

# The Role of Spirituality in Pain, Function, and Coping in Individuals with Chronic Pain

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## Abstract

**Objective.** Chronic pain is a multidimensional experience associated with psychosocial (e.g., pain-related beliefs and pain coping responses) and spiritual factors. Spirituality is a universal aspect of the human experience that has been hypothesized to impact pain experience via its effects on pain, physical/psychological function, resilience and pain-related beliefs, and pain coping responses. However, research evaluating the associations between measures of spirituality and measures of pain and function in individuals with chronic pain is limited. This study seeks to address this limitation. **Methods.** Participants were 62 Portuguese adults with chronic musculoskeletal pain. Participants completed measures of spirituality, pain intensity, physical and psychological function, and pain coping responses. **Results.** Spirituality as hope and a positive perspective toward life was positively and moderately associated with better psychological function and coping responses of ignoring pain sensations and coping self-statements. Spirituality as a search for meaning and sense of purpose was positively and moderately associated with the coping response of task persistence. **Conclusions.** These findings suggest the possibility that spirituality may be a useful resource for facilitating psychological adjustment, potentially promoting the use of some adaptive pain coping responses.

**Key Words:** Chronic Pain; Spirituality; Physical Function; Psychological Function; Coping Responses

## Introduction

Chronic pain is a significant health problem estimated to affect about one in four adults [1,2]. It is a stressful condition with significant negative impacts on many aspects of the life of the person with chronic pain and the lives of their family members [1,3–7].

An increasing body of research over the last few decades has identified a number of nonbiological variables, such as psychosocial factors (e.g., mood, pain-related beliefs, and pain coping responses), spirituality, and religiosity, that are associated with pain severity and physical and psychological function (hereafter referred to as “function”) in individuals with chronic pain [8–13]. These findings support the view of chronic pain as a

multidimensional, subjective biopsychosocial and spiritual experience [14–17].

Interest in studying the role of spirituality on pain and function in individuals with chronic pain is growing [18]. Spirituality is a significant and universal aspect of the human experience [19]. However, there is no clear consensus on its definition [20], and measures used to assess spirituality frequently evaluate nonoverlapping dimensions [21,22]. For the purpose of this study, we define spirituality as the extent to which a person has or is searching for meaning and purpose in life, as feelings of transcendence and connectedness to a higher power, and as a resource of hope in the face of adversities in life [20,22,23].

Although research in this area remains limited, preliminary findings suggest that spirituality and spiritual beliefs may frame the meaning attributed to pain in individuals with chronic pain, depending on how the pain has been integrated in the sense of self [24]. These findings indicate that spirituality and spiritually meaningful practices 1) can act pain coping responses [25–30] and 2) are positively and weakly to moderately associated with a) pain tolerance [14], b) better physical and psychological function [13,31–36], and c) the use of the so-called “active” or “adaptive” pain coping responses [28,37]. However, perhaps given the lack of a consensus on how spirituality is defined and assessed, significant positive effects of spirituality on health outcomes and well-being are not always found [13,38–40].

Taken together, the results of these studies suggest the possibility that spirituality may influence pain and function via its effects on pain-related beliefs and attributions (the meaning attributed to, the appraisal of, and attitudes towards “pain”) and pain coping responses [9,13,14,41–46]. Thus, spirituality may influence pain by 1) buffering the negative effects of pain-related stressors (e.g., pain severity, pain interference); 2) its effects on an individual’s resilience (resulting in spirituality being associated with better function, greater tolerance of pain, and lower pain intensity); 3) its effects on pain appraisals (i.e., the meaning of pain), which then influence the pain coping responses used by the individual; and/or 4) its effects on the individual’s evaluation of his or her personal resources to meet the demands of pain. As proposed by DeZutter et al. [47], this perspective can be framed within the transactional theory of stress and coping [48], considering that spirituality influences both primary (evaluation of/meaning attributed to the situation or stressor, that is, pain, as a threatening, harmful, or challenging event) and secondary (evaluation of one’s own resources to cope with the situation or stressor, i.e., pain) appraisals. Previous research provides some support for the first, second, and third paths noted above regarding the association between spirituality and pain. First, the well-being of those individuals with higher levels of spirituality is less influenced by increasing levels of stress (e.g., illness, pain severity) [13,49,50]. Second, measures of spirituality have been found to be positively associated with the use of the active and/or adaptive coping responses [28,37]. Third, the associations between spiritual/religious practices (such as prayer) and pain tolerance seem to be mediated by a positive cognitive re-appraisal of pain [47].

However, research regarding the extent to which spirituality may be associated with 1) pain, 2) function, and 3) cognitive and emotional responses—which in turn may be related to biological responses, decisions to use a specific set of coping responses, the experience of pain, and function [46,51,52]—is still in its infancy. Moreover, the role of spirituality on health and pain-related aspects is also likely influenced by cultural factors [52,53]. As a result, findings from studies with participants from the

United States and Northern European countries may not necessarily generalize to individuals living in Southern European countries or other parts of the world. Although, as noted by Büssing et al. [37], secularization and individualization exist across Europe, these countries’ culture is deeply embedded in the Judeo-Christian (catholic) tradition, and familism (i.e., a tendency to maintain strong family bonds that frequently translates into intrafamily and intergenerational solidarity and sharing of resources, as well as in perceiving family and family members’ needs as a priority) is a relevant societal trait that likely varies from country to country.

Given the above considerations, this exploratory cross-sectional study aims to examine the associations between spirituality, pain, and function, on the one hand, and the associations between spirituality and pain coping responses, on the other, in a sample of Portuguese adults with chronic musculoskeletal pain. Although a few previous studies have focused on the association between spirituality and general coping responses in individuals with chronic pain [33,37,54,55], this is the first study, to our knowledge, focusing on the associations between spirituality and pain-specific coping responses. Based on previous findings [52,56], we hypothesized that spirituality would be 1) negatively and weakly associated with pain intensity; 2) positively and weakly associated with physical function; 3) positively and weakly to moderately associated with psychological function; and 4) positively weakly to moderately associated with active and/or adaptive pain coping responses (e.g., ignoring pain sensations, coping self-statements, task persistence).

## Methods

### Participants

The participants were 62 Portuguese adults with chronic musculoskeletal pain who were outpatients of one of seven Portuguese health institutions in the North, Center, and South of Portugal. Inclusion criteria were 1) being at least 18 years old; 2) experiencing pain due to a musculoskeletal condition for at least three months; and 3) being willing to participate in this study. Prospective participants with 1) physical disability or cognitive impairment that would prevent participation, 2) significant psychopathology (e.g., active suicidal intention), or 3) a diagnosis of fibromyalgia were excluded from the study.

Table 1 summarizes the demographic and pain history characteristics of the study sample. As can be seen, most participants were women (63%) aged 18–90 years ( $M = 60.45$ ,  $SD = 16.22$ ). Most study participants were married or in a legally recognized conjugal relationship (65%). Participants had pain for at least three months due to arthrosis (29%), disc hernia (18%), lupus (14%), rheumatoid arthritis (13%), ankylosing spondylitis (3%), or another musculoskeletal condition (23%).

**Table 1.** Descriptive statistics of the study variables (N = 62)

	No.	%	Min	Max	M	SD	Sk	Ku	$F, p, \eta^2_p$
Sex (female)	39	62.9	–	–	–	–	–	–	–
Age	–	–	18.00	90.00	6.45	16.22	–0.53	0.004	–
Marital status									–
Single	10	16.1	–	–	–	–	–	–	
Married or in a legally recognized relationship	40	64.5	–	–	–	–	–	–	
Divorced or separate	3	4.8	–	–	–	–	–	–	
Widow	9	14.5	–	–	–	–	–	–	
Education level (No. of years of formal education)	–	–	1.00	19.00	7.68	4.78	0.79	–0.42	
Diagnosis									–
Arthrosis	18	29.0	–	–	–	–	–	–	
Rheumatoid arthritis	8	12.9	–	–	–	–	–	–	
Herniated disc	11	17.7	–	–	–	–	–	–	
Lupus	9	14.5	–	–	–	–	–	–	
Ankylosing spondylitis	2	3.2	–	–	–	–	–	–	
Other musculoskeletal condition	14	22.6	–	–	–	–	–	–	
NRS	–	–	1	10	5.31	2.20	0.22	–0.44	–
SF-12 PCS	–	–	0.00	85.71	38.88	24.28	0.19	–0.93	–
SF-12 MCS	–	–	9.52	10.00	58.06	2.66	–0.19	–0.09	–
Spirituality Scale subscales									–
Beliefs	–	–	2.00	8.00	6.02	2.21	–0.62	–1.07	
Hope/Optimism	–	–	4.00	12.00	7.67	2.07	0.41	–0.51	
CSQ-14 subscales									8.70, <0.001, 0.13
Diverting Attention	–	–	0.00	6.00	2.72 <sup>a</sup>	1.71	–0.003	–0.60	
Reinterpreting Pain Sensations	–	–	0.00	6.00	2.18 <sup>b</sup>	1.54	0.40	–0.32	
Catastrophizing	–	–	0.00	6.00	2.47 <sup>a,b</sup>	1.82	0.32	–1.04	
Ignoring Pain Sensations	–	–	0.00	6.00	2.61 <sup>a</sup>	1.70	–0.06	–0.87	
Praying/Hoping	–	–	0.00	6.00	2.85 <sup>a,d</sup>	1.67	–0.05	–0.53	
Coping Self-statements	–	–	0.00	6.00	3.79 <sup>c</sup>	1.53	–0.59	0.14	
Increasing Behavioral Activities	–	–	0.00	6.00	3.39 <sup>c,d</sup>	1.49	–0.24	–0.02	
CPCI-16 subscales									13.64, <0.001, 0.18
Guarding	–	–	0.00	7.00	2.24 <sup>a</sup>	1.96	0.57	–0.29	
Resting	–	–	0.00	7.00	2.70 <sup>a</sup>	1.98	0.08	–0.83	
Asking for Assistance	–	–	0.00	7.00	2.33 <sup>a</sup>	2.34	0.73	–0.75	
Relaxation	–	–	0.00	7.00	3.86 <sup>b</sup>	2.17	–0.29	–0.90	
Task Persistence	–	–	0.00	7.00	3.70 <sup>b</sup>	2.36	–0.11	–1.00	
Exercise/Stretch	–	–	0.00	7.00	4.00 <sup>b</sup>	2.24	–0.22	–0.930	
Seeking	–	–	0.00	7.00	2.77 <sup>a</sup>	2.45	0.29	–1.30	
Coping Self-statements	–	–	0.50	7.00	4.78 <sup>c</sup>	1.96	–0.47	–0.79	

Different letters represent statistically significant differences between the subscale scores in post hoc Fisher least significant differences tests.

CPCI-16 = 16-item Chronic Pain Coping Inventory; CSQ-14 = 14-item Coping Strategies Questionnaire; NRS = Numerical Rating Scale; SF-12 MCS = SF-12 Mental Component Summary; SF-12 PCS = SF-12 Physical Component Summary.

## Measures

Study participants were asked to complete a sociodemographic and pain history questionnaire (age, sex, marital status, education level, duration of pain, pain etiology) and self-report measures of pain intensity, physical and psychological function, pain coping responses, and spirituality.

### Pain Intensity

Average pain intensity in the previous 24 hours was evaluated using an 11-point numeric rating scale (NRS), where 0 indicated “no pain” and 10 indicated “worst imaginable pain.” Previous research supports the validity and responsiveness of the NRS as a measure of pain intensity [57].

### Physical and Psychological Function

The Portuguese Medical Outcomes Study 12-item Short Form Health Survey (SF-12) [58–60] was used to

measure physical and psychological function. This is a 12-item questionnaire providing two summary scores ranging from 0 to 100: a Physical Component Summary (SF-12 PCS) score and a Mental Component Summary (SF-12 MCS) score. Higher scores indicate better physical (SF-12 PCS) or psychological (SF-12 MCS) health status. Previous research supports the validity and reliability of the Portuguese SF-12 [58–60].

### Coping Responses

Two questionnaires were used to assess pain coping responses: the Portuguese two-items-per-scale Coping Strategies Questionnaire (CSQ-14) [56] and the Portuguese two-items-per-scale Chronic Pain Coping Inventory (CPCI-16) [56]. The CSQ-14 is a 14-item questionnaire assessing seven pain coping domains: Diverting Attention (how often someone thinks of things that distract from pain),

Reinterpreting Pain Sensations (how often someone thinks of pain as if it was another sensation), Catastrophizing (how often someone engages in negative self-statements), Ignoring Pain Sensations (how often someone denies that pain hurts and its impact), Praying/Hoping (how often someone hopes or prays for the pain to get better), Coping Self-statements (how often someone tells him/herself that he/she is able to cope with pain), and Increasing Behavioral Activities (how often someone engages in active behaviors). Participants indicated the frequency of use of each of the 14 pain coping strategies on a seven-point Likert-type scale ranging from 0 (“never do that”) to 6 (“always do that”). Scores for each pain coping domain ranged from 0 to 6, with higher scores indicating a more frequent use of the coping strategy assessed. The CPCI-16 is composed of 16 items asking respondents to indicate the number of days (of the past seven days) that participants used each strategy to cope with pain at least once. The 16 coping responses are grouped into eight pain coping domains: Guarding (how much someone limits the movement of a body part), Resting (how much someone engages in resting activities, e.g., sitting down), Asking for Assistance (how much someone asks for help from others with some activity), Relaxation (how much someone engages in relaxation activities, e.g., meditating), Task Persistence (how often someone continues an activity despite the pain), Exercise/Stretch (how much someone engages in stretching activities), Seeking (how much someone seeks to talk to or be with others), Coping Self-statements (how often someone thinks positive thoughts about his/her pain). Scores for each scale can range from 0 to 7, with higher scores indicating a more frequent use of the coping strategy domain assessed. The validity and reliability of the subscales of the original versions of the CSQ ( $0.60 < \alpha < 0.85$ , test-retest reliability of 0.58 to 0.84 for a five-week interval) and CPCI ( $0.71 < \alpha < 0.91$ , test-retest reliability of 0.60 to 0.83 for a four-week interval) have been demonstrated in previous research, both for the English version and for the Portuguese version [61–67]. The subscales of both the CSQ-14 and CPCI-16 have shown validity through 1) their strong correlations ( $r \geq 0.70$ ) with the corresponding subscales of the original full-length versions of both measures [68]; 2) the patterns of association with pain and physical and psychological dysfunction [68–70]; and 3) the ability to detect statistically significant differences in the frequency of use of each coping strategy as a result of psychosocial intervention when compared with pretreatment scores [68]. Previous research supports the concurrent validity of the Portuguese versions of both the CSQ-14 and CPCI-16 [56].

### Spirituality

The five-item Spirituality Scale (SS) [71] was originally developed to assess spirituality in cancer survivors, with two domains: Spiritual Beliefs and Hope/Optimism. The first domain reflects the attribution of meaning and sense of purpose and to spiritual beliefs as the source of a sense

of purpose, whereas the second reflects hope about and generally a positive perspective toward life. Respondents are instructed to indicate their degree of agreement with each item on a four-point Likert-type scale ranging from 1 (“disagree”) to 4 (“completely agree”). Scores can range from 0 to 8 in the first domain and from 0 to 12 in the second, with higher scores indicating greater spirituality. Previous research supports the reliability and validity of this measure in a sample of patients with cancer (Beliefs:  $\alpha = 0.69$ ; Hope/Optimism:  $\alpha = 0.92$ ), in a sample of chronic renal patients in hemodialysis with chronic pain (Beliefs:  $\alpha = 0.78$ ; Hope/Optimism:  $\alpha = 0.69$ ), and in a sample of elderly participants from the general population (total scale:  $\alpha = 0.81$ ) [71–73].

### Procedure

A nonprobabilistic convenience sample of people with chronic musculoskeletal pain was recruited among the outpatients of seven health institutions in the North, Center, and South of Portugal. Before any participants were enrolled, the study was reviewed and approved by the ethics review boards of each of the abovementioned seven health institutions. Prospective participants meeting the eligibility criteria were then invited to participate while waiting for the physical therapy session to start, at the beginning (between the first and third sessions) of their rehabilitation program. In accordance with the Declaration of Helsinki, all prospective participants were informed of the study aims and procedures, were given the opportunity to ask any questions they had about the study, and were assured of anonymity and confidentiality before participation. In addition, all participants provided written informed consent before completing the study measures. They then completed the study measures while waiting for their physical therapy session to start. Participants who were unable to read or write were assisted by a trained research assistant in reviewing the informed consent form and completing the study measures. Specifically, for these participants, the information contained in the informed consent form was read to them. Participants who were unable to sign their name provided oral consent. All participants were encouraged to ask any questions or discuss any concerns about the study procedures, risks and benefits, and other information contained in the consent form. Comprehension of this information was tested by asking participants to summarize the information in the consent form.

### Data Analysis

All statistical analyses were performed using the software IBM SPSS Statistics (version 25). Alpha was set at 0.05 for all analyses. We first computed the frequencies (No., %), means ( $M$ ), standard deviations ( $SD$ ), skewness ( $Sk$ ), and kurtosis ( $Ku$ ) for all study measures for descriptive purposes. To detect differences in the frequency of use of the different coping strategies assessed, we performed

two repeated-measures analyses of variance (ANOVAs), with the CSQ-14 and CPCI-16 subscales as dependent variables. Before these analyses, we evaluated the normality and sphericity of the variance–covariance matrix assumptions, analyzing the  $Sk$  and  $Ku$  of the CSQ-14 and CPCI-16 subscales, with absolute values of  $Sk$  and  $Ku$  lower than 3 and 10, respectively, indicating absence of severe violation of the normality assumption [74,75]. If a violation of the assumption of sphericity was found, we planned to use Huynh-Feldt epsilon to set the degrees of freedom. In the event that significant between-scale score differences were found, we planned to perform between-subscale comparisons using post hoc Fisher least significant difference tests. Next, to test the study hypotheses, we computed a series of partial correlation coefficients, controlling for sex and age, to examine the univariate associations between spirituality and measures of pain intensity, physical and psychological function, and pain coping responses. Before these analyses, we evaluated test assumptions, namely normality, as described above [74,75]. Missing data from the SS and from the SF-12 were replaced by the series mean. This was the case for a single missing response from the SS Hope/Optimism domain and from the SF-12 PCS. No missing data were found for the NRS, CSQ-14, and CPCI-16.

## Results

### Descriptive Information

Table 1 summarizes the descriptive information for the study variables. Participants reported a moderate pain intensity level (NRS) on average and significant physical and psychological dysfunction, as evidenced by mean scores of physical (SF-12 PCS:  $M = 38.88$ ,  $SD = 23.28$ ) and psychological (SF-12 MCS:  $M = 58.06$ ,  $SD = 20.66$ ) function lower than the normative data set for healthy Portuguese individuals for both physical (25th percentile = 60,  $M = 76$ ) and psychological (25th percentile = 57.14,  $M = 71.24$ ) function reported in previous research [60,76]. The most commonly used pain coping responses included the responses of CSQ-14 and CPCI-16 Coping Self-statement ( $M = 3.79$ ,  $SD = 1.53$ , and  $M = 4.78$ ,  $SD = 1.96$ , respectively), CSQ-14 Increasing Behavioral Activities ( $M = 3.39$ ,  $SD = 1.49$ ), CPCI-16 Exercise/Stretch ( $M = 4$ ,  $SD = 2.24$ ), CPCI-16 Relaxation ( $M = 3.86$ ,  $SD = 2.17$ ), and CPCI-16 Task Persistence ( $M = 3.70$ ,  $SD = 2.36$ ). Less frequently used coping responses, in turn, were CSQ-14 Reinterpreting Pain Sensation ( $M = 2.18$ ,  $SD = 1.54$ ), CPCI-16 Guarding ( $M = 2.24$ ,  $SD = 1.96$ ), CPCI-16 Asking for Assistance ( $M = 2.33$ ,  $SD = 2.34$ ), CPCI-16 Resting ( $M = 2.70$ ,  $SD = 1.98$ ), and CPCI-16 Seeking ( $M = 2.77$ ,  $SD = 2.45$ ).

### Associations Between Spirituality, Pain Intensity, Function, and Pain Coping Responses

Table 2 shows the partial correlation coefficients between the study variables, controlling for sex and age. Only the SS Hope/Optimism subscale was significantly

**Table 2.** Partial correlation coefficients (controlling for sex and age)

	SS Beliefs	SS Hope/ Optimism
NRS	0.03	0.17
SF-12 PCS	−0.004	0.07
SF-12 MCS	0.23	0.33**
CSQ-14 subscales		
Diverting Attention	−0.08	0.05
Reinterpreting Pain Sensations	−0.15	0.16
Catastrophizing	−0.03	−0.23
Ignoring Pain Sensations	0.11	0.30*
Praying/Hoping	0.18	0.01
Coping Self-statements	0.18	0.43***
Increasing Behavioral Activities	−0.10	0.07
CPCI-16 subscales		
Guarding	−0.05	−0.20
Resting	−0.07	−0.11
Asking for Assistance	0.02	−0.02
Relaxation	−0.04	0.05
Task Persistence	0.30*	0.04
Exercise/Stretch	−0.05	−0.20
Seeking	−0.01	0.02
Coping Self-statements	−0.07	−0.06

\* $p < 0.05$ ; \*\* $p < 0.01$ ; \*\*\* $p < 0.001$ .

CPCI-16 = 16-item Chronic Pain Coping Inventory; CSQ-14 = 14-item Coping Strategies Questionnaire; NRS = Numerical Rating Scale; SF-12 MCS = SF-12 Mental Component Summary; SF-12 PCS = SF-12 Physical Component Summary.

associated with psychological function, as measured by the SF-12 MCS, with this correlation being positive and moderate ( $r = 0.33$ ,  $P < 0.01$ ). SS Hope/Optimism was also moderately positively and significantly associated with CSQ-14 Ignoring Pain Sensation ( $r = 0.30$ ,  $P < 0.05$ ) and CSQ-14 Coping Self-statements ( $r = 0.43$ ,  $P < 0.001$ ), whereas only SS Beliefs was significantly, but weakly, associated with CPCI-16 Task Persistence ( $r = 0.30$ ,  $P < 0.05$ ).

## Discussion

This study sought to evaluate the associations between a measure of spirituality and measures of pain, function, and pain coping responses in a sample of Portuguese adults with chronic musculoskeletal pain. This is the first study, to our knowledge, focusing on the associations between spirituality and pain-specific coping responses and on the role of spirituality in the pain experience in a sample of Portuguese patients with chronic pain. This study is part of a broader research program aiming to test the influence of spirituality on the pain experience, as hypothesized in the literature [13,47,49,50], in the context of a Southern European country.

In line with previous findings [52], we hypothesized that spirituality would be negatively and weakly associated with pain intensity and positively and weakly to moderately associated with physical and psychological

function. Furthermore, we anticipated that spirituality would be positively and weakly to moderately associated with more frequent use of active and/or adaptive pain coping responses. The findings provide limited support for these hypotheses. Overall, the associations found were frequently weak and nonsignificant, especially those between spirituality and pain, and physical function and passive and maladaptive pain coping. However, when statistically significant, positive moderate associations were found between 1) spirituality as a resource for hope and a positive perspective toward life and psychological function, and adaptive pain coping responses of positive coping self-statement and ignoring pain sensations; and 2) spirituality as a resource for the search for meaning and sense of purpose through spiritual/religious beliefs and the adaptive and active pain coping response of task persistence.

Weak and non-statistically significant correlations between spirituality and pain and physical function—although inconsistent with previous research, in which weak but significant associations have been found between spirituality and pain and physical function [13,34,35,52,55]—are in line with previous studies, in which nonsignificant associations emerged [13,38–40,52,77]. As noted by Rippentrop et al. [13], the reasons for an absence of significant associations between spirituality and pain and physical function are not entirely clear but may be attributable to changes in the level of pain, physical function, and spirituality over time that may hinder the discovery of an association between these variables in cross-sectional studies [33]. In addition, even though spirituality may not be strongly associated with pain intensity or physical function, individuals who endorse higher levels of spirituality may be more resilient and display higher levels of pain tolerance; thus, for some individuals and for some domains of spirituality, spirituality may operate as a moderator that influences the negative impacts of pain [46]. Consistent with this possibility, previous findings suggest that when both pain intensity and pain tolerance are measured, more spiritual resources tend to be associated with more pain tolerance, even when pain intensity does not differ between those endorsing higher vs lower levels of spirituality [33,78]; feeling or being more spiritual may not impact how much pain an individual feels but may impact how they respond to that pain. Future research is needed to determine the reliability of this conclusion.

In turn, the positive association found between psychological function and spirituality as hope/optimism, but not between the former and spirituality in terms of spiritual/religious beliefs as a source of meaning and sense of purpose, is in line with previous research [13,31,35,52,71,79–81], indicating that 1) a vertical dimension of spirituality (i.e., the relationship with the transcendent related to religious beliefs, faith, and practices) may play a less important role in psychological adjustment than a horizontal and existentialistic dimension

of spirituality (i.e., the development of hope/optimism and search for meaning and sense of purpose arising from the relationship with the self, others, and the context); 2) hope/optimism are positively associated with psychological function and subjective well-being; and 3) the strength of the associations between spirituality and function varies depending on the specific domain of spirituality assessed. Although no causal relationships can be concluded based on the current correlational data, taken together, these findings support the possibility that spirituality may be a potential resource for hope and a positive perspective toward life that promotes better psychological, but not physical, function in individuals with chronic pain.

This idea is consistent with the hypothesis that this horizontal dimension of spirituality may function as a buffer for the negative impact of pain on the psychological adjustment and well-being of pain patients [38,47,49]. In fact, when commenting on results indicating a positive association between spiritual transcendence and positive affect (happiness and joy), Bartlett et al. [38] attributed these findings to a buffering effect of spirituality against pain-related stress. The authors suggested that spirituality may offer a framework for a positive meaning and purpose of chronic illness that could potentially ease pain acceptance and the reformulation of life goals, resulting in better psychological adjustment. In turn, spirituality may be the result of a predisposition to experiencing positive affect, having flexible life goals, having hope and optimism about the future, and searching for a sense of meaning and purpose for pain. This could make spiritual individuals more resilient to pain and its impact [38].

The positive association between spirituality, either as hope/optimism or beliefs, on the one hand, and adaptive pain coping responses (such as ignoring pain sensation, coping self-statements, and task persistence), on the other, are consistent with the hypothesis of Bartlett et al. [38] that a spiritual orientation facilitates the use of adaptive coping responses. These results are also in line with previous research showing a positive association between measures of spirituality and the use of adaptive coping responses [37]. This provides support for the abovementioned hypothesis that hope/optimism and using spiritual/religious beliefs as a source of meaning and sense of purpose are resources that may ease pain acceptance and increase individuals' resilience toward pain and the impact of pain [38].

However, neither the vertical nor the horizontal dimension of spirituality was associated with a greater tendency to reinterpret pain sensations or to use the active, and often adaptive, pain coping strategy of increasing behavioral activities in the current sample. Although these results may be potentially attributable to limited power due to the relatively low number of participants in the current study, they are inconsistent with the hypothesis that spirituality is associated with pain experience and

function via its effects on pain appraisals [37,47] and on a tendency toward a positive meaning and purpose of pain leading to pain acceptance [38]. These discrepancies indicate that more research is warranted to further clarify the associations between spirituality and pain-specific coping responses, as well as the mechanisms explaining the association between spirituality and psychological function and coping.

### Limitations

To our knowledge, this is the first study evaluating the associations between spirituality and pain and function in a sample of Portuguese patients with chronic pain. It is also the first study assessing the association between spirituality and pain-specific coping responses. However, this study has a number of limitations that should be taken into consideration when considering the study findings. First, our convenience sample consisted of only 62 Portuguese adults with chronic musculoskeletal pain. Both the nonprobabilistic nature of the sample and the relatively small sample size may hinder the representativeness of the study population and our ability to detect true effects (i.e., may contribute to an increased risk for type II error). Additional research is needed to determine the generalizability and reliability of the current findings and to clarify the mechanisms explaining the associations between spirituality, psychological function, and coping in individuals with chronic pain. Second, the religious affiliation of the study participants was neither assessed nor controlled. The sample composition with regards to participants' religious affiliation—potentially influencing spiritual beliefs and practices—might not be representative of the religious make-up of the study population. Future research should assess and control for this variable. Third, the correlational and cross-sectional nature of the study design does not allow for evaluation of the causal nature of the associations between spirituality, psychological function, and pain coping responses, nor the mechanisms explaining such associations or the variations in spirituality and psychological function and coping over time. A longitudinal design or an experiment in which individuals were randomly assigned to a condition in which they were encouraged to explore and change (e.g., increase) their spiritual understanding of pain would enable a thorough understanding of the role of spirituality in pain experience. Fourth, in the current study, we defined and operationalized spirituality as the extent to which a person has or is searching for meaning and a sense of purpose in life, as well as feelings of transcendence and relatedness to a higher power, as a resource of hope in the face of misfortune. As a result, the measure used to assess spirituality did not capture other important domains of spirituality, such as spiritual distress or spiritual struggles. Indeed, research suggests that spiritual distress may be even more closely related to pain-related outcomes than the domains of spirituality assessed in this study [82–86]. Future researchers should

incorporate measures of this spirituality domain when studying spirituality and response to pain.

### Conclusions

Despite the study's limitations, the findings provide new important information regarding the role that spirituality may play in adjustment to chronic pain. The findings suggest the possibility that spirituality, both as hope/optimism and as using spiritual/religious beliefs, may be an important source of meaning that gives individuals a sense of purpose and that spirituality may be a useful resource for psychological adjustment, potentially promoting the use of adaptive pain coping responses. Both dimensions of spirituality should be taken into account and used in favor of the patient's adjustment in the context of patient care.

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