerlo, puesto que debían poder realizar la pauta seleccionada en el futuro (Fase II del proyecto en el que se enmarca este estudio). La exclusión de las personas con comorbilidades que impideran realizar ejercicio, es habitual en estudios de andar en muestras de asociaciones (Latorre et al., 2013; Sañudo et al., 2010; Sañudo et al., 2011). Además, se descartaron las participantes que andaban por encima de la pauta seleccionada. Sin embargo, en nuestro estudio, la proporción de mujeres de la población elegible que finalmente participó resultó ser menor con respecto a la de los estudios arriba mencionados: en torno a un 47.42% frente al 85% (Latorre et al., 2013), 79.24% (Sañudo et al., 2010) y 81.01% (Sañudo et al., 2011). Sin embargo, el número de participantes ha sido mucho mayor en nuestro estudio: 276 participantes de 582 elegibles frente a 85 de 100 (Latorre et al., 2013), 64 de 79 (Sañudo et al., 2010) y 42 de 53 (Sañudo et al., 2011), añadiendo que pertenecían a cuatro asociaciones diferentes alejadas geográficamente (Madrid, Talavera de la Reina, Alicante y Elche), con lo cual, el procedimiento de reclutamiento y organización de las sesiones puede añadir variablidad de contratiempos y dificultades para la asistencia de las participantes.

Como es sabido, el ejercicio regular disminuye la sintomatología y mejora la calidad de vida de las personas con fibromialgia (Busch et al., 2008; Häuser et al., 2010b; Kelley y Kelley, 2011; Sañudo et al., 2010b). Concretamente, andar es un ejercicio de bajo impacto musculoesquelético, recomendado para problemas de dolor crónico (O'Connor et al., 2015) que ha mostrado resultados positivos en fibromialgia (Busch et al., 2011; Schachter et al., 2003; Thomas et al., 2010) y al tratarse de un ejercicio fácil y adaptable a cada circunstancia, permite el automanejo de la enfermedad (Gusi et al., 2009). Sin embargo, a pesar de que se conoce que la baja adhesión al ejercicio físico puede limitar la eficacia de beneficios para la salud a largo plazo (Jordan et al., 2010), es sorprendente que no se haya profundizado en este tema tanto en relación con el ejercicio en general como a andar en particular. En la revisión sobre adhesión al ejercico físico de andar que hemos realizado, la adhesión en términos de asistencia a las sesiones de ejercicio es algo que se puede conocer aunque no todos los trabajos la informan. Sin embargo, se desconoce la adhesión al ejercicio atendiendo a los parámetros establecidos de antemando en los estudios, ya sea la frecuencia, la duración o la intensidad del ejercicio, tanto en las sesiones como una vez finalizadas o en el periodo de seguimiento, cuando se asume que la persona realizará de forma autónoma lo aprendido.

La adhesión en términos de asistencia a las sesiones de los programas que incluyen el ejercicio de andar de los últimos 15 años, ha sido alta (de 73 a 83.20%). Este resultado ha ido en contra de lo esperado a partir de una primera aproximación a la literatura, puesto que en los estudios revisados las tasas de adhesión a andar resultaron ser, incluso tras la intervención, no excesivamente altas, entre el 37.5% y el 62.5% (Mannerkorpi et al., 2010; Meyer y Lemley, 2000; Richards y Scott, 2002). Sin embargo, como es obvio, la asistencia de los participantes a las sesiones no significa necesariamente que se esté realizando el ejercicio, ya que no está claro si las personas llegan a realizar el suficiente ejercicio para obtener el beneficio terapéutico o si mantienen los niveles de ejercicio durante el tiempo suficiente para autogestionar su condición después del tratamiento (Bollen, Dean, Siegert, Howe y Goodwin, 2014; Jack, McLean, Moffett y Gardiner, 2010). Asimismo, las tasas proporcionadas no siempre se refieren a la actividad de andar debido a los diferentes componentes que se incluyen en muchas de estas intervenciones. Por lo tanto, es necesario una mayor y más detallada información relativa a la adhesión específica a andar para poder establecer conclusiones más sólidas sobre estas tasas de adhesión. No obstante, esto se presenta como una oportunidad para seguir investigando sobre la adquisición de la adhesión de los participantes entre sesiones y durante el seguimiento. De momento, se recomienda informar y, en su caso, hacerlo con mayor detalle, el registro de los datos relacionados con la adhesión, no solo en términos de asistencia a sesiones sino de adquisión y mantenimiento real del ejercicio indicado.

En dos de los estudios que componen esta tesis, el consejo médico aparece como un factor fundamental en relación con el ejercicio físico estudiado. Por un lado, es relevante como moderador de la adhesión en términos de asistencia a las sesiones de los programas de ejercicio que incluyen andar (R^2 = .520) y, por otro, ha sido el predictor más importante de la ejecución de la conducta de andar para hacer ejercicio en nuestra población (OR = 1.876). En el primer caso, las tasas de asistencia fueron mayores cuando el reclutamiento de los/las participantes se hizo a través de los médicos. En el segundo caso, como hemos comentado, la recomendación médica de andar (prevalente en nuestra población de referencia) fue el mejor predictor de la conducta, pero no de realizarla correctamente, es decir, considerando todos los elementos de la pauta recomendada para personas con fibromialgia (Gusi et al, 2009). Obviamente, esto puede reflejar la situación clínica habitual en relación con el consejo genérico de hacer ejercicio físico o específicamente de andar. Por tanto, cabe esperar obtener resultados positivos si ese consejo se ofreciera de forma específica considerando los diferentes componentes y la situación individual de las personas con fibromialgia. Sobre todo cuando, además, los médicos han sido percibidos como referentes normativos importantes por estas personas, tanto en nuestro caso como en el de otros autores (Dobkin et al., 2006). Se sabe que una buena relación médico-paciente (Sewitch et al., 2004) y la experiencia del profesional (Marques, De Gucht, Gouvela, Leal y Maes, 2015) se asocian positivamente con la adhesión a los tratamientos en fibromialgia. Según lo que hemos obtenido, todo parece apuntar a que la actividad de andar y el papel del médico tienen relación positiva, que habrá que explorar con mayor profundidad en el futuro, tanto en el caso de estos profesionales como en el de otros profesionales de la salud.

Cabe señalar que en el meta-análisis realizado, las intervenciones que incluyeron andar como ejercicio, se realizaron mayoritariamente en un contexto clínico, bajo la supervisión de profesionales y acompañadas, en muchos casos, de actividades para el manejo de síntomas y apoyo psicológico (en ocasiones realizadas en la misma sesión de ejercicio). Así, no disponemos de datos relacionados con un contexto comunitario y de “automanejo” como puede ser el representado por las asociaciones de pacientes. En este contexto, la conducta estudiada se pretende implantar sin supervisión ni apoyo profesional, asociándola exclusivamente a la motivación individual.

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En nuestra población de referencia, la prevalencia de ejercicio físico andando de forma regular, cumpliendo la pauta seleccionada, se situó en torno al 31%. Estos datos coinciden con los de otros autores que mostraron los bajos niveles de ejercicio físico previos a una intervención tanto en población reclutada del contexto clínico (Kaleth, Saha, Jensen, Slaven y Ang, 2013) como de la comunidad (Kelley, Kelley, Hootman y Jones, 2008; Latorre et al., 2013). Con respecto al ejercicio de andar en concreto, Latorre et al. (2013) encontraron que la actividad física regular de los participantes antes de comenzar la intervención era menor de 20 minutos o con una frecuencia menor a 3 días a la semana.

Las mujeres con fibromialgia de este estudio informaron realizar mayoritariamente actividades de baja a moderada intensidad, siendo muy bajo el porcentaje que cumplía con el mínimo de tiempo recomendado como saludable, 150 minutos a la semana como mínimo (23.2%). Este dato es similar al obtenido en otro estudio, 20.6%, que comparaba la actividad física de una población con fibromialgia con personas sanas (Segura-Jiménez et al., 2015). El tiempo total a la semana dedicado a la actividad en las mujeres con fibromialgia, valorado según la versión corta de la misma medida de evaluación (IPAQ Group, 2002), nuestra muestra declaró menor cantidad de tiempo (medianas de 835 minutos en la muestra total y 1053 minutos en la muestra que andaba) con respecto a la población de otro estudio (media entre 2741 y 3081 minutos por semana) (McLoughlin et al., 2011). Sin embargo, esta diferencia puede darse debido a dos razones: 1) la media de edad de nuestro estudio es 10 años mayor y puede haber diferencias por la edad, como señala McLoughlin et al. (2011) en el estudio mencionado, donde la edad,además, fue un predictor de andar (OR = 1.021) más potente que en nuestro caso, o 2) las diferentes versiones del mismo cuestionario,, ya que en la version larga utilizada por McLoughlin et al. (2011) se incluyen especificaciones acerca del tiempo dedicado al trabajo, a las tareas de casa, transporte y ocio. En nuestro caso se optó por la versión corta para facilitar la cumplimentación por correo. Finalmente, las muestras de ambos trabajos son semejantes respecto del tiempo que informan estar “sentadas” al día: mediana de 270 minutos (240-300) en nuestro caso y entre 194 y 412 minutos en el estudio de comparación.

Como se ha expuesto, para predecir la ejecución de la conducta se consideró la estructura teórica de la TAP (Ajzen, 1985, 1991). Al incluir la intención comportamental como el determinante inmediato de la acción esta teoría ofrece una estructura sencilla que, además, permite trabajar a dos niveles: predictivo y explicativo. La identificación de las creencias modales nos permitió explicar la conducta seleccionada y trabajar con ellas para motivar su incorporación en una población de personas con fibromialgia, en un contexto comunitario. Las creencias se exploraron desde un punto de vista cualitativo y cuantitativo. En el primer caso, a través de análisis temático como técnica cualitativa (Braun y Clarke, 2006) y en el segundo, del análisis de frecuencias y de contenido sugerido por los autores de la teoría (Fishbein y Ajzen, 2010). En los dos estudios realizados con este fin, se pudo comprobar que las participantes informaron una mayor y variada cantidad de creencias positivas que negativas sobre las consecuencias de su ejecución del comportamiento (andar en los términos expuestos para hacer ejercicio físico). En general, esperaban sentirse mejor y mejorar su salud, coincidiendo estos resultados con estudios previos (Beltrán-Carrillo, Tortosa-Martínez, Jennings y Sánchez, 2013; Juuso, Skär, Olsson y Söderberg, 2013). Sin embargo, los beneficios esperados se combinaron con expectativas respecto de resultados negativos directamente relacionados con su problema concreto, como el dolor en varias partes del cuerpo, dolor en general o fatiga y estas creencias negativas se dieron con mayor frecuencia que las positivas. La existencia de creencias positivas y negativas sobre un mismo objeto es algo esperado y descrito en la teoría (Fishbein y Ajzen, 2010), por lo que no es sorprendente que se de en este caso. En relación con las creencias de control, aunque las participantes informaron de condiciones facilitadoras para su ejecución como ser acompañada o animada por otros y tener las tareas de casa hechas, fueron más frecuentes los inhibidores o dificultades esperadas para la realización de la conducta. Sobre todo los relacionados con su problema de salud, como el dolor, la fatiga o el malestar psicológico del mismo modeo que en otros trabajos (Hallberg y Bergman, 2011; Palstam, Gard y Mannerkorpi, 2013). Cabe señalar que es la primera vez que se identifican estas creencias respecto de la ejecución individual y autónoma de andar para hacer ejercicio físico. Estos inhibidores son semejantes a las características que se han encontrado entre los participantes que no completaron los programas de ejercicio físico en fibromialgia, como la mayor intensidad de dolor y discapacidad relacionada con el dolor (Harden et al., 2012; Kayo et al., 2012; Valim et al., 2003).

En esta primera fase se elaboró y probó el instrumento que evalúa todos los constructos de la TAP, con buenos resultados psicométricos: buena validez discriminante (correlación ítems-total > .50) y consistencia interna en todas las subescalas (α > .78). Cabe señalar que es uno de los pocos instrumentos que incluyen la evaluación de las creencias identificadas en el estudio correspondiente, puesto que la mayoría de estudios con poblaciones clínicas se limitan al análisis predictivo (Darker et al., 2009; De Bruijn y Rhodes, 2011; Hagger et al., 2002; Symons-Downs y Hausenblas, 2005). Sin embargo, el número de personas que compuso la muestra fue pequeño, por lo que, en futuros trabajos se profundizará en el estudio de su validez de constructo.

Uno de los objetivos relevantes respecto del diseño de la intervención de la fase II del estudio general era identificar las cogniciones relevantes tanto para la intención de andar como para la propia conducta. Para ello, se planteó un estudio prospectivo (Estudio 5) con el objetivo de identificar los predictores de la intención, por un lado, y de la conducta 7 semanas después, por otro. En este estudio, utilizamos los constructos de la TAP pero también incorporamos la percepción del estado de salud y el miedo al movimiento como variables con posibles efectos, tanto en la ejecución de la conducta seleccionada como en la intención de realizarla. Según estudios previos, el miedo al dolor mantiene unos mayores niveles de dolor y de discapacidad y de falta de adhesión al ejercicio (Turk et al., 2004), mientras que el incremento de los síntomas como el dolor y la fatiga (Busch et al., 2011; Mannerkorpi et al., 2003) o el distrés psicológico y el impacto de la enfermedad (Turk et al., 2004), dificultan la adhesión de los participantes a la realización de ejercicio físico. Sin embargo, y en contra de lo esperado, ni el estado de salud ni el miedo al movimiento fueron predictores significativos de la intención y de la conducta. A pesar de que la percepción de la fatiga resultó ser un predictor significativo de la conducta de andar (OR = .912) en el estudio con la población de referencia (Estudio 3) que en el Estudio 5 que ahora nos ocupa, no haya resultado ser predictor, puede explicarse debido a varias razones: en primer lugar, la diferencia en las medidas de evaluación de la fatiga, en segundo lugar, la inclusión de otros factores predictores en el Estudio 3 (como la recomendación médica o variables sociodemográficas) y, en tercer lugar, la diferencia entre estudios, el Estudio 3 fue transversal y el 5 es prospectivo, con 7 semanas de diferencia desde la primera medida. Además, en el caso del Estudio 3, el efecto fue muy débil y probablemente no se mantuviera en el tiempo.

Entre los constructos de la TAP, el único predictor de la conducta de andar en esta muestra resultó ser la percepción de control comportamental (OR = 1.30). Esto es coherente con la literatura acerca de la predicción de los constructos TAP en poblaciones con problemas de salud, donde la percepción de control es el constructo más relevante en la predicción de la actividad física (McEachan et al., 2011). En relación con la medida objetiva obtenida a través de los podómetros (pasos) ni la intención ni la percepción de control comportamental resultaron significativos, en contra de lo que han mostrado otros autores (Scotts et al., 2007).

Nuestro trabajo ha mostrado que las mujeres con fibromialgia tienen intención de realizar la conducta seleccionada (M = 5.93; Rango: 1-7). Sus predictores fueron, en primer lugar, la percepción de control comportamental (β = .37) y en segundo lugar, la actitud instrumental hacia la conducta (β = .15) explicando, junto a la norma subjetiva y la conducta previa (no significativos) un 28% de varianza explicada. Esto es coherente con estudios anteriores en población con problemas de salud crónicos (Galea y Bray, 2006), aunque la cantidad de varianza explicada fue mayor (67%) y con estudios meta-analíticos sobre la actividad física que concluyen que la actitud junto a la percepción de control predicen mejor la intención que la norma subjetiva (Hagger et al., 2002, Symons-Downs y Hausenblas, 2005). Cabe señalar que en nuestro trabajo, la dimensión afectiva de la actitud no fue un predictor significativo, en contra de lo obtenido en los estudios sobre ejercicio físico (Rhodes y DeBruijn, 2013). Este resultado es lógico si consideramos que la conducta a realizar se planteó como una intervención eficaz para mejorar la salud en fibromialgia y que estas personas tienen muy presente su sintomatología a la hora de ejecutarla; por el contrario, resulta cohrente que en población general el placer o disfrute de la actividad (dimensión afectiva) sea el componente de mayor peso en la actitud para hacer ejercicio. Además, en nuestro caso, las explicaciones sobre los beneficios de la conducta de andar es posible que potenciasen aspectos positivos ya existentes en las participantes, ya que la mayoría tenía la recomendación médica de andar.

Nuestros resultados contrastan también con los de otros estudios, en primer lugar, en problemas de dolor en el que tanto la *percepción de control comportamental* como la *intención* fueron predictores de andar con un 29% de varianza explicada (Dixon et al., 2012) y, en segundo lugar, de fibromialgia (Doyle-Baker, 2001), donde los tres constructos de la TAP (y no dos como en nuestro caso) explicaron el 32% de la varianza en la intención de realizar ejercicio físico en general (Doyle-Baker, 2001). Esta falta de correspondencia con las muestras de dolor crónico y fibromialgia puede explicarse por las diferencias entre sus características y las diferencias en las conductas objetivo, de acuerdo con los supuestos TAP tanto desde un punto de vista teórico como en su aplicación a la actividad física (McEachan et al., 2011). Los resultados obtenidos en nuestro caso van en la linea de los supuestos de la TAP (Ajzen, 1985, 2011; Azjen y Madden, 1986) que plantean la mayor influencia en la conducta de las cogniciones en el caso de la incorporación de nuevas conductas, como es es este que nos ocupa.

Por lo que respecta a que la intención no resultara ser un predictor de la conducta, es posible que pudiera estar interviniendo una baja percepción de control comportamental asociada a la sintomatología de la fibromialgia que ha aparecido en otros estudios (Rhodes y de Bruijn, 2013). Por otra parte, es probable que la intención en esta muestra fuera alta debido a que las participantes que acudieron a las evaluaciones, eran las más motivadas a andar a causa de la recomendación de hacerlo y el hecho de acudir voluntariamente.

Por tanto, se puede concluir que la TAP en este estudio ha resultado una teoría útil para la predicción de la intención. Sin embargo, no ha sido tan eficaz en la predicción de la conducta. Como se ha señalado en apartados anteriores, hay que tener en cuenta que tener la intención de realizar una conducta no siempre implica su ejecución. En nuestra población también se ha dado el llamado “gap” o “brecha” intención-conducta, pero ha resultado ser menor (el 33% de las personas tenían intención de andar en los términos especificados y no lo hicieron 7 semanas después) que en otras investigaciones en poblaciones sanas (46%) (Rhodes y De Bruijn, 2013a, 2013b).

La aplicación de técnicas como las intenciones de implementación (Gollwitzer, 1999) puede facilitar la reducción del “gap” intención-conducta (Bélanger-Gravel, Godin y Amireault, 2013; Norman y Conner, 2005) a través de planes que especifican cuándo, dónde y cómo llevar a la acción una meta propuesta o cómo se va a superar una dificultad anticipada, con la estructura formal “si…entonces”.

En población general, la combinación de las técnicas motivacionales utilizando la TAP y técnicas volitivas con intenciones de implementación o con planes de acción, ha resultado eficaz para aumentar el ejercicio de andar (Darker et al., 2010; French, Stevenson y Michie, 2012; Milne, Orbell, y Sheeran, 2002; Preswitch, Lawton y Conner, 2003). Resulta pertinente poner a prueba esta combinación en la población de fibromialgia, cuyos problemas físicos pueden afectar directamente a la conducta de andar.

Las *limitaciones* de este trabajo han ido exponiéndose en los diferentes estudios. Sin embargo, cabe señalar en relación con las más relevantes, que en este estudio no se contrastó el diagnóstico clínico de fibromialgia, asumiendo el que cada participante tenía desde atención primaria y reumatología. Sin embargo, en el momento del estudio, en estos contextos se utilizaban los criterios ACR-1990, como criterios recomendados por el Ministerio de Sanidad y Política Social (MSPS, 2011). Además, al inicio nuestra investigación no disponíamos de los criterios ACR-2010 adaptado para autoinforme en población española (Segura-Jiménez et al., 2014). Con todo, se administró un instrumento diseñado específicamente para fibromialgia en población general con el propósito de homogeneizar las muestras. Utilizando el London-4 (White, Harth, Speechley y Østbye, 1999) descartamos a 4 mujeres que no cumplían sus criterios.

Aunque algunos autores han mencionado las limitaciones psicométricas del IPAQ-S en fibromialgia (Kaleth, Ang, Chakr y Tong, 2010), en un estudio reciente sobre instrumentos de actividad física, la escala mostró propiedades psicométricas aceptables (Helmerhorst, Brage, Warren, Besson y Ekelund, 2012) y la forma extendida del IPAQ se ha utilizado en pacientes españoles con fibromialgia (Munguía-Izquierdo, Legaz-Arrese y Mannerkorpi, 2011; Segura-Jiménez et al., 2013).

En relación con el Estudio 4 y con el análisis de grupos focales, hay que tener en cuenta que tanto la necesidad de expresión de las participantes como la negatividad relativa a su situación, pudo haber inflado la experiencia real acerca de los síntomas.

Finalmente, el sesgo muestral de las mujeres que acudieron al estudio, en el sentido de que fueran las motivadas para andar y con mejores “condiciones” psicológicas (menos miedo al movimiento) y físicas (mejor estado de salud) necesita ser explorado. A pesar de esto, no se encontraron diferencias significativas entre las participantes y no participantes del estudio en las características sociodemográficas y la percepción de síntomas. Del mismo modo, no hubo diferencias significativas entre las mujeres que completaron el Estudio 5 y las que no vinieron 7 semanas después.

Por otra parte, la serie de trabajos realizados en esta primera fase, tiene varias *fortalezas:* En primer lugar, para explorar los factores de la adhesión a una conducta determinada de ejercicio físico y recomendada específicamente para problemas crónicos como la fibromialgia, se ha realizado un profundo y detallado análisis a través de perspectivas metodológicas diferentes, aplicado sobre una muestra representativa, tanto en tamaño muestral como en características de la población debido a unos criterios de inclusión eficaces. En segundo lugar, este estudio es el primero en explorar los determinantes de andar según una pauta específica en mujeres con fibromialgia, siguiendo un modelo teórico de referencia y considerando factores relacionados con esta población (miedo al dolor y estado de salud) tanto desde una perspectiva transversal como prospectiva, midiendo la conducta en un momento de medida y siete semanas después.

La TAP puede ser un modelo adecuado para el trabajo motivacional con los pacientes con fibromialgia. En este sentido, trabajos futuros podrían profundizar en su aplicación utilizando el conocimiento disponible sobre la heterogeneidad de las personas con fibromialgia (Wolfe et al., 2010). Así, podrían tenerse en cuenta factores disposicionales que pudieran configurar ***perfiles*** o subgrupos de pacientes, tal y como se realiza en intervenciones psicológicas (Rodero et al., 2009), considerándolos como variables externas al modelo pero probando si se vinculan a creencias diferentes (puesto que éstas siempre serán la base de cualquier programa de cambio). En esta dirección, hay autores que destacan la importancia de evaluar e identificar a los subgrupos de pacientes con dolor crónico para obtener subpoblaciones homogéneas para aplicar tratamientos individualizados y eficaces (Hasenbring et al., 2012). Se podrían contemplar factores diferentes a los examinados en este estudio y en sentido positivo como, por ejemplo, el optimismo disposicional o la resiliencia que se han relacionado con una mejor adaptación al dolor (Matusiewicz y Krzyszkowska, 2009; Ramírez-Maestre, Esteve y López, 2012, Wright et al., 2011; Wideman et al., 2013).

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Sobre la base de los resultados obtenidos en este estudio respecto de la ausencia de capacidad predictiva del miedo al movimiento, es posible que la forma de evaluación a través de auto–informe haya podido limitar este resultado (Esteve y Ramírez-Maestre, 2013). En este sentido, algunos autores sugieren su evaluación teniendo en cuenta el contenido y estructura de las metas concretas que se persiguen en el tratamiento y las creencias de los pacientes tanto las relativas al dolor como a la discapacidad y al tratamiento (Vlaeyen y Linton, 2012). Para ello, se propone el uso de diarios informatizados y métodos de evaluación ecológicos (Schrooten y Vlaeyen, 2010) que se pueden llevar a cabo fácil y gratuitamente por medio de las nuevas tecnologías, accesibles a todo tipo de muestras hoy en día. Por otra parte, es posible que el miedo al dolor esté actuando como variable externa al modelo TAP, ejerciendo su influencia a través de las creencias. Finalmente, otra posible explicación sea que, precisamente, las personas que acudieron a la evaluación hayan sido aquellas con un bajo miedo al movimiento, mejor estado de salud y motivadas para implementar la conducta; sin embargo, a pesar de ello, aproximadamente un tercio de ellas no la realizaron a pesar de tener intención de hacerlo. Nuestro estudio prospectivo representa el paso previo al desarrollo de una intervención para implementar la conducta seleccionada para una población específica caracterizada por su baja práctica de ejercicio físico. Sobre la base de los resultados obtenidos, pretendemos aumentar la probabilidad de cambio conductual y conseguir una adhesión exitosa al ejercicio. En este sentido, se plantea necesaria tanto la intervención motivacional como volitiva, considerando una serie de factores. En primer lugar, la calidad de un estudio sobre ejercicio físico en fibromialgia mejora con la realización de un informe detallado de los datos demográficos y clínicos de los grupos de estudio (Hauser et al., 2010) con el objetivo de ofrecer información suficiente sobre los factores intervinientes en el desarrollo del programa, incluyendo el

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cumplimiento. En segundo lugar, hay que considerar el nivel basal de las personas participantes en relación con el ejercicio; por ello, no podemos olvidar el bajo nivel de actividad de las personas con fibromialgia (McLoughlin et al., 2011). Por tanto, se recomienda ir aumentando de forma progresiva y comfortable para la persona los niveles de actividad; de este modo, además, se aumenta la percepción de control sobre la conducta (Cedrashchi et al., 2013; Jones y Liptan, 2009; Juuso et al., 2013). Con este fin, se sabe que una información adecuada sobre la enfermedad y el ejercicio, puede influir en el ajuste de creencias y expectativas de dolor para mostrar una realidad manejable y, con ello, aumentar la confianza (Moseley, 2005). En tercer lugar, para prevenir la exacerbación de los síntomas, que influye en el abandono del ejercicio (Jones y Liptan, 2009), se debe motivar a los/las pacientes teniendo en cuenta las limitaciones que perciben (Nijs et al., 2010). Por lo tanto, para desarrollar la actividad en términos de intensidad, duración y periodos de descanso (Nijs et al., 2010) hay que considerar tanto síntomas y forma física como preferencias y motivaciones de los participantes (Busch et al., 2011). El trabajo realizado en la Fase I de la investigación que nos ocupa ha intentado considerar todas estas cuestiones apoyándose, además, en los presupuestos teóricos de un modelo bien establecido y en la evidencia disponible sobre su aplicación en la predicción del ejercicio y la actividad físca en general y andar en particular. .

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8. CONCLUSIONES

De acuerdo a los principales hallazgos de los estudios realizados y agrupados en la presente tesis doctoral, se pueden extraer las siguientes conclusiones:

- Las intervenciones que incluyen el ejercicio de andar en fibromialgia tienen una adhesión alta, considerando como medida la asistencia a las sesiones. Sin embargo, desconocemos la adhesión al ejercicio prescrito o entrenado entre las sesiones y después del tratamiento.
- El reclutamiento de participantes por parte del médico y una mayor duración de las sesiones, probablemente asociada a la incorporación de otros ejercicios y/o actividades multidisciplinares además de andar, se relacionan con una mayor adhesión a los programas de ejercicio en fibromialgia que incluyen andar.
- Se requiere mayor investigación sobre las variables moderadoras de la adhesión al ejercicio de andar en fibromialgia y, para ello, se plantea la necesidad de registrar mejor información con respecto a la adhesión a los ejercicios prescritos de una forma más específica (frecuencia, duración e intensidad), por ejemplo a través de auto-registros o dispositivos móviles.
- La prevalencia de andar regularmente como ejercicio físico en mujeres de entre 18 y 70 años pertenecientes a asociaciones de fibromialgia es baja y los predictores de este comportamiento son la recomendación médica para hacerlo, la edad y la percepción de fatiga.
- El instrumento elaborado para evaluar los constructos de la TAP es adecuado y ha mostrado propiedades psicométricas aceptables. Sin embargo, se plantea analizar con mayor profundidad su validez de constructo en una muestra más amplia que la utilizada en este trabajo.

- Las mujeres con fibromialgia esperaron obtener tanto consecuencias positivas como negativas por la ejecución de la conducta. Sin embargo, estas últimas fueron las más frecuentes y fundamentalmente tuvieron que ver con la sintomatología de su enfermedad como el dolor, la fatiga o el malestar psicológico. Factores que, a su vez, fueron percibidos como importantes inhibidores del comportamiento a realizar.
- En mujeres con fibromialgia, el control percibido ha sido el único predictor de la conducta de andar según la pauta seleccionada. Las personas con mayor percepción de control aumentaron hasta tres veces más la probabilidad de andar durante un mes y medio continuado.
- Las mujeres del estudio tuvieron intención de realizar la conducta, siendo sus predictores la percepción de control comportamental y la actitud instrumental hacia la conducta.
- La TAP en este estudio ha resultado una teoría útil para la predicción de la intención pero no tanto en la predicción de la conducta. Teniendo en cuenta que queda por cubrir el "gap" entre la intención-conducta, resulta pertinente la combinación de las técnicas motivacionales utilizando la TAP y técnicas volitivas con intenciones de implementación para incorporar y aumentar la conducta seleccionada.

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UNIVERSITAS Miguel Hernández

10. CURRICULUM VITAE

Currículum vitae

UNIVERSITAS Miguel Hernández

YOLANDA SANZ BAÑOS

16/06/2016

DATOS PERSONALES

APELLIDOS	Sanz Baños	**FECHA NACIMIENTO**	03/01/1988
NOMBRE	Yolanda	**DNI**	48650895F

FORMACIÓN ACADÉMICA

2015-2016 Universidad Miguel Hernández. Elche. (Alicante)
EXPERTO UNIVERSITARIO EN INNOVACIÓN TECNOLÓGICA EN EDUCACIÓN

2010-2012 Universidad Miguel Hernández. Elche. (Alicante)
MASTER DE PSICOLOGÍA DE LA SALUD

2006-2010 Universidad Miguel Hernandez. Elche. (Alicante)
LICENCIADA EN PSICOLOGÍA.

2010. Premio Extraordinario 5 Estrellas Universidad Miguel Hernández
Formación universitaria integral: rendimiento académico, implicación y proyección social, prácticas en empresas, proyección europea del currículum y desarrollo de habilidades

SITUACIÓN PROFESIONAL ACTUAL

UNIVERSITAS Miguel Hernández

ORGANISMO UNIVERSIDAD MIGUEL HERNÁNDEZ

FACULTAD FACULTAD DE CIENCIAS SOCIOSANITARIAS

DEPT. PSICOLOGÍA DE LA SALUD

DIRECCIÓN POSTAL: 03202

TELÉFONO (indique prefijo, número y extensión) 965 65 8322

CORREO ELECTRÓNICO ysanz@umh.es

SITUACIÓN ADMINISTRATIVA: Personal investigador en formación dentro del programa VALi+d

CONTRATADO - BECARIA A TIEMPO COMPLETO

NORMATIVA CONVOCATÒRIA: Anexo II de la ORDEN 23/2012, de 25 de mayo, de la Conselleria de Educación, Formación y Empleo
NORMATIVA DE ADJUDICACIÓN: Anexo I de la ORDEN 23/2012 del 10 de mayo,
FECHA DE INICIO DE LA BECA: 1 Junio 2013
FECHA DE FINALIZACIÓN DE LA BECA: 1 Junio 2016

IDIOMAS EXTRANJEROS (R= regular; B= bien; C= correctamente)

IDIOMA	HABLA	LEE	ESCRIBE
INGLÉS	C	C	C

CURSOS OFICIALES

Curso Oficial Level Up-Intermediate de la Universidad Miguel Hernández de Elche (Alicante). Vicerrectorado de Relaciones Internacionales. 57 Horas

Curso Nivel C1 del Laboratorio de Idiomas de la Universidad Miguel Hernández de Elche (Alicante) en colaboración con Cambridge. 200 horas

PARTICIPACIÓN EN PROYECTOS DE INVESTIGACIÓN FINANCIADOS EN LOS ÚLTIMOS AÑOS

TÍTULO DEL PROYECTO: INTERVENCIÓN MOTIVACIONAL E INTENCIONES DE IMPLEMENTACIÓN PARA LA ADHESIÓN TERAPÉUTICA AL EJERCICIO FÍSICO EN LA FIBROMIALGIA

ENTIDAD FINANCIADORA: Ministerio de Ciencia e Innovación. Plan Nacional I+D+I. Ref: PSI 2011-25132

DURACIÓN DESDE 01/06/2012 **HASTA** 31/05/2013 (sin financiación MINECO hasta 31/05/16)

INVESTIGADOR/A PRINCIPAL Mª ÁNGELES PASTOR MIRA

PARTICIPACIÓN EN CONTRATOS DE INVESTIGACIÓN DE ESPECIAL RELEVANCIA CON EMPRESAS I/O ADMINISTRACIONES (referidos a los últimos años)

TÍTULO DEL CONTRATO TÉCNICO EN INVESTIGACIÓN TIPO A

EMPRESA-ADMINISTRACIÓN FINANCIADORA UNIVERSIDAD MIGUEL HERNÁNDEZ / Ministerio de Ciencia e Innovación. Plan Nacional I+D+I. Ref: PSI 2011-25132

DURACIÓN DESDE 1 JUNIO 2012 ***HASTA*** 31 MAYO 2013
INVESTIGADOR/A RESPONSABLE Mª ÁNGELES PASTOR MIRA

TÍTULO DEL CONTRATO INNOVA. Proyectos metodológicos de innovación y mejora docente: "APOYO AL SERVICIO DE INNOVACIÓN Y APOYO TÉCNICO A LA DOCENCIA E INVESTIGACIÓN"

EMPRESA-ADMINISTRACIÓN FINANCIADORA UNIVERSIDAD MIGUEL HERNÁNDEZ

DURACIÓN DESDE 1 DE ENERO 2014 ***HASTA*** 31 DE ENERO 2014
INVESTIGADOR/A RESPONSABLE TOMÁS SEMPERE GALLAR

TÍTULO DEL CONTRATO INNOVA. Proyectos metodológicos de innovación y mejora docente: "AMPLIACIÓN Y MEJORA DEL LABORATORIO VIRTUAL DE PRÁCTICAS DE INTERACCIÓN PROFESIONAL EN EL CONTEXTO SANITARIO"

EMPRESA-ADMINISTRACIÓN FINANCIADORA UNIVERSIDAD MIGUEL HERNÁNDEZ

DURACIÓN DESDE 1 DE DICIEMBRE 2015 ***HASTA*** 31 DE ENERO 2016
INVESTIGADOR/A RESPONSABLE

REFERENCIA PROYECTO INNOVA+UMHINNOVA2015/10

PUBLICACIONES
Referidas a los últimos años hasta un máximo de 10 publicaciones)

CLAVE: L = Libro completo, CL = Capítulo del libro, A = Artículo, R = Reseña ("Review"), E = Editor

INTERNACIONAL

AUTORES (p.o. de firma) López-Roig S, María-Ángeles P, Peñacoba C, Lledó A, Sanz Y, Velasco L.
TÍTOL / *TITULO* Prevalence and predictors of unsupervised walking and physical activity in a community population of women with fibromyalgia
REFERENCIA REVISTA O LIBRO Rheumatology International, (online), 1-7 ***AÑO:*** 2016 ***CLAVE*** A
DOI: http://dx.doi.org/10.1007/s00296-016-3508-1

INTERNACIONAL

AUTORES (p.o. de firma) Sanz, Y; Pastor, M.A., Velasco, L., López-Roig, S., Peñacoba, C., Lledó, A. y Rodríguez, C.
TÍTOL / *TITULO* To walk or not to walk: insights from a qualitative description study with women suffering from fibromialgia
REFERENCIA REVISTA O LIBRO Rheumatology International, (online), 1-9. ***AÑO:*** 2016 ***CLAVE*** A
DOI: http://dx.doi.org/10.1007/s00296-016-3459-6

NACIONAL

AUTORES (p.o. de firma) *Mª Angeles Pastor, Sofía López-Roig, Yolanda Sanz, Cecilia Peñacoba, Margarita Cigarán*, Lilian Velasc, Ana Lledó & Carmen Écija*
TITULO *Andar como forma de ejercicio físico en la Fibromialgia: un estudio de identificación de creencias desde la Teoría de la Acción Planeada. / Walking as physical exercise in Fibromyalgia: An elicitation study from the Theory of Planned Behavior.*
REFERENCIA REVISTA O LIBRO Anales de Psicología, *31*(2), 433-446 ***AÑO:*** 2015 ***CLAVE*** A
DOI: http://dx.doi.org/10.6018/analesps.31.2.172151

INTERNACIONAL

AUTORES (p.o. de firma) María-Ángeles Pastor, Sofía López-Roig, Ana Lledó, Cecilia Peñacoba, Lilian Velasco, Inge Schweiger-Gallo, Margarita Cigarán, Carmen Écija, Ramón Limón and Yolanda Sanz
TITULO Combining motivational and volitional strategies to promote unsupervised walking in patients with fibromyalgia: study protocol for a randomized controlled trial: the launch of Trials.
REFERENCIA REVISTA O LIBRO Trials, *15*(1), 120. ***AÑO:*** 2014 ***CLAVE*** A
DOI: http://dx.doi.org/10.1186/1745-6215-15-120

NACIONAL

AUTORES (p.o. de firma) *Daniel Lloret Irles, Víctor Cabrera Perona y Yolanda Sanz Baños*
TITULO: *Relaciones entre hábitos de uso de videojuegos, control parental y rendimiento escolar*
REFERENCIA REVISTA O LIBRO European Journal of Investigation in Health, Psychology and Education, 3(3), 237-248 ***AÑO:*** 2013 ***CLAVE*** A
DOI: http://dx.doi.org/10.1989/ejihpe.v3i3.46

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CONGRESOS

Internacional

AUTORES: Sanz-Baños Yolanda, Pastor María-Ángeles, López-Roig, Lledó, Ana

TÍTULO: Caminar como estrategia de tratamiento de la enfermedad en fibromialgia: Creencias y percepción de apoyo social

TIPO DE PARTICIPACIÓN: Póster (Aceptado)

CONGRESO: II congreso Internacional de la Sociedad Científica Española de Psicología Social (SCEPS)

LUGAR DE REALIZACIÓN: Elche, Alicante **AÑO:** 2016

Internacional

AUTORES: María-Ángeles Pastor-Mira, Sofía López-Roig, Cecilia Peñacoba, Yolanda Sanz, Lilian Velasco, Carmen Écija & Ana Lledó.

TÍTULO: Distress, fear of movement, walking behaviour and disability in fibromyalgia.

TIPO DE PARTICIPACIÓN: Póster (Aceptado)

CONGRESO: 29th Conference of the European Health and Psychology Society (EHPS)

LUGAR DE REALIZACIÓN: Aberdeen, UK **AÑO:** 2016

UNIVERSITAS Miguel Hernández

Internacional

AUTORES: Yolanda Sanz, Maria-Angeles Pastor, Sofía López-Roig, Cecilia Peñacoba, Lilian Velasco and Ana Lledo, Margarita Cigaran, Carmen Ecija

TÍTULO: Emotions and beliefs about walking in women with fibromyalgia from the Theory of Planned Behavior

TIPO DE PARTICIPACIÓN: Póster

CONGRESO: 29th Conference of the European Health and Psychology Society (EHPS)

LUGAR DE REALIZACIÓN: Chipre **AÑO**: 2015

Nacional

AUTORES: Cecilia Peñacoba, Sofía López-Roig, Mª Ángeles Pastor, Yolanda Sanz, Lilian Velasco y Carmen Ecija

TÍTULO: Miedo al movimiento en mujeres con fibromialgia. Repercusiones en la sintomatología emocional asociada en función de la pauta de caminar

TIPO DE PARTICIPACIÓN: Comunicación oral

CONGRESO: V Jornadas “Emociones y Bienestar”, SEAS-Mutua Madrileña; 1-2 octubre

LUGAR DE REALIZACIÓN: Madrid **AÑO**: 2015

Nacional

AUTORES: Cecilia Peñacoba, Mª Ángeles Pastor, Sofía López-Roig, Lilian Velasco, Yolanda Sanz y Ana Lledó

TÍTULO: El dolor y la fatiga como inhibidores de la conducta de caminar en mujeres con fibromialgia. Un estudio de las creencias asociadas y sus repercusiones en la sintomatología

TIPO DE PARTICIPACIÓN: Póster
CONGRESO: V Jornadas "Emociones y Bienestar", SEAS-Mutua Madrileña; 1-2 octubre
LUGAR DE REALIZACIÓN: Madrid AÑO: 2015

Nacional

AUTORES: Lilian Velasco, Yolanda Sanz, Mª Ángeles Pastor, Sofía López-Roig, Cecilia Peñacoba y Charo Rodríguez
TÍTULO: ¿Qué piensan las mujeres con fibromialgia sobre andar como parte de su tratamiento? Revelaciones desde la perspectiva de la metodología mixta
TIPO DE PARTICIPACIÓN: Póster
CONGRESO: V Jornadas "Emociones y Bienestar", SEAS-Mutua Madrileña; 1-2 octubre
LUGAR DE REALIZACIÓN: Madrid **AÑO**: 2015

Nacional

AUTORES/AS: Lledó, A; Sanz, Y; Pastor, Mª; López-Roig, S; Peñacoba, C; Velasco, L; Cigarán, M Écija, C.
TÍTULO: Predictores de la Teoría de la Acción Planeada en la conducta de caminar en mujeres con Fibromialgia.
TIPO DE PARTICIPACIÓN: Poster
CONGRESO: III CONGRESO IBEROAMERICANO DE PSICOLOGÍA DE LA SALUD
PUBLICACIÓN:
LUGAR DE CELEBRACIÓN: SEVILLA **AÑO:** 2014

Nacional

AUTORAS: Sofía López-Roig, Cecilia Peñacoba Puente, Yolanda Sanz Baños, Margarita Cigarán Méndez
TÍTULO: Predictores de la intención y conducta de andar en personas con fibromialgia según la Teoría de la Acción Planeada
TIPO DE PARTICIPACIÓN: Poster
CONGRESO: I Congreso de la Sociedad Científica Española de Psicología Social
PUBLICACIÓN:
LUGAR DE CELEBRACIÓN: Sevilla **AÑO**: 2014

Nacional

AUTORES: Mª Ángeles Pastor, Sofía López-Roig, Yolanda Sanz, Cecilia Peñacoba, Lilian Velasco, Margarita Cigarán, Ana Lledó y Carmen Écija
TÍTULO: EMOCIONES, IMPACTO ENFERMEDAD Y ACTIVIDAD FÍSICA EN MUJERES CON FIBROMIALGIA
TIPO DE PARTICIPACIÓN: Comunicación Oral
CONGRESO: X Congreso de la Sociedad Española para el Estudio de la Ansiedad y el Estrés (SEAS)
PUBLICACIÓN: Libro de Resúmenes. X Congreso Internacional de la Sociedad Española para el Estudio de la Ansiedad y el Estrés –SEAS. Valencia, 11-13 de septiembre 2014. Valencia: SEAS. Sociedad Española para el estudio de la Ansiedad y el Estrés. Pág 198
LUGAR DE REALIZACIÓN: Valencia **AÑO:** 2014

UNIVERSITAS Miguel Hernández

Nacional

AUTORES: Manuel Tirado, Mª Ángeles Pastor, Sofía López-Roig y Yolanda Sanz
TÍTULO: Autoeficacia, Catastrofismo y emociones en mujeres con fibromialgia
TIPO DE PARTICIPACIÓN: Comunicación Oral
CONGRESO: X Congreso de la Sociedad Española para el Estudio de la Ansiedad y el Estrés (SEAS)
PUBLICACIÓN: Libro de Resúmenes. X Congreso Internacional de la Sociedad Española para el Estudio de la Ansiedad y el Estrés –SEAS. Valencia, 11-13 de septiembre 2014. Valencia: SEAS. Sociedad Española para el estudio de la Ansiedad y el Estrés. Pág 263
LUGAR DE REALIZACIÓN: Valencia **AÑO:** 2014

Nacional

AUTORES: Yolanda Sanz, María-Ángeles Pastor, Sofía López-Roig,, Cecilia Peñacoba, Lilian Velasco y Margarita Cigarán Ana Lledó, Carmen Écija
TÍTULO: Emociones y creencias sobre caminar desde la Tª de la Acción Planeada en mujeres con fibromialgia
TIPO DE PARTICIPACIÓN: Póster
CONGRESO: X Congreso de la Sociedad Española para el Estudio de la Ansiedad y el Estrés (SEAS)
PUBLICACIÓN: Libro de Resúmenes. X Congreso Internacional de la Sociedad Española para el Estudio de la Ansiedad y el Estrés –SEAS. Valencia, 11-13 de septiembre 2014. Valencia: SEAS. Sociedad Española para el estudio de la Ansiedad y el Estrés. Pág 249
LUGAR DE REALIZACIÓN: Valencia **AÑO:** 2014

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internacional

AUTORES: Sofía López-Roig, Cecilia Peñacoba, María-Ángeles Pastor, Yolanda Sanz, Lilian Velasco, Ana Lledó, Carmen Écija and Margarita Cigarán* **TÍTULO:** WALKING AS PHYSICAL EXERCISE IN FIBROMYALGIA: IDENTIFYING PROFILES IN PATIENTS' ASSOCIATIONS ACCORDING TO PSYCHOLOGICAL TREATMENT THE THEORY OF PLANNED BEHAVIOUR.
TIPO DE PARTICIPACIÓN: Póster
CONGRESO: 27º CONFERENCE OF THE EUROPEAN HEALTH PSYCHOLOGY SOCIETY
PUBLICACIÓN: **http://ehps.net/ehp/index.php/contents/article/view/612/605**
LUGAR DE REALIZACIÓN: Innsbruck **AÑO:** 2014

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internacional

AUTORES: María-Ángeles Pastor, Sofía López-Roig, Cecilia Peñacoba, Yolanda Sanz, Ana Lledó, Margarita Cigarán, Lilian Velasco & Carmen Écija
TÍTULO: PSYCHOLOGIAL PREDICTORS OF UNSUPERVISED WALKING IN FIBROMYALGIA
TIPO DE PARTICIPACIÓN: Póster
CONGRESO: 27º CONFERENCE OF THE EUROPEAN HEALTH PSYCHOLOGY SOCIETY
PUBLICACIÓN: **http://ehps.net/ehp/index.php/contents/article/view/670/663**
LUGAR DE REALIZACIÓN: Innsbruck **AÑO:** 2014

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internacional

AUTORES: Sofía López–Roig, María-Ángeles Pastor, Cecilia Peñacoba, Yolanda Sanz, Ana Lledó, Margarita Cigarán, Lilian Velasco & Carmen Écija
TÍTULO: PSYCHOLOGICAL AND HEALTH STATUS DETERMINANTS OF THE MOTIVATION FOR WALKING AS PHYSICAL EXERCISE IN FIBROMYALGIA
TIPO DE PARTICIPACIÓN: Póster
CONGRESO: 27º CONFERENCE OF THE EUROPEAN HEALTH PSYCHOLOGY SOCIETY
PUBLICACIÓN: http://ehps.net/ehp/index.php/contents/article/view/613/606
LUGAR DE REALIZACIÓN: Innsbruck **AÑO:** 2014

Nacional

AUTORES: Cecilia Peñacoba, María-Ángeles Pastor, Sofía López-Roig, Yolanda Sanz, Ana Lledó, Carmen Écija.
TÍTULO: Efectos de la comorbilidad psicológica en la actividad física cotidiana en pacientes con Fibromialgia
TIPO DE PARTICIPACIÓN: Póster
CONGRESO: XI Congreso de la Sociedad Española del Dolor
PUBLICACIÓN:
LUGAR DE REALIZACIÓN: Toledo **AÑO:** 2014

Nacional

AUTORES: Sofía López-Roig, Cecilia Peñacoba, María-Ángeles Pastor, Yolanda Sanz, Lilian Velasco, Margarita Cigarán
TÍTULO: Caminar de forma no supervisada y sintomatología en la Fibromialgia
TIPO DE PARTICIPACIÓN: Póster
CONGRESO: XI Congreso de la Sociedad Española del Dolor
PUBLICACIÓN:
LUGAR DE REALIZACIÓN: Toledo **AÑO:** 2014

UNIVERSITAS Miguel Hernández

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internacional

AUTORES: María-Ángeles Pastor, Sofía López-Roig, Yolanda Sanz, Cecilia Peñacoba, Margarita Cigarán, Lilian Velasco, Ana Lledó & Carmen Écija
TÍTULO: BELIEFS ABOUT WALKING IN FIBROMYALGIA: AN ELICITATION STUDY FROM
THE THEORY OF PLANNED BEHAVIOUR.
TIPO DE PARTICIPACIÓN: Póster
CONGRESO: 27º CONFERENCE OF THE EUROPEAN HEALTH PSYCHOLOGY SOCIETY
PUBLICACIÓN: Psychology & Health, 28:sup1, 1-335
LUGAR DE REALIZACIÓN: Bordeaux **AÑO:** 2013

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internacional

AUTORES: Sofía López-Roig, María-Ángeles Pastor, Yolanda Sanz, Cecilia Peñacoba, Lilian Velasco, Ana Lledó, Margarita Cigarán & Carmen Écija
TÍTULO: DOES MEDICAL RECOMMENDATION PREDICT WALKING IN FIBROMYALGIA PEOPLE?
TIPO DE PARTICIPACIÓN: Póster
CONGRESO: 27º CONFERENCE OF THE EUROPEAN HEALTH PSYCHOLOGY SOCIETY
PUBLICACIÓN: Psychology & Health, 28:sup1, 1-335
LUGAR DE REALIZACIÓN: Bordeaux **AÑO:** 2013

---

internacional

AUTORES: María-Ángeles Pastor, Sofía López-Roig, Yolanda Sanz, Cecilia Peñacoba, Margarita Cigarán, Ana Lledó, Lilian Velasco & Carmen Écija
TÍTULO: DO TPB CONSTRUCTS PREDICT INTENTION AND WALKING BEHAVIOUR IN FIBROMYALGIA WOMEN?
TIPO DE PARTICIPACIÓN: Póster
CONGRESO: 27º CONFERENCE OF THE EUROPEAN HEALTH PSYCHOLOGY SOCIETY
PUBLICACIÓN: Psychology & Health, 28:sup1, 1-335
LUGAR DE REALIZACIÓN: Bordeaux **AÑO:** 2013

---

internacional

AUTORES: María-Ángeles Pastor, Sofía López-Roig, Yolanda Sanz, Cecilia Peñacoba, Margarita Cigarán, Ana Lledó, Lilian Velasco y Carmen Écija
TÍTULO: Identificación de creencias y predicción de la intención de andar como pauta de ejercicio físico en mujeres con FM
TIPO DE PARTICIPACIÓN: Póster
CONGRESO: IV INTERNATIONAL SYMPOSIUM for the STUDY of CHRONIC PAIN and FIBROMYALGIA
LUGAR DE REALIZACIÓN: Mallorca **AÑO:** 2013

---

internacional

AUTORES: Sofía López-Roig, María-Ángeles Pastor, Yolanda Sanz, Cecilia Peñacoba, Lilian Velasco, Ana Lledó, Margarita Cigarán y Carmen Écija
TÍTULO: Andar como forma de ejercicio físico no supervidado en fibromialgia: descripción de una muestra de asociaciones.
TIPO DE PARTICIPACIÓN: Póster
CONGRESO: IV INTERNATIONAL SYMPOSIUM for the STUDY of CHRONIC PAIN and FIBROMYALGIA
LUGAR DE REALIZACIÓN: Mallorca **AÑO:** 2013

Internacional

AUTORES: Daniel Loret, Victor Cabrera y Yolanda Sanz
TÍTULO: "Relaciones entre hábitos de uso de videojuegos, control parental y rendimiento escolar"
TIPO DE PARTICIPACIÓN: COMUNICACIÓN ORAL
CONGRESO: III CONGRESO INTERNACIONAL DE CONVIVENCIA ESCOLAR
LUGAR DE REALIZACIÓN: Almería **AÑO:** 2013

Nacional

AUTORES: Yolanda Sanz, Víctor Cabrera, María-Carmen Terol, Rosa Núñez, Maria-Angeles Pastor, Orttn Francisco
TÍTULO: "Uso del HAD en población con Fibromialgia"
TIPO DE PARTICIPACIÓN: Póster
CONGRESO: X CONGRESO NACIONAL DE LA ESPAÑOLA DEL DOLOR (SED)
LUGAR DE REALIZACIÓN: Granada **AÑO**: 2013

UNIVERSITAS Miguel Hernández

Nacional

AUTORES: Yolanda Sanz Baños, Maria-Angeles Pastor, Sofía López-Roig, Cecilia Peñacoba, Ana Lledó, Carmen Ecija

TÍTULO: "Predictores del ejercicio físico en la Fibromialgia: el rol de la recomendación médica y la percepción de síntomas"

TIPO DE PARTICIPACIÓN: Póster

CONGRESO: X CONGRESO NACIONAL DE LA ESPAÑOLA DEL DOLOR (SED)

LUGAR DE REALIZACIÓN: Granada **AÑO**: 2013

Nacional

AUTORES: Yolanda Sanz Baños, Sofla L6pez-Roig, Maña-Angeles Pastor, Cecilia Peñacoba, Lilian Velasco, Margaríta Cirgarán

TÍTULO: "Andar como forma de ejercicio físico no supervisado en Fibromialgia: descripción de una muestra de asociaciones"

TIPO DE PARTICIPACIÓN: Póster

CONGRESO: X CONGRESO NACIONAL DE LA ESPAÑOLA DEL DOLOR (SED)

LUGAR DE REALIZACIÓN: Granada **AÑO**: 2013

Nacional

AUTORES: Yolanda Sanz Baños; Víctor Cabrera Perona; M. Carmen Terol Cantero; Francisco Ortín García

TÍTULO: "Fibromialgia. Relaciones entre la comparación social, pensamiento catastrofista e impacto laboral en pacientes hospitalarios.

TIPO DE PARTICIPACIÓN: Comunicación oral

CONGRESO: X CONGRESO NACIONAL DE LA ESPAÑOLA DEL DOLOR (SED)

LUGAR DE REALIZACIÓN: Granada **AÑO**: 2013

Nacional

AUTORES: Pastor Mira, Mª Angeles; López-Roig, S., Sanz Baños. Y.; Peñacoba Puente, Cecilia; Velasco Furlong, Lilian*; Lledó Boyer, A.; Ecija Gallardo, Mª Carmen; Cigarán Méndez, Margarita

TÍTULO: "Problemas que trata la Psicología en Población con Fibromialgia: la Perspectiva del Paciente"

TIPO DE PARTICIPACIÓN: Póster

CONGRESO: IX CONGRESO INTERNACIONAL DE LA SOCIEDAD PARA EL ESTUDIO DE LA ANSIEDAD Y EL ESTRÉS (SEAS)

LUGAR DE REALIZACIÓN: Valencia **AÑO**: 2012

UNIVERSITAS Miguel Hernández

Nacional

AUTORES: Pastor Mira, Mª Angeles; López-Roig, S., Sanz Baños. Y.; Peñacoba Puente, Cecilia; Velasco Furlong, Lilian; Lledó Boyer, A.; Ecija Gallardo, Mª Carmen; Cigarán Méndez, Margarita
TÍTULO: Problemas que trata la psicología en población con fibromialgia: la perspectiva del paciente
TIPO DE PARTICIPACIÓN: Póster
CONGRESO: IX CONGRESO INTERNACIONAL DE LA SOCIEDAD PARA EL ESTUDIO DE LA ANSIEDAD Y EL ESTRÉS (SEAS)
LUGAR DE REALIZACIÓN: Valencia **AÑO**: 2012

Nacional

AUTORES: Quiles Y., Sanz Y., Martín-Aragón M., Pamies L., Quiles M.J.
TÍTULO: "Autoeficacia y Malestar Psicológico en Cuidadores de Pacientes con un Trastorno de la Conducta Alimentaria"
TIPO DE PARTICIPACIÓN: Póster
CONGRESO IX CONGRESO INTERNACIONAL DE LA SOCIEDAD PARA EL ESTUDIO DE LA ANSIEDAD Y EL ESTRÉS (SEAS)
LUGAR DE REALIZACIÓN: Valencia **AÑO**: 2012

UNIVERSITAS Miguel Hernández

Internacional

AUTORES: Quiles Y., Sanz Y., Pamies L., Quiles M.J.
TÍTULO: "The Spanish Validation of the Revised Scale for Caregiving Self-Efficacy in Eating Disorders"
TIPO DE PARTICIPACIÓN: Póster
CONGRESO: 26TH CONFERENCE OF THE EUROPEAN HEALTH PSICHOLOGY SOCIETY
PUBLICACIÓN: http://dx.doi.org/10.1080/08870446.2012.707817
LUGAR DE REALIZACIÓN: Praga **AÑO**: 2012

Internacional

AUTORES: Terol cantero Mari-Carmen, Sanz Baños Yolanda, Bernabé Castaño Miguel, Martín-Aragón Maite, Pastor Mira Maria-Angeles and Cabrera Perona Victor
TÍTULO: "Anxiety and Depression in women with Fibromyalgia."
TIPO DE PARTICIPACIÓN: Póster
CONGRESO: 25TH CONFERENCE OF THE EUROPEAN HEALTH PSICHOLOGY SOCIETY
PUBLICACIÓN: http://dx.doi.org/10.1080/08870446.2011.617185
LUGAR DE REALIZACIÓN: Creta-Grecia **AÑO**: 2011

Nacional

AUTORES: Bernabé Castaño M., Nuñez Nuñez Rosa María, Sanz Baños Yolanda, Martín-Aragón M.
TÍTULO: "Bienestar Laboral en médicos de urgencias hospitalarias y su relación con el estilo de vida, ocio y la satisfacción personal."
TIPO DE PARTICIPACIÓN: Póster

CONGRESO: VIII CONGRESO INTERNACIONAL DE LA SOCIEDAD ESPAÑOLA PARA EL ESTUDIO DE LA ANSIEDAD Y EL ESTRÉS (SEAS).
LUGAR DE REALIZACIÓN: Valencia **AÑO**: 2010

Nacional

AUTORES: M.C. Terol Cantero, Y. Sanz Baños, V. Cabrera Perona
TÍTULO: "Adaptación española del HAD: una revisión de estudios."
TIPO DE PARTICIPACIÓN: Póster
CONGRESO: VIII CONGRESO INTERNACIONAL DE LA SOCIEDAD ESPAÑOLA PARA EL ESTUDIO DE LA ANSIEDAD Y EL ESTRÉS (SEAS).
LUGAR DE REALIZACIÓN: Valencia **AÑO**: 2010

Nacional

AUTORES: M.C. Terol Cantero, V. Cabrera Perona y Y. Sanz Baños
TÍTULO: "Predictores del estado emocional de mujeres con fibromialgia"
TIPO DE PARTICIPACIÓN: Póster
CONGRESO: VIII CONGRESO INTERNACIONAL DE LA SOCIEDAD ESPAÑOLA PARA EL ESTUDIO DE LA ANSIEDAD Y EL ESTRÉS (SEAS).
LUGAR DE REALIZACIÓN: Valencia **AÑO**: 2010

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