

Original Article

The Relationship Between Pain Catastrophizing and Spiritual Well-Being in Adult Cancer Patients: A Cross-Sectional Observational Study

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Abstract

Context. Chronic cancer-related pain adversely affects patients' physical and psychological well-being. Pain catastrophizing intensifies pain perception and emotional distress, whereas spiritual well-being may provide essential coping mechanisms. The interplay between spiritual well-being and pain catastrophizing in cancer patients is not thoroughly studied.

Objectives. To investigate the relationship between spiritual well-being and pain catastrophizing in cancer patients experiencing chronic pain.

Methods. A cross-sectional observational study was conducted from June 2023 to June 2024 at cancer center enrolling patients with cancer and pain intensity $\geq 4/10$. Participants completed the Pain Catastrophizing Scale and the FACIT-Spiritual Well-being Scale (FACIT-Sp-12) including the domains Meaning, Peace, Faith. Demographic data, symptom burden, and Karnofsky performance status were also collected. A Generalized Additive Model was employed to assess associations between scores of Pain Catastrophizing Scale and spiritual well-being domains, controlling for symptom burden and demographic variables.

Results. Ninety-seven patients, mostly male, with gastrointestinal cancer, a mean age of 62.9 years and mean Karnofsky score 44.4 (SD 7.7) completed the study. Higher levels of Peace ($\beta = -1.96$, $p = 0.004$) and Faith ($\beta = -0.99$, $P = 0.031$) were significantly associated with lower pain catastrophizing, while meaning was not significantly associated ($\beta = 0.87$, $P = 0.237$). Increased symptom burden was positively correlated with higher pain catastrophizing ($\beta = 0.16$, $P = 0.005$). The model explained 38.9% of the variance in pain catastrophizing scores (Adjusted $R^2 = 0.389$).

Conclusion. Spiritual well-being, specifically the Peace and Faith domains, is inversely related to pain catastrophizing in cancer patients. Integrating spiritual care into pain management strategies may enhance coping mechanisms and reduce emotional distress, thereby improving patients' quality of life. *J Pain Symptom Manage* 2025;000:1–8. © 2025 The Authors. Published by Elsevier Inc. on behalf of American Academy of Hospice and Palliative Medicine. This is an open access article under the CC BY license (<http://creativecommons.org/licenses/by/4.0/>)

Key Words

Chronic cancer pain, nursing, adult, pain catastrophizing, spiritual well-being, pain management

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Accepted for publication: 30 March 2025.

Key Message

Higher spiritual well-being is significantly related to lower pain catastrophizing in cancer patients, suggesting the need to integrate spiritual care into pain management strategies to improve patients' quality of life and reduce emotional distress.

Introduction

Chronic cancer-related pain arises from the cancer itself, whether by the primary tumor, metastases, or its treatments such as surgery, chemotherapy, and radiotherapy.¹ Its prevalence is notably high, with 40%–90% of patients experiencing pain and over 30% reporting moderate to severe pain.^{2,3}

This persistent pain inflicts substantial physical suffering and adversely impacts the psychological and social well-being of patients. Effectively managing chronic cancer-related pain demands a comprehensive interdisciplinary approach. This approach must incorporate patient perspectives and address the full spectrum of physical, psychological, social, and spiritual dimensions to ensure treatment adherence, improve quality of life, and provide appropriate pain management.^{4,5}

A critical psychological aspect influencing chronic pain in cancer patients is pain catastrophizing. This involves maladaptive beliefs and cognitive processes characterized by individuals exaggerating the threat and severity of pain and feeling helpless in managing it.^{6,7} Pain catastrophizing is a significant predictor of pain severity, emotional distress, and impaired functionality across various chronic pain conditions, including those faced by cancer patients.⁸ High levels of pain catastrophizing correlate with increased pain intensity, reduced physical function, and a diminished quality of life.

Spirituality is an element of patients' well-being essential for coping with illness.⁹ It aids in meaning-making, offering patients a framework to understand and integrate their suffering, a benefit in managing the emotional and cognitive burdens of chronic pain.^{10–12} Spiritual well-being serves as a measurable means to assess spirituality.^{13–15} Over the past two decades, the relationship between spiritual well-being and quality of life has been globally emphasized.¹⁶ Spiritual well-being has been shown to help patients cope with chronic pain.^{17,18} Integrating spiritual well-being as a stress management strategy has proven effective in reducing pain and enhancing both physical and psychological health in cancer patients.^{19,20}

Integrating spiritual well-being (SWB) and pain catastrophizing (PC) into a broader clinical framework enhances our understanding and management of chronic pain. This approach aligns with the Biopsychosocial Model of Chronic Pain,²¹ which considers the

complex interplay of biological, psychological, and social factors in health and illness.²² Pain catastrophizing, characterized by rumination, magnification, and helplessness, is a key psychological factor that intensifies pain perception and leads to poorer treatment outcomes.²³ Conversely, spiritual well-being, defined as a sense of meaning, transcendence, and inner peace, has been associated with lower pain intensity and enhanced pain coping strategies.²³ This perspective moves beyond a purely biomedical approach, acknowledging that pain is a multifaceted experience influenced by various domains of an individual's life. Empirical evidence supports this model, highlighting the necessity of addressing all contributing factors to effectively manage chronic pain.

Despite the promising between spiritual well-being and pain catastrophizing, there remains a gap in the empirical evidence exploring this relationship, particularly in patients with cancer. While spiritual well-being is associated with improved coping and reduced psychological distress, its impact on pain catastrophizing remains underexplored.⁶ Therefore, this study aims to investigate the relationship between spiritual well-being, pain catastrophizing level, cancer-related pain severity, and patient characteristics.

Methods

Design

A monocentric cross-sectional study was conducted in accordance with the Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) checklist.

Participants and Setting

A consecutive cohort of patients admitted to a specialized cancer center in Palermo, Italy, from June 2023 to June 2024 was enrolled. The study was conducted in a facility that integrates medical oncology, palliative care, and psychosocial support services, emphasizing a holistic approach to patient care. Italy, and particularly this region, has deep-rooted spiritual and religious traditions, with the majority of the population identifying as Roman Catholic. Religious beliefs and practices often intersect with healthcare experiences, influencing patients' coping mechanisms, perceptions of suffering, and engagement with spiritual support. Given this context, the role of spiritual well-being in pain management may be particularly relevant in this population.

The inclusion criteria comprised individuals aged 18 years or older, inpatients at the study site, diagnosed with advanced cancer—defined as recurrent disease with or without metastases, or locally advanced malignancy—experiencing chronic cancer-related pain.

Chronic cancer-related pain was defined as persistent pain lasting more than three months, attributable to cancer progression, metastatic involvement, or cancer-directed treatments. Eligible patients reported a mean pain score of at least 4/10 reported by patients using the Numeric Rating Scale (NRS) for a minimum of three months. Patients experiencing pain related to an acute event were excluded.

Prior to enrolment, all patients were initially managed pharmacologically following international guidelines and institutional protocols for cancer pain treatment.^{24,25} The exclusion criteria included an inability to complete the questionnaire, whether due to cognitive or linguistic impairments, an expected survival of two weeks or less, and a Karnofsky Performance Status (KPS) score of 30 or lower, as this typically indicates a state of severe debilitation where patients are bedridden, require full assistance, or are in the terminal stage of their illness.

Data Collection

Qualified investigators explained the study to potential participants, obtained informed consent, and administered the questionnaire upon receiving consent. The assessment package was conducted as a one-time event, with participants completing the assessment on the same day they provided consent. Demographic data, including age, sex, primary cancer diagnosis, and other patient characteristics, were collected using the specified instruments.

Instruments

Karnofsky Performance Status. The Karnofsky performance status is a standardized measure of physical activity in cancer patients.^{26,27}

Edmonton Symptom Assessment System (ESAS). The ESAS is a clinical tool to evaluate symptom burden in patients with advanced cancer.²⁸ It is widely used for symptom screening and monitoring across all care settings, effectively measuring the intensity of prevalent psychological and physical symptoms with proven validity and reliability.²⁹

This tool is designed to provide a holistic evaluation of a patient's symptom burden. In this study, we utilised the total ESAS score to assess the overall symptomatology, aligning with its intended and validated use.²⁸ This approach ensures a comprehensive assessment, avoiding potential issues of collinearity that may arise from analysing individual items or domains separately.

The Pain Catastrophizing Scale (PCS). The PCS is a 13-item self-report questionnaire assessing the presence of negative cognitions and emotions related to pain, comprising three subscales: helplessness,

magnification, and rumination. Responses to each item use a five-point Likert scale from 0 (never) to 4 (always), yielding a total score ranging 0–52 points, with higher scores indicating greater catastrophizing.⁷ The PCS has been validated as a unidimensional instrument suitable for overall catastrophizing scores, encompassing helplessness (items 1–5, 12), magnification (items 6–7, 13), and rumination (items 8–11).⁷ The Italian version (PCS-I) was used, which demonstrated robust psychometric properties.³⁰ *The Functional Assessment of Chronic Illness Therapy-Spiritual Well-being Scale (FACIT-Sp-12)*

The FACIT-Sp-12 assesses spiritual well-being in patients with chronic and life-threatening conditions through a comprehensive conceptualization of spirituality, including a personal search for meaning and purpose, connection with a transcendent dimension, and associated experiences and emotions.³¹ The 12-item scale uses a five-point Likert scale (0 = not at all, to 4 = very much), with total scores ranging from 0 to 48, where higher scores indicate greater spiritual well-being. The structure of the Italian version of FACIT-Sp-12 was proved through confirmatory factor analysis by Martoni et al.,³² as a three-factor model including Meaning, Peace, and Faith.

Statistical analysis

Normality of the continuous variables was assessed using the Shapiro-Wilk test, as well as visual inspection of residuals through Q-Q plots. Additionally, skewness and kurtosis were computed to further evaluate the shape and symmetry of the distributions. These analyses confirmed that the assumptions of normality were adequately met for the application of the selected statistical model. Prior to modelling, all variables were described using appropriate summary measures based on their distributions. Continuous variables were summarized as medians and interquartile ranges (IQR) or as means and standard deviations (SD), depending on the normality of the distribution. Categorical variables were reported as frequencies and percentages. A Generalized Additive Model (GAM) with an identity link function was chosen to evaluate the association between the Pain Catastrophizing Scale (PCS) and the predictor variables. GAM was selected to allow for potential non-linear relationships while maintaining interpretability in the context of the study.³³ The best-fitting model was identified using a forward stepwise selection procedure based on the Akaike Information Criterion (AIC), which balances model fit and complexity. The generalized cross-validation (GCV) score was compared to alternative models tested during the stepwise selection process, confirming that model selected had the best balance between predictive performance and parsimony.³⁴ A lower GCV score in the selected model indicated improved fit compared to

models with additional or fewer predictors, supporting the choice of the final set of variables.

A post-hoc power analysis was conducted for the GAM. Using $df = 92$, an effect size of $f^2 = 0.63$, and a significance level of $\alpha = 0.05$, the resulting statistical power was calculated to be 0.99. The sample size was determined based on both feasibility constraints and prior research on similar psychological constructs in cancer patients. Although the sample is relatively small, we conducted a post-hoc power analysis to ensure the adequacy of the sample size in detecting significant relationships. With 92 degrees of freedom (df), an effect size of $f^2 = 0.63$, and a significance level of $\alpha = 0.05$, the calculated statistical power was 0.99. This high power indicates a strong capacity to detect meaningful effects, reinforcing the reliability of our findings. Additionally, model adequacy is further supported by an adjusted R^2 of 0.389, deviance explained at 41.4%, and a GCV score of 73.014, while an estimated residual variance ($\sigma^2 = 69.251$) suggests reasonable model specification without overfitting (0.001) substantiates its overall significance, providing additional support for its robustness and explanatory strength.

Results

A total of 496 patients were screened during the study period. Of these, 399 were ineligible: 261 reported a pain intensity below four, 44 had a life expectancy of less than two weeks, 23 had neurological impairments, 19 were illiterate or faced language barriers, and 52 did not provide their consent to study participation. Ninety-seven patients were eligible for inclusion in the study. The majority were male ($N = 54$, 55.7%), with a mean age of 62.9 years (standard deviation [SD] = 10.2). The mean Karnofsky Performance Status score was 44.4 (SD = 7.7). The most common primary diagnosis was gastrointestinal cancer. Detailed participant characteristics are presented in Table 1.

Descriptive statistics (i.e. mean, standard deviation, median or interquartile) for key variables are presented in Table 2. Notably, religious affiliation and spiritual practice varied within the sample: 53.6% identified as Roman Catholic, 29.9% as atheist, 10.2% as agnostic, and 6.3% reported other religious backgrounds, including Muslim and Jewish faiths. Additionally, 20.6% of participants identified as practicing believers, engaging regularly in religious activities. These findings highlight the diversity of spiritual perspectives within the sample, which may have influenced individual experiences of spiritual well-being and pain catastrophizing.

The results of the regression model, highlighting the relationship between the PCS and the predictor variables. The model included the following predictors: age, meaning, peace, faith, and symptoms (see Table 3).

Table 1
Participants' Socio Demographic and Clinical Characteristics
($n = 97$ Patients With Advanced Cancer)

Variable	N (%)	Mean, SD (Range)
Gender		
Male	54 (55.7)	
Female	43 (44.3)	
Age (years):		62.9, 10.2 (32-85)
Karnofsky score		44.4, 7.7 (40-60)
Education level		
Illiterate	1 (1)	
Primary education	23 (23.7)	
Middle school education	40 (41.2)	
High school education	24 (24.7)	
Bachelor's degree or higher	9 (9.3)	
Primary cancer site		
Gastrointestinal	29 (29.9)	
Breast	23 (23.7)	
Lung	23 (23.7)	
Genitourinary	16 (16.5)	
Other	6 (6.2)	
Religious faith and practice		
Believer	45 (46.4)	
Practicing believer	20 (20.6)	
Not believer	32 (33.0)	
Religion		
Roman catholic	52 (53.6)	
Atheist	29 (29.9)	
Agnostic	10 (10.2)	
Muslim	2 (2.1)	
Jewish	2 (2.1)	
Other	2 (2.1)	
Familial Income		
<1000 €	67 (69.8)	
1000–3000 €	27 (28.1)	
3000 €	2 (2.1)	
Living situation		
Spouse/partner	76 (69.09)	
Separated/divorced	16 (14.55)	
Single	14 (12.73)	
Widow/ widower	4 (3.63)	
Symptom intensity		
Pain		6.49, 1.55 (4–10)
Dyspnea		0.68, 2.17 (0–10)
Depression		3.23, 3.54 (0–10)
Anxiety		3.65, 3.39 (0–10)
Poor sleep		3.81, 3.43 (0–10)
Drowsiness		3.42, 2.70 (0–10)
Nausea		1.22, 2.61 (0–10)
Weakness		5.54, 2.99 (0–10)
Poor appetite		3.25, 3.67 (0–10)
Poor well-being		5.36, 3.06 (0–10)
ESAS total		36.65, 16.63 (5–10)

SD = standard deviation.

Table 2
Descriptive Statistics of Key Variables

Variable	Descriptives
FACIT-Sp12 M (SD)	23.96 (6.08)
PCS M (SD)	27.57 (10.64)
ESAS Me [IQR]	39 [22]
Faith Me [IQR]	8 [4]
Peace Me [IQR]	8 [3]
Meaning Me [IQR]	9 [1]
Karnofsky Me [IQR]	40 [10]
Helplessness Me [IQR]	11 [8]
Rumination Me [IQR]	9 [7]
Magnification Me [IQR]	3 [3]

M = mean; SD = standard deviation; Me = median; IQR = Interquartile.

Table 3
Factors Affecting Catastrophizing Pain

Predictor	Estimate	SE	t-Value	P-Value	Sig.
Intercept	37.608	7.602	4.947	0.001	***
Age	-0.016	0.076	-211.0	0.833	
Meaning	0.874	0.735	1.189	0.237	
Peace	-1.962	0.673	-2.915	0.004	**
Faith	-0.991	0.452	-2.191	0.031	*
Symptoms (ESAS)	0.163	0.057	2.820	0.005	**

Sig. = significance.

Bold values are the statistically significant differences.

*** $p < 0.001$.

** $p < 0.01$.

* $p < 0.05$.

The adjusted R^2 value of 0.389 indicates that approximately 38.9% of the variance in the PCS score is explained by the predictor variables. Additionally, the deviance explained by the model is 41.4%. The GCV score was 73.014, and the estimated residual variance (σ^2) was 69.251. Among the predictors, the following were statistically significant and negatively associated with PCS: Peace ($\beta = -1.9622$, $P = 0.004$) and Faith ($\beta = -0.9907$, $P = 0.031$); symptoms were positively associated with PCS ($\beta = 0.1631$, $P = 0.005$). Other variables, such as age and Meaning, did not reach statistical significance, indicating no strong evidence of their association with PCS within this model.

Discussion

This study examined the relationship between spiritual well-being and pain catastrophizing in cancer patients with chronic pain. The findings show that while spiritual well-being, particularly the domains of peace and faith, is associated with reduced pain catastrophizing, the overall effect of these factors on catastrophic thinking is modest. Higher levels of peace were significantly linked to lower scores on the PCS. Peace, representing inner tranquility and emotional balance, appears to mitigate catastrophic thoughts about pain by reducing rumination and magnification of symptoms. The cultural context of the study may have influenced the observed relationships between spiritual well-being and pain catastrophizing. In Italy, spiritual and religious beliefs are deeply ingrained in both individual and institutional healthcare practices.^{35,36} This finding aligns with previous research suggesting that emotional balance enhances coping mechanisms in individuals with chronic pain.^{23,37} Similarly, the faith domain was negatively associated with pain catastrophizing. Faith, reflecting personal beliefs and connection to a higher power, may provide patients with a framework for understanding their illness, fostering hope, and reducing feelings of helplessness.^{23,37,38} Although these results are statistically significant, their clinical impact remains limited. This is in line with previous studies conducted in pain

management centers, where statistically significant results do not correspond to clinical significance.³⁹ In contrast, symptom burden, as measured by the ESAS was positively associated with pain catastrophizing. This indicates that as patients experience greater symptom severity, their levels of catastrophic thinking about pain increase. This finding is consistent with literature indicating that higher physical symptom burdens can exacerbate negative cognitive-emotional responses to pain.⁴⁰ Nonetheless, the effect size in this relationship is also modest, reinforcing the notion that symptom burden, while a significant predictor, does not overwhelmingly influence pain catastrophizing.

Interestingly, the meaning domain of spiritual well-being did not show a significant association with pain catastrophizing ($\beta = 0.874$, $P = 0.237$). This result diverges from previous studies that highlighted the role of meaning-making in coping with chronic illness.^{41,42} One possible explanation is that advanced cancer may pose existential challenges that complicate the ability to derive meaning, thereby weakening its potential influence on pain catastrophizing. Additionally, no significant relationship was found between living situation and mild to moderate levels of pain catastrophizing. This finding contrasts with existing literature, which underscores the importance of spousal support in oncology care.^{43,44} Married patients, who typically receive emotional and practical support from their partners, often show better coping outcomes, suggesting a need for targeted interventions to support unmarried, divorced, or widowed patients.^{45,46}

Despite these important findings, further research is necessary to deepen understanding of the interplay between spiritual well-being and pain catastrophizing. Future studies should explore the mechanisms underlying these relationships using both multicenter quantitative and qualitative designs, particularly in relation to psycho-existential distress. Additionally, investigating these dynamics across diverse cultural and religious contexts could provide valuable insights into how spiritual well-being affects pain perception and coping strategies in various populations.

Limitations, Strengths, and Clinical Implications

This study has several limitations that should be considered when interpreting the results. The monocentric design and small sample size may limit generalizability to the broader, diverse population of cancer patients. Furthermore, the study's cross-sectional nature precludes causal inferences, highlighting the need for longitudinal studies to determine the directionality and causality of associations between spiritual well-being and pain catastrophizing. Additionally, we acknowledge that factors such as pain etiology, patient-related factors, adequacy of pain management, involvement of palliative care specialists, and psychosocial-

spiritual support teams, as well as specific side effects of treatment, should be explored in future studies. These aspects could further illuminate the complex interplay between spiritual well-being and pain catastrophizing in the context of advanced cancer. Moreover, as coping strategies were not measured, future studies should incorporate scales measuring coping strategies. Despite these limitations, the study shows notable strengths. To our knowledge, this is one of the few studies that directly examine the relationship between domains of spiritual well-being and pain catastrophizing in cancer patients. The use of validated instruments like the PCS and FACIT-Sp-12 enhances the reliability and validity of the results. Moreover, employing a Generalized Additive Model (GAM) for statistical analysis allowed assessment of potential nonlinear relationships, providing robust analysis. The high statistical power (0.99) further supports the reliability of the findings. Results from this study hold potential implications for clinical practice although, while statistical significance was observed, clinical significance was not conclusively demonstrated. This suggests that interventions targeting spiritual well-being, such as fostering a sense of peace and strengthening faith, might still offer some benefit in reducing pain catastrophizing among cancer patients, but their practical impact on clinical outcomes requires further investigation.

Strategies such as guided meditation, participation in faith-based support groups, pastoral care, journaling, and the integration of spiritual music and sacred texts may help patients cultivate inner peace and resilience.^{18,20} Additionally, incorporating cognitive-behavioral therapy with spiritual integration, facilitating religious rituals, and encouraging engagement with nature may further enhance spiritual well-being and coping mechanisms.^{9,10}

Healthcare providers should integrate spiritual assessments using validated tools like the FACIT-Sp-12 into routine care and consider collaboration with spiritual care professionals to address patients' broader needs. The adoption of this holistic approach that addresses the physical, psychological, social, and spiritual patients' dimensions may enhance patients' well-being their care even if the clinical relevance of such interventions remains to be fully established.

Conclusions

This study highlights the significant relationship between spiritual well-being and pain catastrophizing in cancer patients with chronic pain. Higher levels of peace and faith are associated with lower pain catastrophizing, suggesting that spiritual well-being serves as a protective factor against maladaptive pain perceptions and enhances coping mechanisms. Conversely, a higher symptom burden correlates with increased pain

catastrophizing, emphasizing the need for comprehensive symptom management. These findings underscore the importance of not only recognizing but actively promoting spiritual well-being in chronic pain management. By adopting targeted interventions that enhance peace and faith, healthcare professionals may improve spiritual well-being and reduce pain catastrophizing, potentially leading to better pain management and quality of life. While the study has limitations, it provides valuable insights into the interplay between spirituality and pain perception. Future research should examine factors such as pain aetiology, patient characteristics, pain management adequacy, palliative care involvement, psychosocial–spiritual support, and socioeconomic factors to clarify the interplay between spiritual well-being and pain catastrophizing in advanced cancer. They should also develop interventions that enhance spiritual well-being and evaluate their impact on catastrophizing, ESAS items, and overall outcomes. A holistic approach integrating spiritual care may improve chronic pain management.

Data Statement

The author (s) affirm that the methods used in the data analyses are suitably applied to their data within their study design and context, and the statistical and psychometric findings have been implemented and interpreted correctly

CRedit Authorship Contribution Statement

Alessio Lo Cascio: Conceptualization, Methodology, Validation, Writing—Original Draft, Writing—Review and Editing, Visualization; Investigation, Data Curation.

Daniele Napolitano: Writing—Review and Editing, Visualization.

Roberto Latina: Methodology, Formal analysis, Writing—Original Draft, Writing—Review and Editing, Visualization.

Marcella Dabbene: Writing—Original Draft, Writing—Review and Editing, Visualization.

Stefano Mancin: Writing—Original Draft, Writing—Review and Editing, Visualization.

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Maria Grazia De Marinis: Conceptualization, Supervision.

Disclosure and Acknowledgments

This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors. The authors are grateful to all the Patients who participated to the study. The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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