Common-sense model of self-regulation to cluster fibromyalgia patients: results from a cross-sectional study in Italy

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Abstract

Objective

Fibromyalgia is a severe and disabling chronic pain syndrome affecting millions of people worldwide. Various patients' subgroups were identified using different atheoretical measures, hardly effective to tailor treatments. Previous literature findings showed the relevance of fibromyalgia patients' illness perceptions in adjusting to the disease. The present study aims to identify clusters of fibromyalgia patients based on their illness perceptions and investigate whether they can differ across pain, mood, physical functioning, catastrophising, and pain acceptance measures.

Methods

Fifty-three newly referred fibromyalgia patients completed clinical and psychological questionnaires. Patients' subgroups were created by applying hierarchical cluster analysis to their answers to Illness Perception Questionnaire-Revised subscales. Potential differences across subgroups in outcome variables were tested.

Results

Cluster analysis identified two patient groups. Group A (32 patients) had a higher representation of fibromyalgia as a chronic disease with severe consequences, lower beliefs in personal and treatment control, and a higher fibromyalgia-related emotional distress than group B (21 patients). Clusters did not differ on pain intensity and duration. Group A, compared to group B, showed worse physical functioning and overall impairment due to fibromyalgia, a poorer psychological condition, a higher tendency to catastrophise, and less pain acceptance.

Conclusion

Study findings reveal two fibromyalgia subgroups differing in emotional suffering and impairment despite similar pain intensity and duration. Patients' illness perceptions and attitudes towards pain, like catastrophising and acceptance, might be critical in adjusting to the disease. A detailed assessment of such risk and protective factors is critical to differentiate patients' subgroups with different needs and thus offer tailored treatments.

Key words

fibromyalgia, self-regulation, illness perception, catastrophising, acceptance, cluster analysis

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Introduction

Chronic pain, *i.e.* pain persisting or recurring for more than 3 months, represents a public health priority worldwide; it affects millions of people in developed and developing countries, with a dramatic burden on affected individuals and societies (1). The term "chronic pain" may refer to a disease in itself or to several syndromes (for a debate see: 2, 3), which are recently categorised into the 11th version of the International Classification of Diseases (ICD-11) (4). Among the different chronic pain syndromes within the ICD-11, fibromyalgia (FM) is one of the most severe and disabling (5). It affects between 0.2 and 6.6% of the general population, especially middle-aged women (6, 7). The 2016 American College of Rheumatology (ACR) criteria (8) diagnosed FM if there are symptoms of generalised pain for more than three months in at least 4 or 5 body regions and specific scores on questionnaires measuring other somatic and cognitive symptoms. FM symptomatology can also include fatigue, sleep disturbances, cognitive dysfunctions, emotional distress, and other somatic symptoms or comorbidities that worsen patient functioning and quality of life (9). Combinations and severity of symptoms may vary from one patient to another. Therefore, researchers tried to identify homogeneous subgroups by using different measures to understand the underlying aetiopathogenetic processes better and discriminate different levels of severity, to set up more tailored therapies (10, 11, 12). FM aetiopathogenesis remains, however, unclear. A combination of genetic and environmental features (*i.e.* psychological and physical stressors) and biological factors (*e.g.* neurotransmitters, hormones, cytokines, endocrine, and immune aspects) seem to be involved (13, 14). Moreover, several psychological variables may worsen emotional and physical functioning, and thus the illness burden (15, 16). No specific diagnostic laboratory tests or biomarkers are available to confirm the diagnosis; in addition, treatment is challenging, partly due to an incomplete understanding of its underlying cause; consequently, the syndrome tends to follow a non-remitting course (13, 14). Given the uncertainty of the diagnosis, symptoms' heterogeneity, frequent comorbidities, and treatment difficulties, FM is considered one of the most challenging pain conditions to adjust to (17).

Some authors have highlighted the role of FM patients' beliefs and representations about their illness as crucial elements to understand their adjustment to the disease (18). According to the Common-sense Model of Self-regulation (CSM) (19), patients constantly integrate the information collected about their illness to synthesise a representation that allows them to explain it, make sense of it, and guide coping strategies. FM patients have been found to show an inconsistent and negative perception of their illness, viewed as chronic and responsible for severe consequences in their lives, and to perceive little personal or treatment control on it (18). In FM patients, a negative illness perception was associated with high levels of pain intensity, emotional and physical distress, pain catastrophising, and low levels of pain acceptance (20).

The literature recommends using theoretically derived models for clustering chronic pain patients to predict their response to interventions (21). Given that the CSM is a solid, theoretically driven, and empirically-based model, it could be helpful to investigate the presence of subgroups of patients with different beliefs about their illness as the first step towards developing tailored treatments.

In the broader context of chronic pain, Hobro *et al.* (22) supported the utility of illness representations to identify two distinct pain groups, namely adaptors and non-adaptors, significantly differing in measures of pain, mood, and functioning. In addition, a randomised controlled trial (RCT) suggested that 18-week cognitive therapy based on illness perceptions may offer clinical improvements in physical activities of patients with chronic low back pain (23).

The present study aimed to (1) identify potential clusters of FM patients based on their illness representations using the CSM, and (2) investigate whether clusters differ across measures of pain,

mood, functioning, pain catastrophising, and pain acceptance.

Methods

Design and participants

This study is a secondary data analysis from an observational, cross-sectional, single-blind diagnostic trial investigating whether Mu opioid receptor on lymphocyte membranes (MOR) could be considered an FM biomarker (24). All study participants (n=102) were recruited between 8 March 2018 and 8 March 2019 at the Clinic for the Diagnosis and Therapy of Fibromyalgia, Rheumatology Unit, Umberto I Policlinic, Sapienza University of Rome, Italy. According to the ACR criteria, critical inclusion criteria were age older than 18 years and the presence of chronic pain due to FM (8). A physician made the diagnosis of FM in the department of Rheumatology. The current study used the subsample of FM patients who underwent blood tests and completed a battery of psychological self-report questionnaires (n=53).

The Research Ethics Committee of Sapienza University of Rome approved the study (Ref. 4937/2018), and the trial was registered in the ISRCTN registry (ID: ISRCTN24645566, 2018). Researchers explained the aims of the study to the participants and collected their written informed consent.

Measures

The survey collected information on socio-demographic characteristics, duration of pain, and current treatments. It also included four questionnaires to measure pain intensity, the impact of FM, emotional distress, illness perception, pain catastrophising, and pain acceptance.

A Numerical Rating Scale (NRS) was used to measure the average pain intensity suffered by the patient in the past week. It was based on a 0–10 response format with 0 for "no pain" and 10 for "the worst pain imaginable" and showed good sensitivity (25).

The Italian version of the Fibromyalgia Impact Questionnaire (26) was used to assess the patients' ability to function in daily life and the full spectrum of FM symptoms. The FIQ consists of one question with ten items focusing on the patient's physical functioning in everyday life, two items evaluating the number of days the patient felt good and the number of days they missed work in the past week, and seven items measuring FM symptoms.

The Italian version of the 21-item Depression, Anxiety and Stress Scale-21 (27) was used to assess three dimensions related to negative emotional states such as Anxiety symptoms (7 items), Depressive symptoms (7 items), and Stress-related symptoms (7 items).

The Italian version of the Illness Perception Questionnaire-Revised (28) was used to assess patients' illness perception. It is a 38-item measure of illness representation in terms of beliefs about perceived illness duration (Acute/chronic timeline, six items), beliefs about the course of the illness over time (Cyclical timeline, five items), beliefs about the expected illness outcomes (Consequences, six items), perception of understandability of the disease (Coherence, five items), perception of negative emotions triggered by the illness (Emotional representation, five items), beliefs in personal control over the disease (Personal control, six items), and beliefs in control of the illness through therapies (Treatment control, five items).

The 6-item catastrophising subscale of the Italian version of the Coping Strategies Questionnaire (29) measured catastrophic thinking related to pain.

The Italian version of the 20-item Chronic Pain Acceptance Questionnaire (30) was used to measure pain acceptance based on persistence in doing pleasant activities instead of controlling pain and avoiding them.

Data analyses

Preliminary Pearson's correlations were calculated between all the psychological and outcome variables. A k-means clustering procedure was undertaken following the CSM to identify FM subgroups based on their illness representations measured with the IPQ-R. Potential differences across subgroups in outcome variables were explored using Student's *t*-test or Mann-Whitney U-test, where appropriate. Preliminary controls for missing data, normality (Shapiro-Wilk test), and homoscedasticity (Levéne test) were performed.

All statistical analyses were performed using SPSS v. 25.0 for Windows (IBM Corp., Armonk, NY, USA). All tests were two-tailed, and a *p*-value of less than 0.05 was considered statistically significant.

Table I. Socio-demographic characteristics of patients (n=53).

Demographics	n (%)
Education (%)	
Primary/middle school or three-years professional school diploma	13 (27.1)
High school	22 (45.8)
University degree	9 (18.8)
Postgraduate	4 (8.3)
Missing	5 (9.4)
Occupation (%)	
Employed	31 (58.5)
Unemployed	8 (15.1)
Housewife	8 (15.1)
Student	1 (1.9)
Missing	5 (9.4)
Housing situation (%)	
Living alone	2 (3.8)
Living with parents	4 (7.5)
Living with current family	37 (69.8)
Living with other non-family people	3 (5.7)
Missing	7 (13.2)

Results

All participants were female, and their mean age was 49.09 years (SD=11.03) with a range of 21–72. Table I reports the other socio-demographic characteristics.

All 53 patients completed the clinical and psychological questionnaires in all their parts. Table II shows frequencies for pain duration and mean values for pain intensity, pain duration, FM impact, physical functioning, depression, anxiety, stress-related symptoms, illness representations, pain catastrophising, and pain acceptance.

The data distribution was normal except for pain severity (NRS). Homogeneity of variances across groups was satisfied for all variables except for pain duration (Levene=4.051, p=0.05). Therefore, comparisons were calculated with the Mann-Whitney U-test for NRS and Welch's correction for pain duration.

Table II. Descriptive data for all clinical and psychological variables (n=53).

Variables	Mean (SD)	n (%)
NRS	7.87 (2.18)	
Pain duration		
1 years		5 (9.4)
>2 years		19 (35.8)
>5 years		10 (18.9)
>10 years		18 (34.0)
>20 years		1 (1.9)
FIQ, total score	8.96 (1.53)	
FIQ, physical functioning subscale	4.44 (1.94)	
DASS-21, depression subscale	7.32 (4.63)	
DASS-21, anxiety subscale	8.41 (4.10)	
DASS-21, stress symptoms subscale	10.62 (4.51)	
IPQ-R Timeline	23.26 (4.82)	
IPQ-R Cyclical	15.64 (2.95)	
IPQ-R Consequences	23.03 (4.09)	
IPQ-R Personal control	19.26 (3.83)	
IPQ-R Treatment control	16.64 (2.67)	
IPQ-R Coherence	14.28 (3.98)	
IPQ-R Emotional representation	17.70 (4.67)	
CSQ Pain catastrophising	17.73 (9.08)	
CPAQ Pain acceptance	54.06 (16.64)	

Correlation analysis (Table III) showed that the only variables significantly associated with pain intensity were the physical functioning subscale and the total score of FIQ, emotional representation of IPQ-R, and pain catastrophising. Except for illness representations of cyclical timeline and coherence, fibromyalgia impact had significant correlations with all the outcome variables investigated. Moreover, except for acute/chronic timeline, cyclical timeline, and coherence, illness representations significantly correlated with depression, pain catastrophising, and pain acceptance, but not with anxiety and stress (though illness representation of consequences correlated significantly with perceived stress). Finally, pain catastrophising and pain acceptance had significant correlations with each other and most of the outcome variables investigated, but not with pain duration and illness representations of acute/chronic timeline, cyclical timeline, and coherence.

Cluster analysis based on IPQ-R subscales classified patients into two groups formed by 32 (group A) and 21 (group B) members, respectively. Compared to group B, group A's represented FM as a chronic disease with severe consequences. They reported lower beliefs in personal and treatment control over the condition and higher emotional distress related to FM (Fig. 1).

Comparisons between groups showed that clusters did not differ on pain intensity and duration. Instead, group A,

Table III. Correlations among clinical and psychological variables.

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
NRS																
Pain duration	0.14															
FIQ-Total	0.50**	0.08														
FIQ-PF	0.28*	-0.17	0.62**													
DASS-Dep	0.19	0.23	0.68**	0.39**												
DASS-Anxiety	0.12	0.09	0.57**	0.42**	0.69**											
DASS-Stress	0.12	0.14	0.52**	0.34*	0.77**	0.71**										
IPQR-AC	0.15	0.11	0.36**	0.27	0.39**	0.21	0.23									
IPQR-Cycl	-0.15	-0.20	-0.10	0.10	-0.16	-0.09	-0.03	-0.07								
IPQR-Cons	0.33*	0.18	0.51**	0.28*	0.47**	0.26	0.34*	0.28*	-0.11							
IPQR-PC	-0.27	-0.05	-0.43**	-0.89**	-0.36**	-0.18	-0.07	-0.33*	0.24	-0.63**						
IPQR-TC	-0.41	-0.01	-0.29*	-0.42**	-0.44**	-0.26	-0.24	-0.21	0.22	-0.28*	0.50**					
IPQR-Coherence	0.13	-0.07	0.01	-0.01	-0.10	0.06	-0.02	0.16	0.16	-0.22	0.02	0.23				
IPQR-E	0.21	0.14	0.40**	0.24	0.61**	0.38**	0.55**	0.17	0.03	0.44**	-0.22	-0.15	-0.28*			
CSQ-PC	0.32*	0.03	0.62**	0.52**	0.63**	0.39**	0.43**	0.20	0.09	0.46**	-0.34*	-0.43**	-0.21	0.57**		
CPAQ	-0.27	-0.09	-0.53**	-0.36**	-0.58**	-0.38**	-0.35**	-0.10	0.01	-0.65**	0.49**	0.35*	0.26	-0.51**	-0.76**	

NRS: pain intensity; FIQ-PF: physical functioning; DASS-Dep: depression; IPQR-AC: acute/chronic timeline; IPQR-Cycl: cyclical timeline; IPQR-Cons: consequences; IPQR-PC: personal control; IPQR-TC: treatment control; IPQR-E: emotional representation; CSQ-PC: pain catastrophising; CPAQ-PA: pain acceptance.
*$p \leq 0.05$. **$p \leq 0.001$.

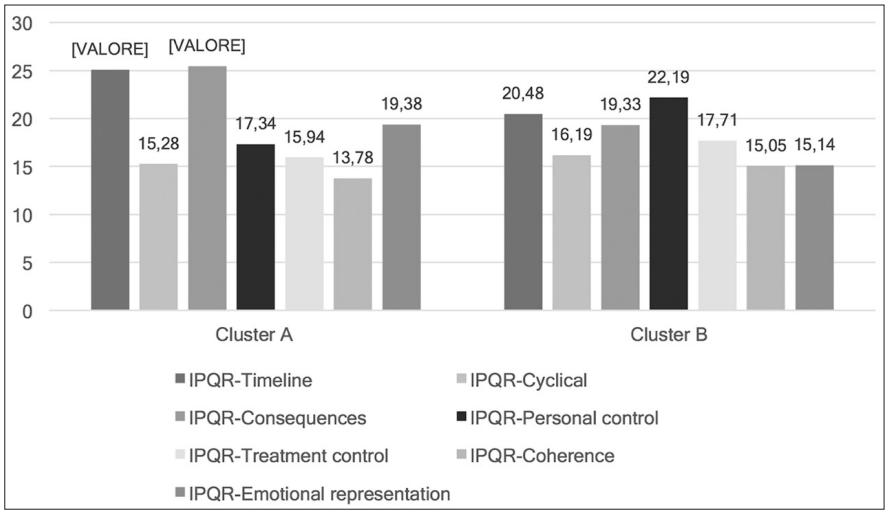

Fig. 1. Difference between clusters on IPQ-R subscales.

Table IV. Descriptive statistics and comparisons between groups.

Variable	Group A (n=32) Mean (SD)	Group B (n=21) Mean (SD)	Two-group test significance (*p*)
IPQ-R Timeline	25.09 (4.31)	20.48 (4.25)	$t^1 = 3.83$, $p<0.001$
IPQ-R Cyclical	15.28 (3.10)	16.19 (2.69)	$t^1 = -1.10$, $p=0.278$
IPQ-R Consequences	25.47 (2.23)	19.33 (3.47)	$t^1 = 7.85$, $p<0.001$
IPQ-R Personal control	17.34 (2.86)	22.19 (3.27)	$t^1 = -5.71$, $p<0.001$
IPQ-R Treatment control	15.94 (2.69)	17.71 (2.31)	$t^1 = -2.49$, $p=0.016$
IPQ-R Coherence	13.78 (3.97)	15.04 (3.98)	$t^1 = -1.14$, $p=0.262$
IPQ-R Emotions	19.37 (3.88)	15.14 (4.70)	$t^1 = 3.57$, $p<0.001$
NRS Pain intensity	8.31 (1.60)[a]	7.19 (2.77)[b]	$U^2 = 256.00$, $p=0.137$
Pain duration	1.88 (1.26)	1.81 (0.87)	*Welch* = 0.05, $p=0.824$
FIQ, total score	73.27 (73.99)	63.04 (14.00)	$t^1 = 3.00$, $p=0.004$
FIQ, physical functioning	4.95 (1.66)	3.66 (2.10)	$t^1 = 2.49$, $p=0.016$
DASS-21, Depression	8.91 (4.34)	4.90 (4.06)	$t^1 = 3.37$, $p<0.001$
DASS-21, Anxiety	9.50 (3.60)	6.76 (4.35)	$t^1 = 2.49$, $p=0.016$
DASS-21, Stress symptoms subscale	11.75 (4.02)	8.90 (4.78)	$t^1 = 2.34$, $p=0.023$
CSQ Pain catastrophising	21.06 (7.72)	12.67 (8.78)	$t^1 = 3.67$, $p=0.001$
CPAQ Pain acceptance	46.44 (13.09)	65.67 (14.84)	$t^1 = -4.96$, $p<0.001$

[1]Student *t*-test; [2]Mann-Whitney U-test. [a]Median = 8.50. [b]Median = 8.

compared to group B, reported worse physical functioning and overall impairment due to the FM syndrome, a poorer psychological condition based on DASS Anxiety, Depression, and Stress subscales, a higher tendency to catastrophising, and less acceptance of pain. Table IV reports descriptive statistics and results of comparisons.

Discussion

The first aim of this study was to identify clusters of FM patients based on their illness representations. Two distinct groups emerged: group A, with a representation of FM as a chronic disease with severe consequences, lower beliefs of control over illness and treatment, and higher emotional distress related to FM; group B, with an opposite and more adaptive representation. These groups were similar to those identified by Hobro *et al*. (22) in a sample of patients (n=98) with different chronic pain conditions. They were named, respectively, "adaptors" and "non-adaptors"; the first showed lower timeline beliefs, stronger beliefs in personal and treatment control, a better understanding of pain, and less perceived pain-related consequences and emotional distress than the latter. The groups were also similar to those identified in a sample of chronic pain patients (n=417) by Frostholm *et al*. (31), who captured a three-cluster solution characterised by two "distressed" groups and a "non-distressed" group.

In the present study, groups did not differ significantly in representing the disease's cyclical timeline or illness coherence. It is not surprising considering the frequently reported cyclicity of FM symptomatology (18, 32), the lack of an established aetiology of the disease as well as of specific instrumental examinations, laboratory tests, or biomarkers able to confirm the diagnosis (24).

Group A reported a worse physical functioning and overall impairment due to the FM syndrome, a poorer psychological condition in terms of depressive, anxious, and stress-related symptoms, a higher tendency to catastrophise, and less acceptance of pain than group B. Findings are consistent with Hobro *et al*. study (22), where non-adaptors reported a poorer physical functioning and emotional wellbeing than adaptors. Findings were also compatible with Frostholm *et al*. study (31), where the two distressed groups scored significantly higher on pain catastrophising and emotional distress than the non-distressed group.

Of note, clusters A and B did not differ on pain intensity and duration, suggesting the existence of two FM subgroups differing in impairment and adjustment to the disease despite similar pain intensity and duration. Indeed, in the present study, were not patients experiencing higher pain for a longer time who reported the worst illness representation but those with more substantial impairment due to the disease and poorer psychological conditions.

Frostholm *et al*. (31) also identified three groups of chronic pain patients with different emotional distress profiles despite similar current pain levels and duration. Among other cluster analytical studies, De Souza *et al*. (33) identified two profiles, FM-Type I and FM-Type II, that shared similar pain levels, but the first had lower anxiety and depression than the latter. Oswald *et al*. (34) found two clusters of FM patients with similar physical wellbeing levels but higher or lower psychological dysfunction. Other authors identified different FM subgroups within a continuum in which pain was linked to

increased emotional distress (35, 36) and sometimes even with worse biological markers (10). In their four-cluster solution, Vincent *et al*. (11) found a continuum of severity profiles: cluster 1 with the mildest physical and psychological symptoms, clusters 2 and 3 with moderate symptoms, and cluster 4 with the most severe symptoms. It is noteworthy that cluster 2 had lower levels of depression and anxiety than cluster 3, despite higher pain intensity. Pérez-Aranda *et al*. (12) identified a 4-cluster classification capturing a different severity level; of note, although groups differed significantly in most clinical measures (*e.g*. fatigue, sleep problems), depression scores did not differ across clusters. Together with the lack of any association between pain intensity and depression, anxiety, or stress levels, these findings suggest that emotional distress can be present only in some patients, despite the pain being a universal symptom of FM. Still, other variables may have a relevant worsening or buffering role on this relationship by hampering or favouring the individual adjustment to the disease.

A longitudinal study on FM patients (n=280) revealed that not the intensity of pain but poor illness perceptions were essential in worsening symptoms of depression and anxiety (37). Notably, authors showed that FM patients who believed their illness negatively affected their mental health were at increased risk for depression, and those who thought treatment of their condition would not be effective were at increased risk for anxiety. The cross-sectional study by Costa *et al*. (38) also suggested that illness perceptions contributed significantly to depression and anxiety, over and above the effects of traditional covariates as pain intensity or pain-related disability. An RCT of a brief Cognitive-Behavioural Therapy (CBT) for patients with non-cardiac chest pain found that changes in illness perceptions strongly mediated the decrease of depression at the end of treatment and follow-ups (39). Illness perceptions, therefore, may be a key variable to explain emotional distress and adaptation by patients with chronic pain to their condition.

Catastrophising was a further variable identified by the present study as associated to a general worst representation of the disease. At the same time, it was also significantly correlated with depression, anxiety, perceived stress, lower disease acceptance, and worst physical functioning. In a heterogeneous sample of chronic pain patients, both Esteve *et al*. (40) and Gillanders *et al*. (20) found catastrophising as a significant mediator in the relationship between pain and emotional distress. We can find an explanation of such a link in the conceptualisation of pain catastrophising as a form of repetitive negative thinking called "catastrophic worry" (41). Based on the similarities between the concept of catastrophising and the avoidance theory of worry (42), Flink *et al*. (41) proposed catastrophising as a cognitive process that allows individuals to approach emotional contents at a superficial level by inhibiting aversive images and intense negative emotions in the short run. However, although reinforced by the immediate reduction of negative affect, this avoidance process delays emotional processing and thus increases emotional distress in the long run. Additionally, catastrophic worries may occur during daily activities, hampering individuals' involvement in the task and the expected positive reinforcement.

In the present study, pain acceptance was associated with the worst illness representation, higher emotional distress, and worst physical functioning. Although the literature suggests that acceptance is principally a mediator of the relationship between pain intensity and physical functioning (43), other studies reported a low or null association between pain acceptance and pain intensity (44, 45) like our study.

Varallo *et al*. (46), in a cross-sectional study on FM patients (n=160), found that both higher pain catastrophising and lower pain acceptance were significant and independent predictors of poorer physical functioning at both self-reported and performance-based levels, even after controlling for body mass index, pain duration, current opioid use, and pain intensity. However, the authors suggested that pain catastrophising and acceptance may influence physical functioning via different pathways. Pain catastrophising, as a risk factor, may raise attention and awareness levels of painful sensations, thus increasing safety behaviours as activity avoidance, movement restriction, and guarded movement, which hinder physical functioning. Pain acceptance could instead represent a protective factor, as individuals willing to engage in valued activities despite pain, without avoiding or controlling it, might be more likely not to implement pain-avoidance behaviours, thus reorienting the attention away from pain-related issues and toward more rewarding aspects of life. Pain catastrophising and pain acceptance may therefore act in an interrelated way. In line with these considerations, Ravn *et al*. (47) found pain acceptance as a significant mediator of the Fear Avoidance Model (FAM), suggesting that it may represent a relevant mechanism within this model. Previous research has already embedded FAM into a larger framework where avoidance behaviours were not necessarily the result of fear of pain but poor pain acceptance and a persistent attempt to control it (48).

Taken together, the results of the present study could have several clinical implications. Although FM represents a debilitating and painful syndrome, not all patients develop high levels of emotional distress. In addition, emotional suffering and physical functioning are more negatively associated with psychological variables such as illness representations, catastrophising, and pain acceptance rather than pain intensity. Therefore, it seems essential to pay attention to the psychological complaints accompanying chronic pain, besides providing relief from the physical aspects of pain by medications. An attempt to reduce psychological risk factors such as illness perceptions and pain catastrophising or enhance protective factors as pain acceptance could improve patients' adjustment to FM. The literature shows the efficacy of multicomponent and multidisciplinary treatments integrating pharmacological and psychological approaches to im-

proving physical and mental functioning of FM patients within a biopsychosocial framework (49, 50). Scientific societies (51) and experts in the field (52) recommended such approaches to FM.

The present study has some limitations to be considered. First, the cross-sectional nature of the study prevents inferences on causality. For example, patients of the study could have a severe functional impairment due to FM that led to a negative illness representation and psychological condition, or a negative illness representation and psychological status that have affected their ability to do daily tasks. Studies with longitudinal approaches could help understanding better the causal relationships between the considered variables. The small sample size and the exclusive female composition of the sample represent further study limitations; thus, although FM primarily affects the female (53), the results warrant replication in a more extensive and gender heterogeneous sample.

Conclusions

FM represents a complex, debilitating and heterogeneous chronic pain syndrome. Optimal FM management requires a comprehensive assessment of the patient's pain, function, and psychosocial complaints and consideration for risk and protective factors that may reduce or enhance patients' quality of life. Patients' illness perceptions and attitudes about pain, as catastrophising and acceptance, may have a critical role in adjusting to the disease. They explained or predicted outcomes across various studies and interventions; thus, targeting them may provide clinicians with new insights into specific subgroups of FM patients, especially whether integrated within interdisciplinary biopsychosocial treatment programmes. Such knowledge might help tailor interventions addressing patients' particular needs and increase the effectiveness of the medical intervention.

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