Perfectionism, maladaptive beliefs and anxiety in women with fibromyalgia. An explanatory model from the conflict of goals

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ABSTRACT

Fibromyalgia (FM) patients are known to be highly demanding of themselves in achieving goals. In fact, some authors suggest that perfectionism influences maladaptive coping regarding health and hinders routine tasks. Despite the evidence about the anxiety caused by this demanding pattern and the difficulty it creates in dealing with the conflict between goals, to date, there are no studies exploring the relationship between these psychological processes from motivational theories of pain. This study aims to explore the mediating role of pain catastrophizing and cognitive fusion between maladaptive perfectionism and anxiety among 230 FM women. Results found that pain catastrophizing and cognitive fusion contribute to the negative effect of maladaptive perfectionism on anxiety. These results can be interpreted from motivational theories of pain (conflict of goals), allowing action guidelines for the personalization of treatments.

1. Introduction

Fibromyalgia (FM) is a chronic pain syndrome accompanied by different comorbidity that includes emotional problems and cognitive difficulties (Wolfe, Clauw, Fitzcharles, et al., 2010). Among these patients, perfectionism, conceptualized as carrying out multiple tasks to be able to achieve goals, has been shown to be an outstanding characteristic (Sirois et al., 2019). Hyperactive lifestyles don't only increase anxiety, but also contribute to functional disability, due to engaging in maladaptive activities (Molnar & Sirois, 2016; Sirois et al., 2019). The tasks these patients take on are usually linked to highly relevant values (i.e. work and family life) and are usually accompanied by the expectation that they are to be carried out (Velasco-Furlong et al., 2020). Being able to complete these tasks enters into conflict with the need to regulate their physical discomfort caused by pain or fatigue, which is an ever-present goal (Pérez-Aranda, Andrés-Rodríguez, Feliu-Soler, et al., 2019). The conflict between the goals increases critical and negative self-appraisal, generating feelings of shame and incompetence when they are unable to carry out a routine without pain getting in the way of their activities (Flett, Nepon, & Hewitt, 2016). Perfectionism, and in particular negative self-appraisal, favor the setting of higher and higher goals so as to avoid the frustration created by personal failures (De Rosa,

Dalla-Valle, Rutsztein, & Keegan, 2012), although this can lead to an increase in functional limitation and to long term personal underestimation (Flett et al., 2016; Molnar & Sirois, 2016). De Rosa et al. (2012) state that this phenomenon is due to the perception of lack of achievement in theirs goals, belief that characterizes people with maladaptive perfectionism, resulting in an excessive preoccupation with failure. From the motivational theories of pain (Van Damme, Van Ryckeghem, Wyffels, Van Hulle, & Crombez, 2012), some beliefs such as pain catastrophizing enter into conflict with patients' other relevant goals (Eccleston & Crombez, 2007). Pain catastrophizing is very prevalent in FM (Écija, Luque-Reca, Suso-Ribera, Catalá, & Peñacoba, 2020). Their main aim is to control their pain by stopping activity. Different studies have associated catastrophizing with an increased perception of symptoms and with worse emotional functioning (Carvalho, Trindade, Gillanders, Pinto-Gouveia, & Castilho, 2019; McCracken & Morley, 2014). The efforts to control pain limit the ability to carry out daily routines and decrease patients' quality of life (Pérez-Aranda et al., 2019). Further, from the perspective of acceptance and commitment therapy (ACT), psychological inflexibility is pointed out as one of the defining characteristics of patients with chronic pain (McCracken & Morley, 2014). This inflexibility is characterized by cognitive fusion that refers to how thoughts dominate a person's actions (Gillanders et al., 2014), and has

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been identified as a vulnerability factor associated to physical fatigue (Écija et al., 2020), perceived general health (McCracken & Morley, 2014) and anxiety and depressive symptoms (Carvalho et al., 2019; Écija et al., 2020). This framework suggests that cognitive fusion would explain the inability of patients to implement adaptative coping strategies in the presence of pain (Hughes, Clark, Colclough, Dale, & McMillan, 2017).

Cross-sectional findings support the relationship between perfectionism and pain catastrophizing in chronic pain patients (Randall et al., 2018). Nevertheless, to the best of our knowledge, this association has not been studied among women with fibromyalgia, in spite of the high incidence of perfectionism among this population (Sirois et al., 2019). Furthermore, there are no known studies integrating cognitive fusion in these associations as a variable capable of maintaining catastrophism, and their joint effect on anxiety, as a characteristic symptom of fibromyalgia patients (Luciano, Barrada, Aguado, Osma, & García-Campayo, 2014).

In this context, the current study focuses on the association between concern over mistakes, as a main characteristic of perfectionism among FM patients according to the model proposed by De Rosa et al. (2012), and pain catastrophizing, cognitive fusion and anxiety using a multiple series mediator test. In particular, pain catastrophizing (M_1) and cognitive fusion (M_2) are considered as mediators of the model, and anxiety as outcome variable.

2. Methods

2.1. Study design

Cross-sectional analytical observational design.

2.2. Participants and procedure

A total of two hundred thirty women with fibromyalgia, aged eighteen years and older, diagnosed according to the American College of Rheumatology (ACR) criteria (Wolfe et al., 1990, 2010) participated in the study. All participants had received a diagnosis of FM by rheumatologists or primary care physicians. The study's protocol was approved by the ethics committee of principal institution (omitted for blind review). First, the researchers contacted different Spanish fibromyalgia associations and those women who met the inclusion criteria were contacted by phone to invite them to participate in the study. Afterwards, they were given an individual appointment at the university (omitted for blind review) where they first signed the informed consent and then fill out the questionnaires. The study was carried out between January and December 2018.

2.3. Measures

Sociodemographic variables and clinical data were collected by the research team. Pain intensity was evaluated through The Brief Pain Inventory (BPI) (Cleeland & Ryan, 1994), which contains an item with a numerical scale from 0 ("not pain") to 10 ("the greatest pain imaginable"). Other variables were measured using the following instruments:

2.3.1. Perfectionism
Perfectionism (concern over mistakes) was measured using the Spanish adaptation in women of the Frost Multidimensional Perfectionism Scale (FMPS) (Gelabert et al., 2011). The FMPS includes six dimensions: concern over mistakes, doubts about actions, personal standards, parental expectations, parental criticism and organization. Given the multidimensional nature of perfectionism (Osenk, Williamson, & Wade, 2020), the "concern over mistakes" scale was selected to measure maladaptive perfectionism, in agreement with previous literature (De Rosa et al., 2012). It is composed by nine items on a five-point Likert scale (ranging between 1"strongly disagree" to

5"completely agree"). In this study, Cronbach's alpha was 0.87.

2.3.2. Pain catastrophizing
The Spanish adaptation of the Pain Catastrophizing Scale (PCS) was used (García-Campayo et al., 2008), composed of thirteen items with a five-point Likert scale ranging from 0 (not at all) to 4 (always), being widely used in chronic pain and fibromyalgia in particular (Carvalho et al., 2019; Écija et al., 2020; McCracken & Morley, 2014). Despite the lack of homogeneity in the chronic pain samples in previous studies, Rodero et al. (2010) and Sullivan, Sullivan, and Adams (2002) indicate that scores greater than 32 on the global scale of pain catastrophizing are considered an important indicator of a worse prognosis in chronic pain populations. However, Guía práctica sobre Fibromialgia (2011) indicates as a cut-off point the score of 35 to establish a worse clinical prognosis. In this study, Cronbach's alpha was 0.94.

2.3.3. Cognitive fusion
Cognitive fusion was measured using the Spanish version of Cognitive Fusion Questionnaire (CFQ) (Gillanders et al., 2014; Romero-Moreno, Márquez-González, Losada, Gillanders, & Fernández-Fernández, 2014). The scale is composed of seven items with a seven-point Likert response format ranging from 1 (never) to 7 (always), with a theoretical range between 7 and 49. High scores indicate a high degree of cognitive fusion. This scale has been used with FM patients (Écija et al., 2020). Cronbach's alpha was of 0.91 in this study.

2.3.4. Anxiety symptoms
The Anxiety subscale of the Spanish version of the Hospital Anxiety and Depression Scale (HADS) (Cabrera, Martín-Aragón, Terol, Núñez, & de los Ángeles Pastor, 2015) was used. The HADS is a brief and widely used instrument to measure the possible presence of anxiety and depressive states in medical, non-psychiatric outpatient clinic settings. The anxiety subscale contains seven items, with a four-point Likert response scale from 0 (never) to 3 (always). Scores less than eight indicate that there are no anxious symptoms. Scores between eight and thirteen indicate mild anxiety, scores from fourteen to twenty indicate moderate anxiety and scores higher than twenty indicate severe anxiety symptoms. The internal consistency of anxiety subscale was 0.78.

2.4. Analytic strategy

The Statistical package SPSS version 22 (Armonk, NY, USA) was used. Descriptive analyses were calculated for the sociodemographic and clinical variables. Pearson's correlation analyses were used to explore the relationships between variables.

The PROCESS macro version 3.4.1 was used with two significant mediators (pain catastrophizing and cognitive fusion). Simple mediation analysis (model 4) was tested to determine to what extent perfectionism and these mediators affect anxiety independently (pain catastrophizing and cognitive fusion), in hope that the results might add some new conclusions. In the following step, multiple mediation analysis was performed to examine the individual effects of each mediator while monitoring the other. Specifically, serial multiple mediation analysis (SMM) was used to explore causal chain linking mediators with a specific direction of causal flow. For this, model 6 of PROCESS macro was used applying two significant mediators for each single analysis.

On the basis of the preview research, concern over mistakes (perfectionism) was considered the first variable (predictor, X), while anxiety served as the final variable (outcome, Y). Pain catastrophizing (M_1) and cognitive fusion (M_2) were considered to be the mediating variables (see Fig. 1). The "C" path represents the total effect of X on Y, having controlled for indirect effects. Indirect effects are defined as the effect of M_1 and M_2 on anxiety (Y) (c'). The total effect of X on Y is represented by the sum of $a_1b_1 + a_2 + b_2$. As recommended by Hayes (2013) to test the significance of the indirect effects, bias-corrected (BC) and bias-corrected and accelerated (BCa) bootstrap confidence intervals
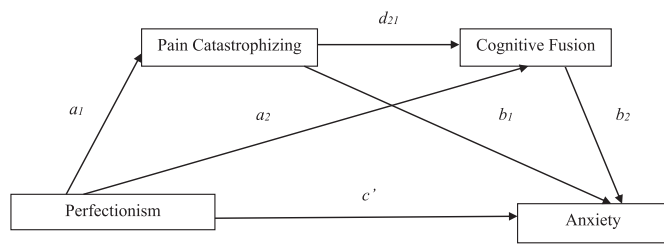
Fig. 1. Path diagram illustrating the direct effects and causal paths linking perfectionism-anxiety symptoms.

(CIs) were computed. The bootstrap estimates were based on 10,000 to control for type I errors in the sample and a *95% CI* was used.

3. Results

3.1. Descriptive and correlation analyses

Table 1 shows the sociodemographic and clinical characteristics of the sample and variables of interest. The average age of participants was 56.91 (*SD* = 8.94). Most participants were married (79%), had primary studies (67%) and were housewives (33%). Participants reported an average pain intensity of 6.88 (*SD* = 2.01). Participants scored 22.09 (*SD* = 7.63) in perfectionism, showed high levels of pain catastrophism (mean = 31.80, *SD* = 11.68) and high levels of cognitive fusion (mean = 33.30, *SD* = 9.59). Regarding to anxiety, participants show mild levels of anxiety (mean = 11.83, *SD* = 3.22).

Table 1
Sociodemographic and clinical data.

FM participants (*n* = 230)					Max	Min
Sociodemographic data	*n*	(%)	M	(SD)		
Age			56.91	8.94	78	30
Marital status						
Married	182	(79)				
Divorced or separated	20	(8.7)				
Widow	16	(7)				
Single	12	(5.3)				
Educational level						
Primary studies	152	(67)				
Intermediate studies	61	(27)				
University studies	17	(6)				
Employment status						
Housewife	76	(33)				
Retired due to pain	42	(18)				
Retired	33	(14.4)				
Unemployed	28	(12.2)				
Worker	28	(12.2)				
Sick leave	23	(10.2)				
Clinical data						
Medication	Yes/no	Yes/no				
Pain relievers	194/36	(84) (16)				
Sleeping pills	130/100	(59.4) (40.6)				
Antidepressants	145/85	(66.5)/ (33.5)				
Pain intensity			6.88	2.01		
Time since diagnosis (years)			12.14	8.45	46	1
Variables of interest						
Perfectionism			22.09	7.63	44	9
Pain catastrophizing			31.80	11.68	52	2
Cognitive fusión			33.30	9.59	49	7
Anxiety			11.83	3.22	19	4

Note. M: mean.
SD: standard deviation.

Table 2 shows the descriptive statistics and correlations among variables. Significant positive correlations among all variables (perfectionism, pain catastrophizing, cognitive fusion and anxiety) were observed. Effect sizes were small for the correlation between perfectionism and pain catastrophizing (*r* = 0.292), large for the correlation between cognitive fusion and anxiety (*r* = 0.625), and medium for the rest of correlations (from 0.363 to 0.553). No significant correlations were found between study variables with time since diagnosis and age. As recommended Baron and Kenny (1986), mediators must significantly correlate with predictors and outcome variables.

3.2. Mediation models

3.2.1. Simple mediation analysis

The mediating role of pain catastrophizing in the relationship between perfectionism and anxiety was examined. The total and direct effect of perfectionism on anxiety was significant (*t* = 5.90, *p* = .000). The effect of perfectionism on pain catastrophizing (*t* = 4.62, *p* = .000) and the effect of pain catastrophizing on anxiety (*t* = 6.14, *p* = .000) were significant. Moreover, a significant indirect effect of perfectionism and pain catastrophizing on anxiety was found (*t* = 4.28, *p* = .000). This means that concern over mistakes enhances anxiety symptoms. This relationship is mediated by the pain catastrophizing as one of the objectives that causes the internal conflict goals.

Cognitive fusion was also studied as a mediator between perfectionism and anxiety. The total and direct effect of perfectionism on anxiety was significant (*t* = 2.58, *p* = .010). A significant effect of perfectionism on cognitive fusion was found (*t* = 6.53, *p* = .000) and of cognitive fusion on anxiety (*t* = 10.28, *p* = .000). A significant indirect effect of perfectionism and cognitive fusion on anxiety was found in the mediation model (*t* = 6.001, *p* = .000). This means that the relationship between maladaptive perfectionism and anxiety is significant when cognitive fusion mediates this prediction.

Perfectionism had a significant indirect effect on anxiety with pain catastrophizing and cognitive fusion as mediators (Table 3).

3.2.2. Serial multiple mediation (SMM)

This model uses the assumption that mediators influence others. Since two mediators were used, two different causal order models were produced: Model 1 (SMM1; M_1: pain catastrophizing and M_2: cognitive fusion) and Model 2 (SMM2; M_1: cognitive fusion and M_2: pain catastrophizing). The two models were compared in terms of the significant path created by each different causal order of the mediators.

Table 4 shows SMM coefficients for both SMM1 and SMM2. All indirect effects were significant in both SMM models for perfectionism. Nevertheless, the contrast effect of SMM1 suggested that the indirect effect 2 ($X{\rightarrow}M_1{\rightarrow}M_2{\rightarrow}Y$) was stronger than the indirect effect 3 ($X{\rightarrow}M_2{\rightarrow}Y$) (B = 0.0461, CI = 0.0119, 0.0843). This would mean that SMM1 shows a stronger mediating effect of pain catastrophizing when we include the effect of cognitive fusion ($a_1d_{21}b_2$ = 0.0732, CI = 0.042 0.110, *t* = 2.12, *p* = .035) in comparison to the effect of each mediator separately (see Fig. 2). These results show that catastrophic beliefs regarding pain intensify the capacity of attachment to these thoughts and not the other way around. These psychological constructs mediate the relationship between maladaptive perfectionism and anxiety, enhancing the anxious symptoms of the participants. In comparison to SMM2, the effect of the contrast was not significant.

4. Discussion

Multidimensional perfectionism has been explored as a prevalent characteristic in fibromyalgia patients (Sirois et al., 2019; Sirois & Molnar, 2014), influencing the inclusion of unhealthy life styles that favor the maintenance and development of the disease (Sirois et al., 2019). Although there are numerous studies among chronic pain patients, and in particular in fibromyalgia, regarding the maladaptive

Table 2
Pearson correlation coefficients among study variables.

	Mean	(SD)	[Max-Min]	1	2	3	4	5	6
1. Perfectionism	22.09	7.63	[44–9]	–					
2. Pain catastrophizing	31.80	11.60	[52–2]	0.292**	–				
3. Cognitive fusion	33.31	9.61	[49–7]	0.397**	0.445**	–			
4. Anxiety	12.21	3.87	[21–1]	0.363**	0.442**	0.625**	–		
5. Time since diagnosis	12.14	8.45	[1–46]	0.125	−0.102	0.073	0.049	–	
6. Age	56.91	8.94	[30–78]	0.076	−0.112	0.221	0.000	0.505	–

Note. SD: standard deviation.
** Correlation is significant at level 0.01.

Table 3
Simple mediations of the effect of Perfectionism.

Bootstrapping					
Point estimated		BC 95% CI		BCa 95% CI	
		Lower	Upper	Lower	Upper
Mediators between perfectionism					
Indirect effects total					
Pain catastrophizing	0.014	0.007	0.021	0.055	0.164
Cognitive fusion	0.114	0.075	0.156	0.153	0.299

Note. The point estimate is the indirect effect calculated in the original sample.
CI Confidence Interval.
BC bias corrected.
BCa bias corrected and accelerated.

Table 4
Causal chain according to model for Perfectionism ($X \rightarrow M_1 \rightarrow M_2 \rightarrow Y$).

Perfectionism				
SMM1				
Ind1	Perfectionism	Pain catastrophizing	Cognitive fusion	Anxiety
Ind2				
Ind3				
SMM2				
Ind1	Perfectionism	Pain catastrophizing	Cognitive fusion	Anxiety
Ind2				
Ind3				

Values in bold indicate significant bias-corrected bootstrap 95% confidence interval above zero.

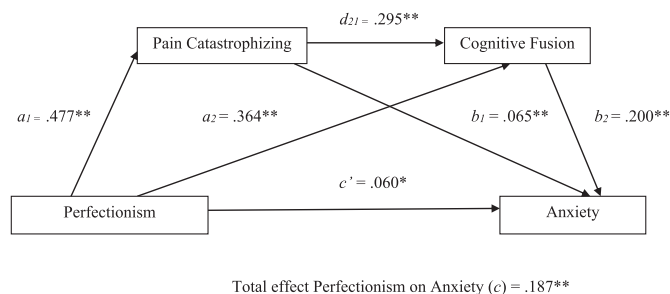Total effect Perfectionism on Anxiety (c) = .187**

Fig. 2. Path diagram illustrating SMM model 1 linking perfectionism with anxiety. *Note.* Top path diagram shows direct and indirect effects through perfectionism on anxiety with cognitive pattern on FM patients. It is appreciated that the association between perfectionism and anxiety is significant when pain catastrophizing and cognitive fusion acts. *$p < .05$, **$p < .01$.

cognitive components of pain catastrophizing (Galvez-Sánchez et al., 2020; Nijs et al., 2013) or cognitive fusion (Carvalho et al., 2019; Écija et al., 2020), the association between these cognitive variables with maladaptive perfectionism and its possible influence of quality of life of these patients is unknown. Therefore, the association between perfectionism and cognitive factors could be hypothesized from the

motivational perspective of goal conflict (Eccleston & Crombez, 2007).

Perfectionism, based on negative self-appraisal has been shown to be associated to insecure attachment, rooted in the establishment of emotional links based in fear and in emotional repression to avoid rejection (Ko, Hewitt, Cox, Flett, & Chen, 2019). Previous studies have confirmed the prevalence of insecure attachment in FM patients (Peñacoba, Pérez-Calvo, Blanco, & Sanromán, 2018). Nevertheless, the cognitive and emotional factors that could be involved in the maintenance of negative self-criticism among adult FM patients, which have, additionally, been shown to be highly prevalent among this population (e.g. pain catastrophizing) have not been studied (Carvalho et al., 2019; Écija et al., 2020; Galvez-Sánchez et al., 2020; Randall et al., 2018). According to the multicomponent model of negative self-criticism proposed by De Rosa et al. (2012) along with the model of multidimensional perfectionism by Frost, Marten, Lahart, and Rosemblate (1990), we proposed concern over mistakes as a possible independent variable that defines this pattern of maladaptive perfectionism.

Aiming to contribute data on this particular question, the current study focused on these associations from the motivational perspective of pain (Van Damme et al., 2012), considering catastrophism as a consequence of the conflict between relevant goals. Perfectionism based on concern over mistakes is considered as an enhancer of said conflict by imposing relevant activities and expected results. Furthermore, cognitive fusion as a maintainer of the catastrophic beliefs, contributes to higher levels of anxiety caused by the conflict between goals according to the results obtained in the SMM1. Previous literature has shown cognitive fusion to be a main explanatory component of maladaptive activity patterns in FM (Angarita-Osorio, Pérez-Aranda, Feliu-Soler, et al., 2019). From the perspective of psychological flexibility regarding pain (McCracken & Morley, 2014), "inflexible patterns" present a rigid cognitive and behavioral repertoire in relation to pain (i.e. avoiding activities that cause or increase pain, social isolation or pain catastrophizing), consequently increasing symptoms (Scott, Hann, & McCracken, 2016). Despite evidence showing that cognitive fusion and pain catastrophizing affect maladaptation to pain independently, there is scarce research in relation to the associations between both these psychological constructs in FM (Écija et al., 2020).

In addition, the psychological inflexibility model highlights the need to include personal variables to explain anxiety. In this sense, the current study proposes that perfectionism, as a personality trait, reinforces the demands regarding the management of multiple and incompatible tasks and goals (personally relevant goals vs pain control) (Fleeson & Jayawickreme, 2015; Flett et al., 2016; Velasco-Furlong et al., 2020) within the proposed serial mediation model. Taken together, the results found have shown that catastrophizing and cognitive fusion can be considered relevant cognitive mediators between perfectionism and anxiety (Van Damme et al., 2012) according to the results found in the SMM1 compared to the SMM2 model.

The use of a cross-sectional design hinders the ability to arrive at solid conclusions. Nevertheless, the use of multiple mediations has allowed us to analyze a causal model regarding the maladaptation of FM (Van Damme et al., 2012). These results give us the chance to clear some questions that come up in the clinical practice with fibromyalgia patients, such as their lack of adherence to healthy behaviors (i.e. physical

exercise), in spite of their motivation for change (Sanz-Baños et al., 2018). The inclusion of perfectionism can help professionals to design personalized programs that include strategies to implement the above-mentioned healthy behaviors, therefore improving patients' quality of life.

The study has a series of limitations, such as the previously mentioned cross-sectional design and the use of self-reports as the only means to obtain information. Regarding this last point, the use of mixed methods would improve the knowledge regarding the beliefs that are involved in perfectionism and its specific associations to goal conflict. In relation to perfectionism, more research is required to confirm if there are other variables together with concern over mistakes that define this pattern in women with FM. Also, the key pathways of this model that link maladaptive perfectionism to anxiety did not include the effect of age and the time since diagnosis in this relationship due to the absence of significant correlations with the variables of interest. However, previous literature highlights the need to address the influence of psychosocial variables on chronic pain, differentiating between stages of chronicity (Nieminen, Pyysalo, & Kankaanpää, 2021), so further research on this issue should be carried out. Finally, it is important to consider that the sample was composed by female FM patients only. Important differences have been revealed between this population and other populations with chronic pain, which does not guarantee the generalizability of the findings.

In spite of the above mentioned limitations, the current study includes, as a novelty, the analysis of perfectionism from the point of view of a integrative model based on the motivational theory of pain (Van Damme et al., 2012), in particular, analyzing its maladaptive profile within the framework of the Frost et al. (1990) multicomponent model and from the self-criticism explanatory model (De Rosa et al., 2012).

5. Conclusion

The model here proposed allows for the detection of self-demands regarding responsibilities and the control of symptoms, as a personality trait associated to cognitive variables that interfere with goal attainment. Pain catastrophizing has been the most widely studied factor from the motivational perspective of pain and it has been suggested to be the cognitive component responsible for the interference with goals (Eccleston & Crombez, 2007; Van Damme et al., 2012). The results obtained also support the inclusion of cognitive fusion as one of the key factors in the maintenance of pain catastrophizing, within the explanatory model proposed for anxiety based in perfectionism.

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Ethics approval

All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki Declaration and its later amendments or comparable ethical standards. The study was approved by the Bioethics Committee of Rey Juan Carlos University (Reference PI17/00858).

Consent to participate

Informed consent was obtained from all individual participants included in the study.

CRediT authorship contribution statement

All authors contributed to the study conception and design. Material preparation, data collection and analysis were performed by Lorena Gutiérrez, Lilian Velasco and Cecilia Peñacoba. The first draft of the manuscript was written by Lorena Gutiérrez y Cecilia Peñacoba and all authors commented on previous versions of the manuscript. All authors read and approved the final manuscript.

- **Lorena Gutiérrez Contributions:** Conceptualization, Data curation, Formal analysis, Investigation, Methodology, Writing—original draft, Writing review and editing.
- **Lilian Velasco Contributions:** Conceptualization, data curation, Investigation, Methodology, Resources Writing—original draft, supervision, validation. Funding acquisition.
- **Sheila Blanco Contributions:** Conceptualization, methodology, resources, data curation; writing—original draft preparation.
- **Patricia Catalá Contributions:** Conceptualization, resources, data curation, writing—original draft preparation.
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- **Cecilia Peñacoba Contributions:** Conceptualization, Data curation, Formal analysis, Investigation, Methodology, Writing—original draft, Writing review and editing.

Declaration of competing interest

The authors declare that they have no conflict of interest.

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