

Evaluating the FACIT-Sp-12: a systematic review of measurement properties of spiritual well-being in cancer patients

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ABSTRACT

Introduction: Assessing cancer patients' spiritual well-being is crucial. The Functional Assessment of Chronic Illness Therapy-Spiritual Well-being 12 (FACIT-Sp-12) is a measure of spiritual well-being. However, its psychometric properties and significance in varied cultural and therapeutic situations must be assessed. This study aims to investigate whether the FACIT-Sp-12's measurement properties yield the most accurate spiritual data for cancer patients.

Methods: This systematic review examined full-text studies written in English and involving patients with cancer published between 2000 and 2024, using cross-sectional, randomized controlled trials, case-control, and quasi-experimental designs. This study used the MEDLINE (PubMed and EBSCO), ScienceDirect, Scopus, Taylor and Francis, and selected ProQuest databases. We assessed the papers methodically using the PRISMA flow before reviewing ten of them. The Consensus-based Standards for the Selection of Health Measurement Instruments tool has been used for evaluating the review articles.

Results: We found that various studies on spirituality in cancer patients conducted in different countries have employed diverse research methods. All these studies used the FACIT-Sp-12, which has been modified and adapted for cultural contexts. Cronbach's alpha ranges from 0.70 to 0.91, indicating that FACIT-Sp-12 is consistent across studies. COSMIN has been used to evaluate and critique FACIT-Sp-12; however, its structural validity, Cronbach's alpha for the subscales, intraclass correlation, and measurement error remain unsatisfactory. Some publications examine hypotheses and provide satisfactory responses, but there is little discussion on criterion validity or cross-cultural adaptation.

Conclusions: We determined that patients with cancer could use the FACIT-Sp-12. This study suggests using the FACIT-Sp-12 spiritual assessment tool for cancer patients in research and nursing care.

Keywords: cancer, FACIT-Sp-12, measurement properties, spiritual well-being

Introduction

Carcinomas can occur in any organ system and constitute a significant global health issue, ranking second among non-communicable diseases, following cardiovascular disease WHO (2020). The global cancer statistic indicates a troubling rise in both incidence and

mortality, with the implication of the disease encompassing not only physical but also psycho-social and spiritual dimensions. Advanced cancer patients frequently undergo physical decline alongside significant existential and spiritual distress, which can present as a loss of meaning, disrupted faith, or inner turmoil (Taylor, 2006, Lewis *et al.*, 2014, Berman, 2015, Winkelman *et al.*,



2016, Ernstmeyer *et al.*, 2021). Spiritual concerns, especially common among patients with advanced or terminal-stage cancer, frequently go unassessed and inadequately addressed in standard care (Taylor, 2006, Schultz *et al.*, 2017, Eshghi *et al.*, 2023, Khalili *et al.*, 2024).

In numerous hospitals, spiritual care remains fragmented and lacks standardization, despite its significance for patient quality of life. Studies conducted across various nations, including the United States (Astrow *et al.*, 2018), Germany (Büssing *et al.*, 2018), Iran (Nejat *et al.*, 2023), and Indonesia (Warsini *et al.*, 2024), have demonstrated differences in the identification and management of spiritual needs within oncology environments. Several frameworks, the Spiritual Attitude And Involvement List (SAIL) (de Jager Meezenbroek *et al.*, 2012), the Spiritual Needs Assessment For Patients (SNAP) (Sharma *et al.*, 2012), the Spiritual Interests Related To Illness Tool (SPiRiT) (Taylor, 2006), the Spiritual Needs Questionnaire (SpNQ) (Büssing *et al.*, 2010), the Quality of Life in Cancer Survivors (QOL-CS) (Ferrell *et al.*, 1995), are frequently employed; however, the Functional Assessment of Chronic Illness Therapy-Spiritual Well-being 12 (FACIT-Sp-12) (FACIT.org) has emerged as one of the most widely used instruments in both clinical and research contexts. The FACIT-Sp-12 assesses three fundamental aspects of spiritual well-being: faith, meaning, and peace (Smith *et al.*, 2007) and has been translated into multiple languages for application in culturally diverse groups.

Although widely used, no comprehensive evaluation of the psychometric quality of the FACIT-sp-12 has been conducted across cancer populations in various cultural contexts. The lack of systematic evidence concerning its validity, reliability, and measurement properties poses a challenge for achieving accurate spiritual assessment in oncology patients. Addressing this gap is essential to developing culturally relevant and clinically effective tools for comprehensive cancer care. This research conducted a systematic literature review to assess the measurement properties of the FACIT-Sp-12, applying the Consensus-based Standards for the Selection of Health Measurement Instruments (COSMIN) guidelines. This study aimed to evaluate the validity and reliability of the tool to confirm its suitability for research and clinical application in addressing the spiritual well-being of cancer patients.

Materials and Methods

Research Design

This study used a systematic literature review design to investigate the measurement properties of the patient-reported outcome measurement (PROM) FACIT-Sp-12, using the Consensus-based Standards for the Selection of Health Measurement Instruments (COSMIN) guidelines. The COSMIN framework was selected for its methodological rigor in assessing the reliability, validity,

and responsiveness of PROMs. It was applied using the COSMIN Risk of Bias Checklist to evaluate the psychometric quality of the study included (Mokkink *et al.*, 2016).

Eligibility criteria

The inclusion criteria were full-text research papers published from 2000 to 2024, diverse cross-sectional studies, randomized controlled trials (RCTs), case-control studies, and quasi-experimental studies written in English, with a particular emphasis on patients with cancer. Keyword search for research publications using CPTM (Construct of Interest/Measurement Instrument, Population, Type of measurement instrument, and measurement Properties) (Hosseini *et al.*, 2024). The keywords utilized were “FACIT-Sp-12 for construct of interest/measurement instrument,” “Cancer” as population, “PROM” (Patient Reported Outcome Measurement) as type of measurement instruments, and “Validity” OR “Reliability” OR “Psychometric Properties” as measurement properties. Exclusion criteria for the study included the unavailability of full text, not involving cancer patients as the study population, focusing on qualitative studies, reviews, editorials, commentaries, books, or conference abstracts, and lacking a psychometric evaluation specifically in terms of validity, reliability, or measurement properties.

Information Sources

The research databases are through major platforms, including MEDLINE (PubMed and EBSCO), ScienceDirect, Scopus, Taylor and Francis, and selected ProQuest databases. To minimize overlap, PubMed and MEDLINE searches were carefully cross-checked, and the detailed search strategy, including specific databases and keywords, was provided in the supplementary material. The search was completed in March 2024, and no new studies meeting the inclusion criteria were identified thereafter.

Search Strategy

Keywords used were “FACIT-Sp-12,” “Cancer Patients,” “Validity,” “Reliability,” “Psychometric Properties” incorporated with a Boolean Operator and a Medical Subject Heading (MeSh Term), as shown in Appendix 1. Three researchers, AF, are validating, analyzing, reviewing, and editing, as well as EBW and NY, who are validating, reviewing, and editing, used COSMIN to examine the papers. INR served as the format analysis, and YA served as the conceptualization and supervision when members of the research team were unable to reach consensus on the selected articles.

Selection Process

Figure 1 illustrates the article selection process according to the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) (Haddaway *et al.*,

2022). EndNote 21 was also used to filter the articles (Clarivate, 2021). Three researchers (AF, EBW, and NY) reviewed and selected publications using EndNote 21. Subsequently, we shared our findings with the international researchers (INR). If we were unable to reach an agreement, we sought mediation from Professor (YA), who served as a supervisor. For the following review, AF, EBW, and NY will evaluate the selected papers for risk of bias using the COSMIN tool.

Synthesis Methods

We extracted information to better understand each study's features. Three reviewers independently extracted data using a standardized form developed based on COSMIN guidelines. The form included study characteristics (country, design, language), participant details (sample size, age, sex), and psychometric properties of the FACIT-Sp-12. Any discrepancies were resolved through discussion or consultation with a third reviewer.

Reporting bias assessment

We measured the characteristics of the FACIT-Sp-12 instrument in three phases using COSMIN. The very first stage of the COSMIN Risk of Bias involved assessing the methodological quality of all the collected studies (Mokkink *et al.*, 2016, Terwee *et al.*, 2018). Based on the list of elements, we assessed each measuring characteristic in each article and assigned a rating of outstanding, adequate, dubious, or insufficient. The methodology's quality was evaluated based on the lowest ranking across all criteria presented in the box. Content validity was employed as the starting parameter for evaluating each measurement property. We deemed the measurement characteristics of content validity, including relevance, comprehensiveness, and responsiveness, to ensure that the instrument accurately represented the measured construct (Mokkink *et al.*, 2016).

After that, we examined the instrument's internal structure, focusing on its structural validity, internal consistency, cross-cultural validity, and measurement equivalence. The assessment of internal consistency was performed by evaluating the instrument's structural validity, which may include one or two factors. If a one-factor structure is confirmed, it is essential to assess Cronbach's α for all items. After validation of a two-factor structure, Cronbach's α will be evaluated for each subscale. Following the assessment of measurement reliability and measurement error, and hypothesis testing for construct validity (including convergent validity and discriminant or known-group validity), additional measurement aspects warrant consideration. Current quality standards assess the measuring features of each study outcome and grade them as sufficient (+), insufficient (-), or uncertain (?) (Liberati *et al.*, 2009, Terwee *et al.*, 2018).

The overall rating's evidence quality was classified as high, medium, low, or very poor using a modified GRADE (Grading of Recommendations Assessment, Appraisal, Development, and Evaluation) approach (Mokkink *et al.*, 2016, Prinsen *et al.*, 2018). A high rating signifies strong confidence that the actual measurement property closely aligns with the estimated value; a medium rating indicates reasonable confidence with potential discrepancies; a low rating suggests limited confidence and possible significant differences; and a very low rating reflects minimal confidence and a high probability of substantial differences. The evaluation incorporated factors such as risk of bias, inconsistency, noncompliance, and insufficient sustainability (Mokkink *et al.*, 2016, Prinsen *et al.*, 2018). The quality of evidence assessment was limited to internal consistency, as it is a prerequisite for evaluating structural validity. Other measurement properties were not graded for evidence quality beyond the criteria outlined in the modified GRADE approach. The above process was carried out by all three reviewers, who reached an agreement through discussion or mediation by the supervisor.

Results

Study selection

The database search retrieved 196 publications, which were subsequently screened in EndNote 21, yielding 10 papers that met the research inclusion criteria (Figure 1).

Study characteristic

Table 1 summarizes the features of the papers examined in this study. The findings revealed that ten studies conducted across eight countries- the Netherlands, Italy, Indonesia, Spain, Turkiye, the United States, Jordan, Iran, and Japan-examined cancer patients using diverse research designs, including cohort (n=1), observational (n=2), quasi-experimental (n=1), cross-sectional (n=4), and factor analysis (n=2). The study populations consisted of patients with advanced, terminal, gynecological, and non-metastatic cancers, with sample sizes ranging from 108 to 505. Most studies were conducted in hospital settings (n=7), while the remaining were conducted in hospice, home care, or clinic settings (n=3). Sample ages varied from 31 to 100 years, and gender distribution was generally balanced between men and women. The instruments employed were predominantly translated versions of the FACIT-Sp-12, many of which underwent forward-backward translation to ensure cultural equivalence. Reported Cronbach's alpha coefficients ranged from 0.70 to 0.91, indicating good to excellent internal consistency.

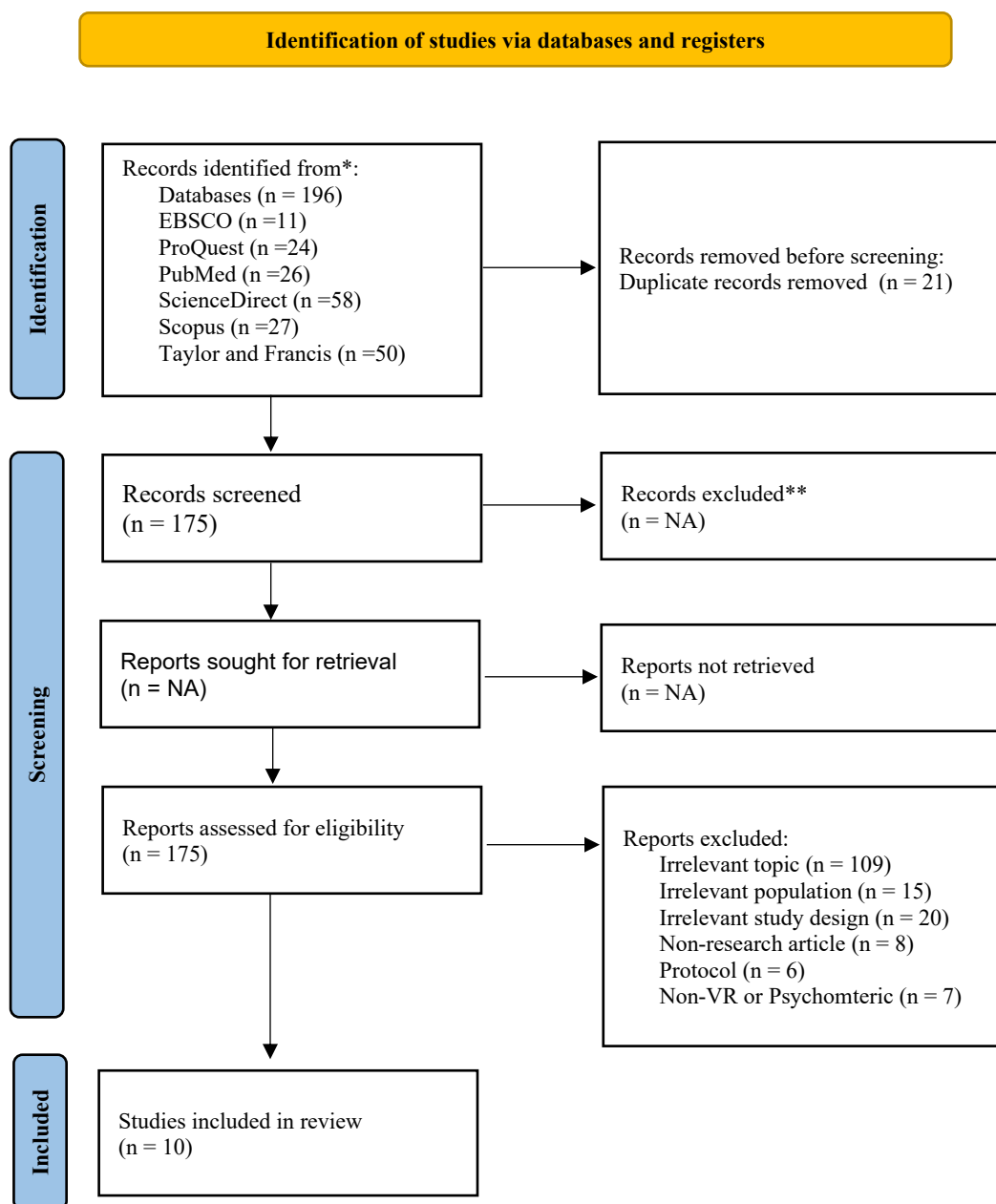


Figure 1 PRISMA flow diagram

Collectively, these findings demonstrate that the translated and culturally adapted FACIT-Sp-12 can be reliably utilized among cancer patients across different cultural contexts and settings.

After implementing COSMIN as a benchmark for risk of bias (Table 2), ten studies reveal identical measurement property strength and gaps (Table 3). All investigations demonstrated positive internal consistency, indicating that the instrument's properties fit together well. Most studies had positive structural validity ratings, supporting numerous instrument factor structures; responsiveness and hypothesis testing were also positive, showing they can detect expected group differences or change over time. Recurring issues are present. Test-retest/absolute agreement reliability was either not reported or unclear in most investigations,

thereby reducing confidence in score stability. The sample's measurement error was almost always unassessed or rated "?", therefore practically all the instrument's random or systematic error around observed scores was unknown. Criterion validity was rarely tested (positive results are infrequent), preventing inferences concerning instrument scores and gold standards. Several studies found cross-cultural validity to be positive, but others found it uncertain or nonexistent, limiting the generalizability of measures across locations and languages. The three low-quality studies contributed disproportionately to these gaps because they had multiple indeterminate or negative ratings across key domains (reliability, measurement error, and some validity indices), reducing their overall evidence. Strong evidence research had better structural validity, internal

consistency, and responsiveness/hypothesis testing. While several instruments have acceptable internal structure and consistency, the frequent lack of measurement error, sparse criterion validation, and inconsistent reporting of reliability and cross-cultural validity must be addressed before these instruments can be recommended without hesitation. Quality evaluation was conducted using the GRADE methodology, a modified version of the risk of bias assessment (Uijen *et al.*, 2012). These findings suggest that FACIT-Sp-12 has strong evidence and is appropriate for use in cancer patients.

Discussions

This systematic review examined the psychometric properties of FACIT-Sp-12 in cancer patients, following the COSMIN framework (Mokkink *et al.*, 2016). The result indicates that the FACIT-Sp-12 exhibits adequate measurement properties, including internal consistency, construct validity, and responsiveness. Nonetheless, significant gaps persist, especially concerning cross-cultural validity, measurement error, and criterion validity. Seven studies achieved a low-risk classification, whereas three were deemed high risk due to incomplete statistical analysis, the absence of hypothesis testing, or inadequate reporting practices, indicating evaluation bias. Variability in methodological rigor affects the strength of the evidence and underscores the necessity of consistent adherence to psychometric standards (Uijen *et al.*, 2012).

Construct validity was assessed via hypothesis testing across seven studies, thereby supporting the theoretical foundation of spirituality as quantified by FACIT-Sp-12. Confirmatory and exploratory factor analysis (CFA and EFA) across six studies provided additional support for the instrument, confirming its factor structure (Noguchi *et al.*, 2004, Jafari *et al.*, 2012, Bai and Dixon, 2014, Aktürk *et al.*, 2017, Jimenez-Fonseca *et al.*, 2018, Damen *et al.*, 2021). Internal consistency demonstrated robustness across 10 studies, with Cronbach's alpha values ranging from 0.71 to 0.91, thereby satisfying the 0.70 threshold for both total and subscale scores. The findings support the internal consistency of the FACIT-Sp-12 dimensions (Noguchi *et al.*, 2004, Jafari *et al.*, 2012, Lazenby *et al.*, 2013, Bai and Dixon, 2014, Costantini *et al.*, 2016, Aktürk *et al.*, 2017, Jimenez-Fonseca *et al.*, 2018, Nasution *et al.*, 2020, Damen *et al.*, 2021). However, the Jimenez-Fonseca study reported reliability indicators, including an Omega coefficient of 0.874 (Jimenez-Fonseca *et al.*, 2018). The Costantini study reported an intraclass correlation coefficient (ICC = 0.72 for patient assessments; ICC = 0.82 for staff assessments) (Costantini *et al.*, 2016), which indicates both internal consistency and inter-rater reliability.

Responsiveness, a critical characteristic for instruments designed to identify longitudinal change,

was validated in seven publications, thereby reinforcing its applicability in clinical monitoring and intervention assessment (Noguchi *et al.*, 2004, Jafari *et al.*, 2012, Lazenby *et al.*, 2013, Bai and Dixon, 2014, Jimenez-Fonseca *et al.*, 2018, Nasution *et al.*, 2020, Damen *et al.*, 2021). None of the studies reviewed reported measurement error, a critical aspect of the COSMIN framework that indicates systematic and random deviations not associated with actual changes in the underlying construct (Mokkink *et al.*, 2016). This type of inaccuracy raises concerns about the precision and reproducibility of the FACIT-Sp-12.

Another concern was cross-cultural validity. Three studies did not document any translation or cultural adaptation process (Costantini *et al.*, 2016, Aktürk *et al.*, 2017, Rabitti *et al.*, 2020), and none utilized advanced methodologies such as structural equation modelling (SEM) or differential item functioning (DIF) analysis to verify measurement invariance. These omissions contradict established recommendations for cross-cultural adaptation, and psychometric re-evaluation to ensure conceptual equivalence across population (Beaton *et al.*, 2000). Criterion validity was examined in a single study that described the translation process and stakeholder involvement, but it did not report an Area Under the Curve (AUC) value (Damen *et al.*, 2021). The lack of comparison with a gold standard further undermines the robustness of the validity evidence, as outlined in the COSMIN guidelines (Mokkink *et al.*, 2016).

The FACIT-Sp-12 is a reliable instrument for evaluating spiritual well-being in cancer patients. Future research must prioritize enhancing cultural adaptability, explicitly documenting measurement error, and integrating gold-standard comparisons to improve validity. The application of advanced statistical methods, including SEM and IRT, is crucial for enhancing the instrument's effectiveness across various populations and clinical settings.

No research or reviews have examined the measurement properties of the FACIT-Sp-12 in patients with cancer. FACIT-Sp-12 was designed as a spiritual evaluation tool for patients with chronic cancer. 12 questions required little time for patients to evaluate their spiritual experiences throughout the previous seven days. Researchers are new to using COSMIN for article critique; thus, they need to try and error to achieve what they want. COSMIN is more complicated than other article criticism tools. COSMIN is challenging to complete independently, as it requires collaborators to discuss the article.

When reviewing papers with COSMIN, there may be instances when the research article lacks sufficient data, prompting interactions with the author or researcher. However, satisfactory responses might not have been achieved. Furthermore, the publications in the review

lacked a detailed methodology or findings that assessed the instrument's quality, making the review difficult or yielding poor results. This evaluation did not include content validity owing to data restrictions and unanticipated author responses, such as failure to respond to emails. The researcher reviewed and assessed the scale items in accordance with COSMIN instructions. Despite employing COSMIN principles to assess measurement quality, the procedure is somewhat subjective, especially regarding content validity, which the researcher must evaluate.

We identified 10 publications for this systematic review and evaluated them using the COSMIN checklist. The articles being assessed had several flaws, including insufficient structural validity without inter-factor analysis; almost all articles reported Cronbach's alpha scores but often failed to report it for each subscale. Despite this being one of the assessment points in COSMIN, the majority failed to meet reliability standards owing to the lack of an intraclass correlation coefficient (ICC) measurement. None of the publications assessed measurement error, nine did not report criterion validity, and three did not report cross-cultural validity. Seven publications reported acceptable hypothesis testing and responses, while three did not.

Conclusion

The FACIT-Sp-12 has been studied in numerous different cultures and languages, with substantial research supporting its use in cancer patients. Critiquing articles using the COSMIN procedures and standards enables training in critiquing papers using COSMIN for individuals interested in critiquing studies to assess instrument quality. Policymakers, hospitals, and nursing services may use the study's findings as a resource to help cancer patients assess their spiritual condition and address any spiritual concerns, thereby improving overall patient satisfaction, health outcomes, and nursing care for cancer patients.

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Availability of data and materials

The datasets supporting the findings of this study have been made publicly available in the Open Science Framework (OSF) repository at <https://osf.io/p247y>.

Authors' contributions

AF: Data collection; analysis; manuscript writing; references, Study conception and design; critical revisions for important intellectual content; EBW: Data collection; analysis; manuscript writing; references, Study conception and design; NY: Data collection; analysis; references, Study conception and design; YA & INR: Conceptualization, Methodology, Formal analysis, Data curation, Review & Editing

Declaration of Interest

The authors declare that they have no affiliations with or involvement in any organization or entity that has financial interests in the subject matter or materials presented in this manuscript.

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Table 1 Research articles' characteristics based on author, study design, population, sample, setting, age, gender, country, original/translation, cultural adaptation process, and Cronbach's alpha

Author	Study Design	Population	Sample Size	Setting	Age (yr) Mean (SD or range)	Gender (%)	Country	Original / Translated	Cross-cultural	Cronbach's alpha
Damen et al., (2021)	Cohort study	Advanced Patients with cancer	400	Hospital	64.4 (9.8), [31–88]	M: 208 (52%) F: 192 (48%)	Betherland	Translated	NA	Sub-scale 0.71 – 0.86
Rabitti et al., (2020)	Observational study	Advanced and terminally ill Patients with cancer	150	Hospice or home care	70.5 (12.8), [31–100]	M: 69 (50.7) F: 67 (49.3%)	Italy	Translated	forward-backward translation	Subscale Meanings 0.73 Peace 0.79 Faith 0.85 Total 0.78
Nasution et al., (2020)	Quasi- experimental method and a pre- and post-test with control group for research design	Gynecological Patients with cancer	108 (54 respondents in each group)	Hospital	Mean Intv: 47.17 Ctrl: 44.35	Female 100%	Indonesia	Translated	NA	
Jimenez-Fonseca et al., (2018)	Observational study	Non-metastatic, resected cancer	504	Hospital	58.6 (12.1)	F: 310 (61.5%)	Spain	Translated	NA	Peace subscales of 0.85 and 0.86 for faith
Aktürk et al., (2017)	Cross-sectional	Patients with cancer	137	Hospital	NA	M: 194 (38.5%) F: 78 (56.9%)	Turkiye	Translated	forward-backward translation	Total 0.87 Subscales 0.78 - 0.90
Costantini et al., (2016)	Cross-sectional	Terminally ill Patients with cancer	150	Hospice	NA	M: 48.1%	Italy	Translated	forward backward translation	Total 0.70
Bai & Dixon, (2014)	Principal components analysis (PCA) and 3 common factor analysis	Newly diagnosed with advanced cancer	118	Clinic	59.6 (12.2)	F: 55.5% M: 49 (51.5%)	United State	Original	NA	Subscale 0.78 - 0.88
Lazenby et al., (2013)	Cross-sectional	Patients with cancer	205	Hospital (cancer center)	46.5 (13.7) 19-77	F: 69 (58.5) M: 92 (45%) F: 113 (55%)	Jordan	Translated	translation and adaptation into Arabic	Total 0.83
Jafari et al., (2012)	Cross-sectional	Patients with cancer	153	Hospital	46.8 (15.1) 18-86	M: 58 (38%) F: 95 (62%)	Iran	Translated	forward-backward translation	Total 0.90 Subscales 0.72 - 0.90
Noguchi et al., (2004)	Cross-sectional	Patients with cancer	306	Hospital	62.9 SD-NA 22-87	M: 164 (53.6%) F: 142 (46.4)	Japan	Translated	forward-backward translation	Subscale 0.81 - 0.91

Table 2 Risk of bias assessment using the COSMIN.

Item	Damen et al., (2021)	Rabitti et al., (2020)	Nasution et al., (2020)	Jimenez-Fonseca et al., (2018)	Aktürk et al., (2017)	Costantini et al., (2016)	Bai & Dixon, (2014)	Lazenby et al., (2013)	Jafari et al., (2012)	Noguchi et al., (2004)
Structural Validity	Reporting CFA	No explanation	No explanation	EFA and Semi CFA	Factor analysis with KMO Bartlet results	No explanation	EFA and CFA	No explanation	3-factor CFA	CFA
Internal consistency	Cronbach's alpha sub-scale between 0.71 – 0.86	Cronbach's alpha for each subscale	Cronbach's alpha totaled 0.78, none for subscales	Cronbach's alpha	Cronbach's alpha totaled 0.87 for subscales	Total Cronbach's alpha 0.70	Total Cronbach's alpha is missing, for	Total Cronbach's alpha 0.83	Total Cronbach's alpha 0.90; for	Cronbach's alpha total is missing, for

Item	Damen et al., (2021)	Rabitti et al., (2020)	Nasution et al., (2020)	Jimenez-Fonseca et al., (2018)	Aktürk et al., (2017)	Costantini et al., (2016)	Bai & Dixon, (2014)	Lazenby et al., (2013)	Jafari et al., (2012)	Noguchi et al., (2004)
		Meaningfulness 0.73 Peace 0.79 Confidence 0.85		Peace 0.85 and 0.86 for confidence	between 0.78 - 0.90		subscales between 0.78 - 0.88		subscale 0.72 – 0.90	subscale 0.81 – 0.91
Reliability	No explanation	No explanation	No explanation	reporting coefficient omega	No explanation	ICC 0.72 for patient assessment and 0,82 for staff assessment	No explanation	No explanation	No explanation	No explanation
Measurement error	No explanation	No explanation	No explanation	No explanation	No explanation	No explanation	No explanation	No explanation	No explanation	No explanation
Hypotheses testing for construct validity	Yes	No explanation	Yes	Yes	No explanation	No explanation	Yes	Yes	Yes	Yes
Cross-cultural validity\measurement invariance	Yes	Yes	Yes	No explanation	No explanation	No explanation	Yes	Yes	Yes	Yes
Criterion validity	Yes	No explanation	No explanation	No explanation	No explanation	No explanation	No explanation	No explanation	No explanation	No explanation
Responsiveness	Yes, however AUC	No explanation	Yes, however AUC	Yes, however AUC	No explanation	No explanation	Yes, however AUC	Yes, however AUC	Yes, however AUC	Yes, however AUC
	Not explained		Not explained	Not explained			Not explained	Not explained	Not explained	Not explained

EFA= Exploratory Factor Analysis; CFA= Confirmatory Factor Analysis; ICC= Intraclass Correlation Coefficient; AUC= Area Under Curve;

Table 3 GRADE criteria and article quality

Author	Country	Structural Validity	Internal Consistency	Reliability	Measurement error	Hypothesis testing	Cross-cultural validity	Criterion Validity	Responsiveness	Risk of Bias	Level of Evidence
Damen et al., (2021)	Netherland	+	+	?	?	+	+	+	+	L	Strong
Rabitti et al., (2020)	Italy	?	+	?	?	?	+	?	-	H	Low
Nasution et al., (2020)	Indonesia	?	+	?	?	+	?	?	?	M	Moderate
Jimenez-Fonseca et al., (2018)	Spain	+	+	+	?	+	?	?	+	L	Strong
Aktürk et al., (2017)	Turkiye	+	+	?	?	?	?	?	-	H	Low
Costantini et al., (2016)	Italy	?	+	+	?	?	?	?	-	H	Low
Bai & Dixon, (2014)	America	+	+	?	?	+	+	?	+	L	Strong
Lazenby et al., (2013)	Jordan	?	+	?	?	+	+	?	+	L	Strong
Jafari et al., (2012)	Iran	+	+	?	?	+	+	?	+	L	Strong
Noguchi et al., (2004)	Japan	+	+	?	?	+	+	?	+	L	Strong

“+” = Sufficient; “-” = insufficient; “?” = indeterminate; H= High; M= Moderate; L= Low