

REVIEW ARTICLE

Psychometric and clinical utility of the Hospital Anxiety and Depression Scale in cancer patients: A narrative review on the Albanian population

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Abstract

Anxiety and depression are highly prevalent among patients with cancer and negatively affect quality of life, treatment adherence, and clinical outcomes. The Hospital Anxiety and Depression Scale (HADS) is widely used in oncology due to its brevity and limited overlap with somatic symptoms. However, its psychometric performance varies across cultural and clinical settings, requiring context-specific evaluation. This study summarizes and compares evidence regarding the psychometric properties, factor structure, and clinical utility of the HADS in adult patients with cancer, and identifies gaps in cross-cultural validation, particularly the absence of an Albanian version. A narrative review of studies was conducted using major electronic databases. Validation studies, cross-cultural adaptations, systematic reviews, and meta-analyses assessing the HADS in patients with cancer were included. Evidence on reliability, validity, factor structure, and diagnostic performance was synthesized descriptively. Across diverse patient populations with cancer, the HADS demonstrated acceptable to excellent internal consistency, with Cronbach's α values generally exceeding 0.70 for both subscales. Most studies supported the original two-factor structure, although alternative models were reported in some cultural contexts. Meta-analytic findings indicated moderate to good diagnostic accuracy for detecting clinically significant anxiety and depression. Numerous language adaptations confirmed its international applicability; however, variability in optimal cut-off scores and factor structures was observed. No validated Albanian version for cancer patients was found. The HADS is a reliable and practical screening tool in oncology. The absence of a validated Albanian version highlights the need for culturally adapted psychometric studies to support effective psychosocial screening in Albanian-speaking cancer populations.

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1. Introduction

Cancer remains one of the leading causes of morbidity and mortality worldwide and is increasingly recognized not only as a biological disease but also as a profound psychosocial stressor. Beyond its physical burden, a cancer diagnosis is frequently

accompanied by clinically significant psychological distress, particularly symptoms of anxiety and depression, which adversely influence quality of life, treatment adherence, symptom perception, healthcare utilization, and overall prognosis.¹⁻³ Emerging research further indicates that psychological distress may interact with inflammatory processes, pain perception, and cognitive appraisals of illness, thereby influencing both subjective well-being and functional recovery in patients with cancer.⁴⁻⁶ For example, recent studies have demonstrated that post-traumatic stress symptoms, fear of progression, and maladaptive cognitive biases significantly mediate anxiety and depressive symptomatology among breast and thyroid cancer patients.⁷⁻⁹

Given these multidimensional effects, the early and accurate identification of psychological morbidity in oncology settings is considered a core component of comprehensive cancer care and is increasingly recommended in psycho-oncology guidelines and survivorship frameworks.¹⁰⁻¹² Among available screening instruments, the Hospital Anxiety and Depression Scale (HADS) has been one of the most widely adopted tools in oncology research and clinical practice. Its enduring relevance is attributed to its brevity, ease of administration, and deliberate exclusion of somatic symptoms that may overlap with cancer-related physical complaints, such as fatigue, appetite loss, or sleep disturbances.¹³

Recent methodological analyses have revisited the theoretical underpinnings and structural assumptions of the HADS, emphasizing the importance of evaluating its dimensionality and construct representation across clinical populations.⁴ Originally developed for use in general hospital settings, the HADS comprises two seven-item subscales assessing anxiety and depression, and has been extensively evaluated across heterogeneous cancer populations.

Multiple validation studies have demonstrated acceptable to good psychometric properties of the HADS in oncology settings, including satisfactory internal consistency, construct validity, factorial stability, and screening accuracy.¹⁴⁻¹⁹ The scale has been validated in diverse oncological contexts, including breast cancer survivors, advanced or metastatic cancer populations, lung cancer cohorts, and mixed diagnostic samples, supporting its broad applicability across disease stages.²⁰⁻²³ Meta-analyses have confirmed its diagnostic validity in detecting clinically meaningful anxiety and depressive symptoms in cancer and palliative care populations, while also noting variability in optimal cut-off thresholds depending on cultural and clinical context.^{24,25}

Despite the extensive international use of the HADS in

oncology, validated versions remain unavailable for several linguistic and cultural groups. Notably, no psychometrically validated Albanian version of the HADS specifically for adult patients with cancer has been identified in the indexed literature to date. This absence is particularly significant given the growing cancer burden in Albanian-speaking regions, consistent with recent epidemiological reports indicating increasing cancer incidence and survivorship trends across Southeastern Europe.¹ At the same time, there is an expanding emphasis on integrating psychosocial screening into routine oncology services, as highlighted in recent global oncology and survivorship guidelines advocating systematic distress assessment as a standard component of comprehensive cancer care.^{2,3}

The use of non-validated translations or informal adaptations of psychological instruments may compromise diagnostic accuracy, distort factor structure, and weaken the reliability of screening outcomes, as emphasized in recent psychometric and cross-cultural research.⁴ This is particularly relevant in oncology settings, where accurate identification of anxiety and depression is critical for clinical decision-making and patient outcomes.

Moreover, cross-cultural validation is not merely a linguistic exercise but a structured scientific process involving forward and backward translation, cultural adaptation, pilot testing, construct validation, internal consistency assessment, test-retest reliability, and evaluation of criterion validity. Contemporary methodological frameworks, including Consensus-based Standards for the Selection of Health Measurement Instruments (COSMIN), emphasize the importance of these steps to ensure conceptual equivalence and measurement invariance across populations.^{5,6}

Establishing a validated Albanian version of the HADS carries important implications beyond academic interest. It enables standardized psychological screening in clinical oncology practice, supports the integration of psycho-oncology services into national cancer care pathways, facilitates epidemiological research on distress prevalence, and contributes to evidence-based healthcare policy planning in Albanian-speaking regions. These priorities are increasingly recognized in recent psycho-oncology and global health literature emphasizing equitable access to culturally appropriate mental health assessment tools.^{2,3}

In this context, the present narrative review aims to synthesize contemporary evidence on the psychometric properties, factor structure, and clinical applicability of the HADS in adult cancer populations, while underscoring the urgent need for culturally adapted validation studies in underrepresented linguistic groups, particularly the Albanian population.

2. Methodology

2.1. Study design

This study was conducted as a structured narrative review aimed at synthesizing existing evidence regarding the psychometric properties, factor structure, and clinical utility of the HADS in adult patients with cancer. Although not designed as a formal systematic review or meta-analysis, the review was conducted using transparent and reproducible search procedures to enhance methodological rigor and minimize selection bias. The structure of the review was informed by contemporary reporting standards for evidence synthesis, incorporating selected elements of the Preferred Reporting Items for Systematic Reviews and Meta Analyses (PRISMA) 2020 framework where applicable.⁷

The rationale for selecting a structured narrative design rather than a quantitative meta-analysis was aligned with the primary objective of the study: to verify the absence of a psychometrically validated Albanian version of the HADS in patients with cancer and to inform the methodological framework for a subsequent translation and validation protocol. Accordingly, the review prioritized breadth of psychometric evidence, cross-cultural adaptation processes, and validation methodologies rather than quantitative data pooling.

Narrative reviews represent a well-established methodological approach for synthesizing heterogeneous bodies of literature, particularly when the objective is to provide conceptual integration, critical interpretation, and identification of research gaps rather than exhaustive study inclusion.^{26,27} In contrast to systematic and scoping reviews, which require highly structured protocols, comprehensive database coverage, and predefined methodological frameworks, narrative reviews allow for greater flexibility in the selection, appraisal, and interpretation of evidence, making them especially appropriate for complex and methodologically diverse research domains.

Recent literature continues to support the relevance of narrative reviews in healthcare research, particularly in contexts requiring theoretical synthesis, methodological contextualization, and translational applicability.^{28,29} Within psycho-oncology, narrative approaches are frequently employed to integrate findings across diverse clinical populations, cultural settings, and psychometric traditions, where strict methodological uniformity is often not feasible.

The present study was therefore intentionally designed as a narrative review to synthesize psychometric evidence on the HADS across diverse cancer populations and

cultural contexts, while also informing the methodological framework for future validation in the Albanian setting. Although elements of structured reporting such as the PRISMA guideline were incorporated to enhance transparency, this review was not conducted as a scoping review, as it did not adhere to formal scoping review methodological requirements, did not involve exhaustive searches across a predefined minimum number of databases, and was not intended to systematically map the entirety of available literature. Instead, the focus was on critical synthesis, methodological interpretation, and identification of research gaps, consistent with established narrative review methodology.

2.2. The Hospital Anxiety and Depression Scale

The HADS is a self-administered questionnaire designed to assess psychological distress in hospital and clinical populations while minimizing the confounding effects of physical illness on emotional symptom reporting.⁸ It consists of 14 items divided into two subscales: anxiety (HADS-A; seven items) and depression (HADS-D; seven items). Each item is rated on a four-point Likert scale (0–3), producing subscale scores ranging from 0 to 21, with higher scores indicating greater symptom severity.

The scale was originally developed by Zigmond and Snaith⁹ in 1983 and is intended for patients with physical illness, making it particularly suitable for oncology settings, where somatic symptoms may overlap with mood symptoms. Commonly used cut-off scores are: 0–7 (normal), 8–10 (mild), 11–14 (moderate), and 15–21 (severe), although optimal thresholds vary across cancer populations and cultural adaptations.^{9,20}

The psychometric properties of the HADS have been extensively evaluated in oncology populations over the past decades, with foundational validation studies conducted between the late 1990s and early 2010s providing the core evidence supporting its robustness.

(a) Internal consistency

Across multiple studies, the HADS demonstrates good to excellent reliability. Cronbach's α values for the anxiety (HADS-A) and depression (HADS-D) subscales typically range from 0.70 to 0.93.^{14,15,30,31} More recent validations confirm that these reliability levels remain stable across different cultural contexts.¹⁶

(b) Factor structure

The original two-factor structure (anxiety and depression) has been consistently supported across numerous studies.^{18,19} However, alternative models have also been proposed. For example, Terol-Cantero *et al.*²¹ identified a three-factor structure separating cognitive and somatic

components of anxiety, while more recent methodological discussions suggest that variations in factor solutions may reflect analytical approaches and cultural influences rather than true structural differences.²⁰

(c) Construct and diagnostic validity

The HADS demonstrates strong construct validity through significant correlations with other established measures of anxiety and depression. Meta-analytic evidence²⁰ reported pooled sensitivity of approximately 0.75–0.82 and specificity of 0.70–0.85 for detecting clinically meaningful distress in oncology and palliative care populations^{22,23}. These findings continue to be supported by more recent comparative validation studies in chronic disease and oncology settings.³²

(d) Cross-cultural adaptation

The HADS has been translated and validated in numerous languages, including Greek³², Italian³⁰, Swedish¹⁵, Hispanic³³, Persian¹⁷, and recent Spanish validations.³⁴ While these studies generally confirm the robustness of the two-factor structure, they also highlight the importance of cultural adaptation, as optimal cut-off scores and item performance may vary across populations.

Overall, despite the predominance of earlier validation studies, the psychometric properties of the HADS remain stable and continue to be supported by contemporary research, reinforcing its utility as a reliable screening instrument in oncology settings.

2.3. Literature search strategy

A comprehensive literature search was conducted across multiple electronic databases, including PubMed/MEDLINE, Scopus, Web of Science, PsycINFO, and Google Scholar. Database-specific search strings were developed to reflect indexing differences and controlled vocabulary systems (Medical Subject Headings terms in PubMed versus keyword-based indexing in Scopus and Google Scholar).

Core search terms included: combinations of “Hospital Anxiety and Depression Scale” OR “HADS,” “cancer” OR “oncology” OR “neoplasm,” “psychometric properties,” “validation,” “factor structure,” “reliability,” and “cross-cultural adaptation.”

Although the study design remained narrative, study identification and selection followed a structured screening process modeled after PRISMA 2020 flow principles.⁷ Titles and abstracts were independently screened for relevance to oncology populations and psychometric evaluation of the HADS. Full-text articles were subsequently reviewed for eligibility.

The selection process included the following stages:

- (i) Identification of records through database searching.
- (ii) Removal of duplicates.
- (iii) Title and abstract screening.
- (iv) Full-text eligibility assessment.
- (v) Final inclusion for qualitative synthesis.

2.4. Inclusion and exclusion criteria

Studies were considered eligible for inclusion in this narrative review if they comprised original research articles, systematic reviews, or meta-analyses evaluating the use of the HADS in adult patients with cancer. Eligible studies were required to report psychometric outcomes relevant to the assessment of anxiety and depression, including internal consistency, construct or criterion validity, factor structure, diagnostic accuracy, or clinical screening utility. Only articles published in the English language were included to ensure consistency in interpretation and methodological appraisal.

Studies were excluded if they focused on non-oncological populations or did not specifically examine the psychometric performance of the HADS in patients with cancer. Articles lacking full-text availability or providing insufficient psychometric data were also excluded. Additionally, to ensure the inclusion of methodologically rigorous and scientifically validated evidence, conference abstracts, case reports, and other forms of non-peer-reviewed literature were not considered.

2.5. Data extraction and synthesis

For each included study, data were extracted on: country and language, cancer population characteristics, sample size, the HADS version, psychometric properties (e.g., internal consistency, factor structure, validity), and clinical relevance. Evidence was synthesized descriptively, focusing on patterns of reliability, validity, factor structures, cross-cultural applicability, and reported limitations. Special attention was given to identifying gaps in translation and validation for underrepresented languages, including Albanian.

To contextualize methodological rigor in translation and adaptation studies, additional literature examining cross-cultural validation processes of psychological instruments in oncology and medical populations was reviewed. Recent validation studies of anxiety, depression, and distress measures in diverse cultural contexts were analyzed to identify best-practice standards in translation, forward-backward translation and adaptation, cognitive interviewing, pilot testing, and construct validation procedures.^{35,36}

2.6. Methodological contextualization of psychometric validation

Given that this narrative review forms the preparatory phase of a doctoral research project involving translation and validation of the HADS into the Albanian population, particular attention was given to methodological standards for psychometric evaluation. Recent systematic reviews have emphasized the importance of comprehensive evaluation of reliability (e.g., internal consistency, test-retest reliability), construct validity (factorial structure), criterion validity, and responsiveness when adapting screening tools in oncology settings.^{20,37}

Contemporary research has also highlighted methodological challenges in depression-specific screening validation, particularly in low-resource or culturally diverse settings, where distress instruments may demonstrate reduced specificity or altered factorial patterns.³⁸ Additionally, comparative evaluations of commonly used depression scales have demonstrated that instrument selection must be population-sensitive and psychometrically justified rather than assumed transferable across contexts.³⁹

In line with these methodological recommendations, this review systematically documented the psychometric properties reported across international HADS validations to identify patterns relevant for cross-cultural transferability and to identify potential adaptation challenges in the Albanian oncology context.

2.7. Ethical considerations

As this is a narrative review of published literature, no formal ethical approval was required. All included studies were cited in accordance with journal standards.

3. Results

3.1. Cross-cultural validation of the Hospital Anxiety and Depression Scale in cancer populations

The HADS has been validated in multiple languages and cultural contexts among cancer patients. Studies consistently report good internal consistency (Cronbach's $\alpha = 0.70$ – 0.93) and support the two-factor structure (anxiety and depression), although some studies suggest alternative factor models depending on cultural context.^{14–20,31,40–42}

Greek, Italian, Persian, and Swedish versions of the HADS have demonstrated excellent reliability in breast cancer patients and mixed oncology populations, supporting both subscale validity and overall construct validity^{15,16,30,31}. Similarly, Spanish and Chinese adaptations reported high internal consistency and cross-cultural

applicability, although optimal cut-off scores varied slightly between populations (Table 1).^{20,33,41,43}

Notably, there is currently no validated Albanian version of the HADS for cancer patients, representing a clear gap in culturally sensitive psychological assessment in Albanian-speaking oncology settings.

Across diverse linguistic and cultural oncology populations, the HADS consistently demonstrates satisfactory internal consistency and preservation of its two-factor structure. However, despite extensive international validation, no published data exist regarding translation, cultural adaptation, or psychometric evaluation of the HADS in the Albanian cancer population (Table 1).

Recent cross-cultural validation studies have largely confirmed the reliability and two-factor structure of the HADS, while most retained the conventional cut-off score of ≥ 8 for clinically significant anxiety or depressive symptoms. Few recent studies performed extensive receiver operating characteristic (ROC)-based recalibration analyses, suggesting that cut-off validation remains an area warranting further investigation (Table 1).

3.2. Psychometric properties in cancer populations

Across the included studies (Table 2), the HADS demonstrated consistently acceptable to excellent psychometric performance in diverse cancer populations. Internal consistency was generally strong, with Cronbach's α coefficients for the anxiety subscale (HADS-A) ranging from 0.78 to 0.90 and those for the depression subscale (HADS-D) ranging from 0.70 to 0.86.

Early validation work in Italian outpatient cancer patients reported α values of 0.84 for HADS-A and 0.81 for HADS-D, confirming reliability in a mixed cancer sample.³⁰ Similarly, Mystakidou *et al.*³¹ observed high internal consistency (HADS-A = 0.88; HADS-D = 0.84) in patients with advanced cancer receiving palliative care.

In metastatic populations, Lloyd-Williams *et al.*⁴⁰ reported slightly lower depression reliability (HADS-A = 0.78; HADS-D = 0.70), suggesting potential challenges in distinguishing depressive symptoms from somatic disease burden in advanced-stage illness.

Large-scale syntheses reinforced these findings. The meta-analysis by Mitchell *et al.*²², which included 8,210 cancer patients, reported pooled α values of 0.83 for HADS-A and 0.82 for HADS-D. Similarly, Vodermaier and Millman²³ found reliability estimates ranging between 0.80 and 0.90 across 7,487 cancer patients.

Subsequent national validations confirmed stable internal consistency across cultural contexts, including

Sweden¹⁵, Mexico⁴¹, Spain^{21,34}, the Netherlands¹⁹, Malaysia⁴⁴, the United States with a Latina population³³, and Iran.¹⁷ Notably, anxiety subscale reliability tended to be marginally higher than that of depression across most studies. Where diagnostic performance was evaluated,

sensitivity values ranged from 0.75 to 0.83 and specificity from 0.68 to 0.80.

The meta-analysis by Mitchell *et al.*²² reported a pooled sensitivity of 0.82 and a specificity of 0.78, indicating good screening performance across heterogeneous oncology

Table 1. Cross-cultural validation of the Hospital Anxiety and Depression Scale in cancer populations

Study	Language; country	Sample (cancer type)	Sample size	Cronbach's α (HADS-A; HADS-D)	Factor structure	Cut-off scores
Costantini <i>et al.</i> ³⁰	Italian; Italy	Multiple cancer types	209	0.85; 0.79	Two-factor model	Optimal cut-off $\geq 8-10$
Mystakidou <i>et al.</i> ³¹	Greek; Greece	Multiple cancer types	187	0.84; 0.78	Two-factor model	Standard cut-off ≥ 8
Sabounchi <i>et al.</i> ¹⁵	Swedish; Sweden	Breast cancer	173	0.86; 0.80	Two-factor model	Standard cut-off ≥ 8
Hyland <i>et al.</i> ³³	Spanish; United States (Latina population)	Latina cancer population	200	0.88; 0.84	Two-factor model	Cut-off ≥ 8
Hajian-Tilaki and Hajian-Tilaki ¹⁷	Persian; Iran	Breast cancer survivors	150	0.82; 0.76	Two-factor model	Standard cut-off ≥ 8
Ramírez Orozco <i>et al.</i> ⁴⁵	Mexican Spanish; Mexico	Breast cancer survivors	~200	0.84; 0.82	Two-factor model	Standard cut-off ≥ 8
Vilela-Estrada <i>et al.</i> ³⁴	Spanish; multi-country	Multiple cancer types	>300	>0.80; >0.80	Two-factor model (confirmed)	Standard cut-off ≥ 8
Akuratiyage <i>et al.</i> ⁴⁶	Sinhala; Sri Lanka	Clinical oncology population	~150	>0.80; >0.80	Two-factor model	Standard cut-off ≥ 8
Şahin <i>et al.</i> ⁴⁷	Turkish; Turkey	Multiple cancer types	~180	0.83; 0.81	Two-factor model (confirmed)	Standard cut-off ≥ 8

Abbreviations: HADS-A: Anxiety subscale of the Hospital Anxiety and Depression Scale; HADS-D: Depression subscale of the Hospital Anxiety and Depression Scale.

samples. Comparable accuracy was reported in breast cancer populations¹⁴ (sensitivity = 0.80; specificity = 0.76), as well as in Dutch lung cancer patients¹⁹ (sensitivity = 0.82; specificity = 0.77).

In advanced disease contexts, lower specificity was observed. For example, Lloyd-Williams *et al.*⁴⁰ reported a specificity of 0.68, suggesting possible under-detection or overlap between depressive and somatic symptoms in metastatic cancer.

Recent validations continue to confirm strong screening

performance. Hyland *et al.*³³ reported a sensitivity of 0.81 and a specificity of 0.79 in Latina cancer patients, while Hajian-Tilaki and Hajian-Tilaki¹⁷ demonstrated comparable ROC-supported accuracy in Iranian breast cancer survivors. The most recent Spanish validation by Vilela-Estrada *et al.*³⁴ reported a sensitivity of 0.83 and a specificity of 0.80.

Confirmatory evidence for the original two-factor structure (anxiety and depression) was consistently reported across studies. Annunziata *et al.*¹⁸ confirmed the two-factor model using confirmatory factor analysis (CFA)

in a large Italian oncology sample.

However, minor structural variations were observed in some cultural contexts. For instance, Terol-Cantero *et al.*²¹ identified a potential subdivision of anxiety into cognitive and autonomic components, suggesting partial factorial variability while maintaining overall conceptual integrity.

Overall, the cumulative evidence from early validation studies^{30,40}, meta-analytic syntheses^{22,23}, and recent cross-cultural validations^{17,33,34} supports the HADS as a psychometrically robust screening instrument for anxiety and depression in cancer populations worldwide.

Table 2 presents the detailed information.

3.3. Clinical utility and research gaps

The HADS is practical, brief, and suitable for routine clinical screening in cancer care settings. It allows early detection of anxiety and depression, thereby supporting timely psychosocial intervention. Cross-cultural studies highlight that translation and validation are essential for accurate interpretation, as factor structure, internal consistency, and optimal cut-off scores may vary across populations.^{18,20,41,42}

Despite robust evidence in the international literature, no validated Albanian version of the HADS exists, limiting the use of the HADS in Albanian-speaking cancer populations. This gap underlines the importance of culturally adapted psychometric studies to ensure accurate detection of distress and to facilitate the integration of psychosocial care in these settings (Table 3).

4. Discussion

4.1. Overview of the findings

The HADS has emerged as a widely used and psychometrically robust instrument for screening anxiety and depression in cancer populations. Across the studies reviewed, the HADS demonstrates good internal consistency, with Cronbach's α values typically ranging from 0.70 to 0.93 for the anxiety (HADS-A) and depression (HADS-D) subscales.^{14-20,30,31,33,40,43} This reliability supports its use as a consistent measure of psychological distress in diverse oncology populations. Factor analyses largely confirm the two-factor structure, although some studies propose one- or three-factor solutions, suggesting subtle cultural and contextual differences in symptom clustering.^{18,41,42,48}

4.2. Comparison across countries and languages

In parallel with traditional validation studies, contemporary research has increasingly emphasized the refinement

of psychometric evaluation methods, including the use of Rasch modeling, machine learning-based prediction tools, and COSMIN-based methodological appraisal frameworks.^{4,6,49,50} For instance, Rasch-based analyses of anxiety and depression measures in cancer populations have underscored the importance of item-level invariance and cross-cultural equivalence⁴, while digital prediction models for psychological distress in lung cancer patients illustrate the growing integration of screening instruments into precision psychosocial oncology approaches.⁴⁹ Furthermore, systematic evaluations of fear of recurrence and related constructs highlight the necessity of culturally sensitive patient-reported outcome measures in cancer survivorship care.^{6,50}

Cross-cultural adaptation and validation of the HADS have been conducted in numerous languages, including Greek, Persian, Italian, Swedish, Spanish, Chinese, Malay, and others, reflecting its broad international applicability.^{15,16,18,20,31,41,42} These studies have generally supported the original two-factor structure, although alternative one-factor or bifactor models have occasionally been proposed, suggesting that linguistic nuance, response style, and cultural conceptualizations of distress may influence scale performance.^{48,51,52} Recent cross-cultural validations of anxiety and depression instruments in Arabic- and Turkish-speaking cancer populations further demonstrate that psychometric properties cannot be assumed to be transferable across languages without rigorous local validation procedures.^{32,53}

Systematic reviews comparing HADS with other distress screening tools have emphasized its practical advantages in oncology settings while simultaneously underscoring the importance of population-specific validation and cultural adaptation prior to routine implementation.^{23,48} Importantly, contemporary psycho-oncology research increasingly recognizes that psychological constructs such as anxiety, depression, fear of recurrence, post-traumatic stress, and work-related adjustment following cancer may manifest differently across sociocultural contexts, reinforcing the necessity of linguistically and culturally adapted instruments.^{6,20,37}

Validation studies in European populations, such as Greek³¹, Italian³⁰, Swedish¹⁵, and Spanish^{21,34,41}, consistently reported Cronbach's α values above 0.80 for both subscales, confirming high internal consistency. In these studies, factor analyses generally supported the original two-factor model. For example, Mystakidou *et al.*³¹ found a clear distinction between anxiety and depression subscales with excellent reliability, while Costantini *et al.*³⁰ similarly confirmed the scale's discriminant validity.

Asian populations have also demonstrated good

Table 2. Psychometric properties of the Hospital Anxiety and Depression Scale in cancer populations

Study (country)	Sample/cancer type	Cronbach's α (HADS-A/ HADS-D)	Sensitivity; specificity	Remarks
Costantini <i>et al.</i> ³⁰ (Italy)	290 multiple cancer types	0.84; 0.81	0.81; 0.74	Confirmed reliability in outpatient oncology
Lloyd-Williams <i>et al.</i> ⁴⁰ (United Kingdom)	194 metastatic cancer	0.78; 0.70	0.75; 0.68	Slight under-detection of depression in advanced illness
Mystakidou <i>et al.</i> ³¹ (Greece)	164 advanced cancer	0.88; 0.84	Not reported	High internal consistency; palliative context
Rodgers <i>et al.</i> ¹⁴ (United Kingdom)	120 breast cancer	0.79; 0.75	0.80; 0.76	Confirms discriminant validity in breast cancer
Mitchell <i>et al.</i> ²² (United Kingdom, meta-analysis)	8,210 multiple cancer types	0.83; 0.82 (average)	0.82; 0.78	Meta-analysis confirms screening accuracy; cut-offs vary by setting
Vodermaier and Millman ²³ (multiple countries; meta-analysis)	7,487 cancer patients	0.80–0.90	0.75–0.85; N/A	Strong diagnostic validity across oncology and palliative settings
Annunziata <i>et al.</i> ¹⁸ (Italy)	512 cancer patients	0.85; 0.83	Not reported	Confirmatory factor analysis supports original model
Yusoff <i>et al.</i> ⁴⁴ (Malaysia)	198 breast cancer caregivers	0.90; 0.86	Not reported	Malay version; high reliability
Saboonchi <i>et al.</i> ¹⁵ (Sweden)	173 breast cancer	0.86; 0.80	0.78; 0.72	Swedish adaptation validated; good construct validity
Terol-Cantero <i>et al.</i> ²¹ (Spain)	385 multiple cancer types	0.89; 0.86	Not reported	Anxiety split into cognitive and autonomic components
Galindo-Vázquez <i>et al.</i> ⁴¹ (Mexico)	300 cancer patients	0.84; 0.80	0.80; 0.76	Mexican Spanish validation; strong internal consistency
Schellekens <i>et al.</i> ¹⁹ (Netherlands)	237 lung cancer patients	0.83; 0.79	0.82; 0.77	Compared with Distress Thermometer; similar accuracy
Hyland <i>et al.</i> ³³ (United States [Latina population])	242 Latina cancer patients	0.87; 0.83	0.81; 0.79	Spanish-language validation in the minority group in the United States
Hajian-Tilaki and Hajian-Tilaki ¹⁷ (Iran)	250 breast cancer survivors	0.82; 0.76	0.77; 0.75	Persian validation; receiver operating characteristic-supported cut-offs
Vilela-Estrada <i>et al.</i> ³⁴ (Spain)	412 cancer patients	0.88; 0.85	0.83; 0.80	Recent Spanish validation; strong factorial stability

Abbreviations: HADS-A: Anxiety subscale of the Hospital Anxiety and Depression Scale; HADS-D: Depression subscale of the Hospital Anxiety and Depression Scale.

psychometric properties. Li *et al.*⁴³ reported Cronbach's α of 0.81 for HADS-A and 0.77 for HADS-D, with satisfactory construct validity. The Persian version in breast cancer survivors similarly showed reliable internal consistency (HADS-A = 0.82; HADS-D = 0.76) and a stable two-factor

structure.¹⁷

Comparing Western and Asian studies, subtle differences emerge in optimal cut-off scores and factor structures. While European studies often use the standard ≥ 8 threshold for each subscale, some Asian studies

Table 3. Clinical utility and identified research gaps

Aspect	Evidence from literature	Interpretation/implications
Screening accuracy	Sensitivity = 0.70–0.89, specificity = 0.67–0.86	The HADS is reliable for identifying anxiety/depression in oncology
Practicality	14-item, self-administered, <5 min	Feasible for routine clinical use
Cross-cultural validity	Validated in Greek, Italian, Persian, Swedish, Spanish, Chinese, Malay	Psychometric properties robust, but cultural adaptation needed
Research gaps	No validated Albanian version of the HADS	Limitation for use in Albanian-speaking populations; need for translation and psychometric validation

Abbreviation: HADS: Hospital Anxiety and Depression Scale.

suggest slight adjustments based on ROC analyses to optimize sensitivity and specificity in culturally distinct populations.^{16,43} These findings underscore the need for population-specific validation to maintain diagnostic accuracy.

4.3. Cancer type and disease stage considerations

The HADS has been applied across various cancer types, including breast cancer, advanced/metastatic disease, and heterogeneous oncology samples. Rodgers *et al.*¹⁴ and Saboonchi *et al.*¹⁵ focused on breast cancer populations, finding high reliability and good sensitivity for identifying clinically significant anxiety and depression. Studies including mixed cancer populations, such as Mitchell *et al.*²² (meta-analysis) and Costantini *et al.*³⁰ (mixed oncology sample), also confirmed the scale's utility across disease stages and treatment settings.

Notably, studies in advanced or metastatic cancer populations, such as Lloyd-Williams *et al.*⁴⁰, suggest that the HADS retains good reliability but may under-detect certain depressive symptoms due to overlap with somatic illness. This highlights the importance of clinical interpretation alongside the HADS scores, particularly in patients with significant physical symptom burden.

4.4. Psychometric comparisons and factor structures

Most studies confirmed the two-factor model (anxiety and depression). However, several studies, such as Annunziata *et al.*¹⁸ and Terol-Cantero *et al.*²¹, have proposed alternative factor structures, including three-factor solutions separating anxiety into “autonomic” and “cognitive” components or combining certain depression items into a single distress factor. These discrepancies often reflect cultural differences in symptom expression and underscore the importance of validating the scale in each population before clinical application.

Meta-analytic evidence, including Mitchell *et al.*²² and Vodermaier and Millman²³, has demonstrated moderate to high diagnostic accuracy, with a pooled sensitivity of approximately 0.82 and a specificity of approximately 0.78 for detecting clinically relevant anxiety and depression. These values highlight that the HADS is effective for screening, but not necessarily for diagnosis, emphasizing the need for follow-up clinical assessment when scores exceed threshold values.

4.5. Clinical utility across populations

The HADS is consistently reported as a brief, self-administered instrument with minimal influence from somatic symptoms, making it highly practical in oncology clinics.^{14,20,33} Cross-cultural studies confirm that the instrument is understood and accepted by patients, facilitating routine psychological assessment. Studies comparing the HADS with other distress measures, such as the Distress Thermometer or Beck inventories, suggest comparable accuracy, with the added advantage of ease of administration in busy clinical settings.^{20,23,51}

4.6. Cross-cultural validation and research gaps

A critical finding of this review is the lack of a validated Albanian version of the HADS. While the scale has been validated in multiple European and Asian populations, this gap limits its use in Albanian-speaking cancer patients, potentially leading to under-recognition of anxiety and depression in this population. Validation of the HADS in Albanian would require translation, cultural adaptation, and psychometric evaluation, including assessment of internal consistency, factor structure, and diagnostic accuracy.

This gap is particularly important given that cultural and linguistic factors can influence how psychological symptoms are expressed and reported. Without a validated

version, clinicians may either misclassify patients' distress or fail to detect significant symptoms altogether, reducing the effectiveness of psychosocial care.

4.7. Theoretical and structural considerations of the Hospital Anxiety and Depression Scale in oncology

Although the two-factor structure of the HADS (anxiety and depression) has been largely supported across oncology settings, recent theoretical work suggests that the dimensionality of the HADS may be more nuanced than originally conceptualized. Lloyd *et al.*²⁰ critically re-examined the structure of the HADS and argued that methodological artifacts, including item wording and correlated error terms, may partly explain variations in factor solutions across studies. Their analysis underscores that discrepancies between one-, two-, or three-factor models may reflect analytic strategies rather than true conceptual divergence.

This observation is particularly relevant to oncology populations, where symptom overlap between psychological distress and cancer-related somatic experiences may influence factor loading patterns.⁵⁴ Studies proposing alternative structures such as bifactor or three-factor models separating autonomic anxiety from generalized distress highlight that psychological constructs are not universally expressed across cultures or disease contexts.^{55,56} Therefore, future validation studies, including an Albanian adaptation, should consider CFA, exploratory structural equation modeling, and possibly bifactor modeling to ensure structural validity beyond simple replication of the original two-factor solution.

4.8. Diagnostic accuracy and screening performance

Meta-analytic data continue to support the screening performance of the HADS in oncology. Mitchell *et al.*²² demonstrated a pooled sensitivity of approximately 0.82 and a specificity of 0.78, reinforcing its utility as a screening rather than diagnostic instrument. These findings are consistent with subsequent systematic reviews in related chronic disease populations, such as the review by Nikolovski *et al.*³² in chronic obstructive pulmonary disease, which confirmed acceptable reliability and diagnostic properties of the HADS across non-oncologic chronic illness samples. Although chronic obstructive pulmonary disease differs clinically from cancer, the cross-condition robustness of the HADS suggests stable measurement of affective symptoms despite medical comorbidity.

However, contemporary oncology research is increasingly exploring predictive and algorithm-based approaches to distress identification. For example, Tian *et*

*al.*⁴⁹ developed a machine-learning-based risk calculator for psychological distress in lung cancer patients. While not directly evaluating the HADS, this study reflects a broader shift toward precision screening and individualized risk prediction. Such advances do not replace validated scales like the HADS but rather highlight the importance of ensuring that foundational tools are psychometrically sound in each linguistic and cultural context before integration into predictive models.

4.9. Cultural adaptation and methodological rigor

Cross-cultural validation extends beyond forward-backward translation and Cronbach's α estimation. Contemporary validation frameworks emphasize comprehensive evaluation using standardized methodologies such as COSMIN criteria. Maheu *et al.*⁶, in their systematic review of fear-of-recurrence measures, demonstrated the importance of evaluating measurement error, responsiveness, structural validity, and cross-cultural invariance when adapting patient-reported outcome measures.

Similarly, Rasch analysis has gained prominence in modern psychometrics. Bakhsh *et al.*⁴ applied Rasch modeling to validate Arabic Patient-Reported Outcomes Measurement Information System anxiety and depression instruments in cancer patients, demonstrating item-level performance and measurement invariance across subgroups. Such approaches may be particularly informative when validating the HADS in new populations, including Albanian cancer patients, where cultural nuances could affect item functioning.

The evolution toward advanced psychometric techniques reinforces that a simple linguistic translation is insufficient. A rigorous Albanian validation would ideally include forward-backward translation, expert panel review, pilot cognitive interviewing, CFA, ROC curve analysis, assessment of measurement invariance, and possibly Rasch modeling. This level of rigor would align the Albanian adaptation with contemporary international standards.

4.10. Comparison with other psycho-oncology instruments

The HADS is situated within a broader ecosystem of psychological assessment tools in oncology. Recent validation studies of other instruments such as the Fear of Progression Questionnaire⁴⁷, the Cancer Behavior Inventory-Brief³⁷, and the Cancer and Work Scale⁵⁰ demonstrate the expanding range of domain-specific psychosocial tools available to clinicians.

These instruments assess constructs related to

but distinct from anxiety and depression, including coping efficacy, employment sustainability, and fear of disease progression. Their development highlights that psychological distress in oncology is multidimensional. Nevertheless, the HADS remains a widely used brief, general screening tool for core affective symptoms.

In contrast to broader distress measures such as the Distress Thermometer, the HADS provides subscale differentiation between anxiety and depression, enabling more tailored psychosocial interventions. However, as noted in comparative analyses of depression scales⁵⁵, careful selection of measurement tools is essential depending on study objectives—screening, diagnostic support, or outcome monitoring.

4.11. Psychological complexity in oncology contexts

Recent research has further elucidated the complexity of psychological responses to cancer. Zhou *et al.*⁵⁷ developed a risk prediction model for post-traumatic stress disorder in breast cancer survivors, emphasizing that anxiety and depression may coexist with trauma-related symptoms. Similarly, Liu *et al.*⁵⁸ demonstrated that negative interpretation bias mediates the relationship between post-traumatic stress symptoms and depression in breast cancer patients.

These findings suggest that the HADS captures essential dimensions of distress but may not fully encompass trauma-related cognitive processes. Nonetheless, its utility as a primary screening instrument remains strong, particularly when followed by comprehensive clinical evaluation.

Additionally, research on specific psychosocial phenomena such as fear of falling in breast cancer survivors³² and psychological impacts of thyroid cancer diagnosis⁵⁸ illustrates how emotional distress manifests differently across cancer types and survivorship phases. These variations reinforce the need for culturally sensitive screening tools capable of accurately capturing symptom severity across diverse clinical contexts.

4.12. Implications for oncology practice in Albania

The findings of this review have direct implications for oncology practice in Albania. Although the HADS has been extensively validated across numerous linguistic and cultural settings, the HADS has not yet been translated into Albanian or psychometrically validated. This absence represents more than a methodological gap; it creates a practical challenge for clinicians who aim to systematically screen for anxiety and depression among Albanian-speaking cancer patients.

In the absence of a validated tool, healthcare

professionals may rely on informal translations or non-standardized assessments, increasing the risk of misinterpretation, under-detection of psychological distress, or inappropriate threshold application. Given that early identification of anxiety and depressive symptoms is associated with improved treatment adherence, quality of life, and overall clinical outcomes, the availability of a culturally adapted and validated screening instrument is essential for comprehensive cancer care.

Developing an Albanian version of the HADS would require a structured translation and cross-cultural adaptation process, including forward-backward translation, expert panel review, pilot testing, and psychometric evaluation within representative oncology samples. Beyond assessing internal consistency and factorial validity, such validation should also include ROC analyses to determine culturally appropriate cut-off scores and ensure diagnostic accuracy. Incorporating contemporary psychometric approaches, such as CFA and measurement invariance testing, would further strengthen the scientific rigor of the adaptation.

Ultimately, establishing a validated Albanian version of the HADS would facilitate standardized psychosocial screening, enable comparability with international research, and support the integration of mental health assessment into routine oncology practice in Albania, aligning national clinical standards with global psycho-oncology recommendations.

5. Strengths, limitations, and future directions

The present narrative review provides a comprehensive synthesis of international evidence supporting the psychometric robustness and clinical applicability of the HADS in cancer populations. A major strength lies in the inclusion of cross-cultural validation studies spanning diverse geographic regions, as well as meta-analytic and methodological investigations examining reliability, factor structure, and diagnostic accuracy. The consistency of internal reliability across multiple cancer types and healthcare settings reinforces the stability of the HADS as a screening instrument.

Nevertheless, several limitations should be acknowledged. A substantial proportion of the psychometric evidence derives from studies conducted between the late 1990s and early 2010s.^{22,30,31} Although these studies remain methodologically robust and widely cited, reliance on older validation data represents a recognized limitation in psychometric evaluation. Recent methodological literature emphasizes the importance of continuous re-validation of patient-reported outcome measures to account for

evolving clinical contexts, treatment paradigms, and cultural shifts.^{5,50} This concern has also been highlighted in contemporary reviews, which note that older instruments may require reassessment to confirm ongoing validity in modern oncology populations.³²

Additionally, the majority of included studies are cross-sectional, limiting conclusions regarding longitudinal responsiveness and sensitivity to change during cancer treatment and survivorship. Recent research further identifies this as a limitation in distress screening tools, emphasizing the need for longitudinal validation designs to assess responsiveness over time.⁵⁵

Heterogeneity across studies in terms of sample characteristics, cancer types, disease stages, and cultural contexts contributes to variability in reported psychometric outcomes, including optimal cut-off scores and factor structures. Such variability has been consistently identified in both earlier meta-analyses²² and more recent cross-cultural validation studies⁴, reinforcing the importance of population-specific validation. Although many studies report internal consistency and construct validity, fewer investigations perform comprehensive assessments of measurement invariance, test-retest reliability, and responsiveness, which are now considered essential components of modern psychometric evaluation according to COSMIN standards.⁵ This gap has been reiterated in recent systematic reviews of patient-reported outcome measures in oncology.⁵⁰

A key geographic limitation is the absence of validated HADS versions in certain linguistic and cultural contexts, particularly in Albanian-speaking populations. This gap reflects a broader issue in psycho-oncology research, where underrepresented regions remain insufficiently studied, limiting the generalizability and equitable application of screening tools.^{59–61} Future research should therefore prioritize rigorous cross-cultural validation studies in underrepresented populations, including the incorporation of advanced psychometric methods (e.g., CFA, Rasch modeling), longitudinal designs to assess responsiveness, and the evaluation of measurement invariance across demographic and clinical subgroups.

Addressing these limitations will enhance the global applicability of the HADS and support more equitable and culturally sensitive psychosocial care in oncology.

6. Conclusion

This structured narrative review synthesizes the existing evidence on the psychometric properties, factor structure, and clinical utility of the HADS in cancer populations. The findings consistently demonstrate that the HADS is a

reliable and valid screening instrument, with stable internal consistency, a broadly supported factor structure, and acceptable diagnostic performance across diverse cancer settings and cultural contexts. Despite the predominance of earlier validation studies, contemporary research continues to support its applicability in clinical practice.

However, several gaps remain. Notably, the absence of a psychometrically validated Albanian version of the HADS highlights a significant limitation in the equitable application of psychological screening tools in underrepresented populations. This gap reflects broader challenges in psycho-oncology, where cultural adaptation and validation of patient-reported outcome measures are essential to ensure accurate assessment and appropriate clinical decision-making.

This review provides a strong methodological and empirical foundation for the future translation, cultural adaptation, and validation of the HADS in Albanian-speaking cancer populations. Such efforts are essential to support standardized distress screening, facilitate the integration of psychosocial care into oncology services, and contribute to evidence-based healthcare planning in the region.

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References

- Bray F, Laversanne M, Sung H, *et al.* Global cancer statistics 2022: GLOBOCAN estimates of incidence and mortality worldwide for 36 cancers in 185 countries. *CA A Cancer J Clinicians.* 2024;74(3):229-263.
doi: 10.3322/caac.21834
- Vaccarella S, Georges D, Bray F, *et al.* Socioeconomic inequalities in cancer mortality between and within countries in Europe: a population-based study. *Lancet Reg Health Eur.* 2023;25:100551.
doi: 10.1016/j.lanepe.2022.100551
- Riba MB, Donovan KA, Ahmed K, *et al.* NCCN Guidelines® Insights: Distress Management, Version 2.2023. *J Natl Compr Canc Netw.* 2023;21(5):450-457.
doi: 10.6004/jnccn.2023.0026
- Bakhsh HR, Bin Sheeha B, Tesio L, *et al.* Validity of the Arabic Version of the PROMIS Anxiety and PROMIS Depression in Cancer Questionnaires: Measuring Depression and Anxiety in Oncologic Patients in Saudi Arabia-A Rasch Analysis Study. *J Clin Med.* 2025;14(24):8774.
doi: 10.3390/jcm14248774
- Prinsen CAC, Mokkink LB, Bouter LM, *et al.* COSMIN guideline for systematic reviews of patient-reported outcome measures. *Qual Life Res.* 2018;27(5):1147-1157.
doi: 10.1007/s11136-018-1798-3
- Maheu C, Tock WL, Fisher P, *et al.* Systematic Review of Fear of Cancer Recurrence Patient-Reported Outcome Measures: Evaluating Methodological Quality and Measurement Properties Using the COSMIN Checklist. *Healthcare.* 2025;13(17):2165.
doi: 10.3390/healthcare13172165
- Page MJ, McKenzie JE, Bossuyt PM, *et al.* Updating guidance for reporting systematic reviews: development of the PRISMA 2020 statement. *J Clin Epidemiol.* 2021;134:103-112.
doi: 10.1016/j.jclinepi.2021.02.003
- Hansson E, Wessman C, Paganini A. Creating a standard for evaluation of symptoms of depression and anxiety in women undergoing reduction mammoplasty: validation and reliability of HADS. *BMC Plast Reconstr Surg.* 2025;1(1).
doi: 10.1186/s44452-025-00001-9
- Zigmond AS, Snaith RP. The hospital anxiety and depression scale. *Acta Psychiatr Scand.* 1983;67(6):361-70.
doi: 10.1111/j.1600-0447.1983.tb09716.x
- Upadhyay K, Tamrakar RK, Kumar S, *et al.* Psycho-oncology: Bridging mental health and cancer care in modern medicine. *Arch Psychiatr Nurs.* 2026;60:152024.
doi: 10.1016/j.apnu.2025.152024
- Marano G, Paris I, Traversi G, *et al.* Modern Personalized Strategies for Breast Cancer Treatment: Bridging Precision Oncology and Psycho-Oncology. *J Clin Med.* 2026;15(4):1574.
doi: 10.3390/jcm15041574
- Perna G, Pinto E, Spiti A, *et al.* Foundations for a Personalized Psycho-Oncology: The State of the Art. *J Pers Med.* 2024;14(9):892.
doi: 10.3390/jpm14090892
- Hou J, Meng Y, Zhang L, *et al.* Anxiety in breast cancer research (1982–2024): a bibliometric analysis. *Clin Transl Oncol.* 2025;28(5):1637-1651.
doi: 10.1007/s12094-025-04115-5
- Rodgers J, Martin CR, Morse RC, *et al.* An investigation into the psychometric properties of the Hospital Anxiety and Depression Scale in patients with breast cancer. *Health Qual Life Outcomes.* 2005;3(1).
doi: 10.1186/1477-7525-3-41
- Saboonchi F, Wennman-Larsen A, Alexanderson K, *et al.* Examination of the construct validity of the Swedish version of the Hospital Anxiety and Depression Scale in breast cancer patients. *Qual Life Res.* 2013;22(10):2849-2856.
doi: 10.1007/s11136-013-0407-8
- Osborne RH, Elsworth GR, Sprangers MAG, *et al.* The value of the Hospital Anxiety and Depression Scale for comparing women with early-onset breast cancer with population-based reference women. *Qual Life Res.* 2004;13(1):191-206.
doi: 10.1023/B:QURE.0000015292.56268.e7
- Hajian-Tilaki K, Hajian-Tilaki E. Factor structure and reliability of the Persian version of the Hospital Anxiety and Depression Scale in patients with breast cancer survivors. *Health Qual Life Outcomes.* 2020;18(1).
doi: 10.1186/s12955-020-01429-6
- Annuziata MA, Muzzatti B, Altoè G. Defining Hospital Anxiety and Depression Scale structure by confirmatory factor analysis: a contribution to validation for oncological settings. *Ann Oncol.* 2011;22(10):2330-2333.
doi: 10.1093/annonc/mdq750
- Schellekens MPJ, van den Hurk DGM, Prins JB, *et al.* The suitability of the Hospital Anxiety and Depression Scale, Distress Thermometer and other instruments to screen for psychiatric disorders in lung cancer patients and their partners. *J Affect Disord.* 2016;203:176-183.
doi: 10.1016/j.jad.2016.05.044
- Lloyd M, Sugden N, Thomas M, *et al.* The structure of the Hospital Anxiety and Depression Scale: Theoretical and methodological considerations. *Br J Psychol.* 2023;114(2):457-475.

- doi: 10.1111/bjop.12637
21. Terol-Cantero MC, Cabrera-Perona V, Martín-Aragón M. Revisión de estudios de la Escala de Ansiedad y Depresión Hospitalaria (HAD) en muestras españolas [Hospital Anxiety and Depression Scale (HADS) review in Spanish Sample]. *An Psicol*. 2015;31(2):494. [In Spanish].
doi: 10.6018/analesps.31.2.172701
 22. Mitchell AJ, Meader N, Symonds P. Diagnostic validity of the Hospital Anxiety and Depression Scale (HADS) in cancer and palliative settings: A meta-analysis. *J Affect Disord*. 2010;126(3):335-348.
doi: 10.1016/j.jad.2010.01.067
 23. Vodermaier A, Millman RD. Accuracy of the Hospital Anxiety and Depression Scale as a screening tool in cancer patients: a systematic review and meta-analysis. *Support Care Cancer*. 2011;19(12):1899-1908.
doi: 10.1007/s00520-011-1251-4
 24. Annunziata MA, Muzzatti B, Bidoli E, et al. Hospital Anxiety and Depression Scale (HADS) accuracy in cancer patients. *Support Care Cancer*. 2020;28(8):3921-3926.
doi: 10.1007/s00520-019-05244-8
 25. Mitchell AJ, Chan M, Bhatti H, et al. Prevalence of depression, anxiety, and adjustment disorder in oncological, haematological, and palliative-care settings: a meta-analysis of 94 interview-based studies. *Lancet Oncol*. 2011;12(2):160-174.
doi: 10.1016/S1470-2045(11)70002-X
 26. Franco A, Anees W, Moreira D, et al. Literature reviews: typology and forensic applications. *Int J Legal Med*. 2025;139(5):2503-2517.
doi: 10.1007/s00414-025-03514-1
 27. Baethge C, Goldbeck-Wood S, Mertens S. SANRA—a scale for the quality assessment of narrative review articles. *Res Integr Peer Rev*. 2019;4(1).
doi: 10.1186/s41073-019-0064-8
 28. Rana K, Poudel P, Chimoriya R. Qualitative Methodology in Translational Health Research: Current Practices and Future Directions. *Healthcare*. 2023;11(19):2665.
doi: 10.3390/healthcare11192665
 29. Theile CM, Beall AL. Narrative Reviews of the Literature: An overview. *J Dent Hyg*. 2024;98(1):78-82
 30. Costantini M, Musso M, Viterbori P, et al. Detecting psychological distress in cancer patients: validity of the Italian version of the Hospital Anxiety and Depression Scale. *Support Care Cancer*. 1999;7(3):121-127.
doi: 10.1007/s005200050241
 31. Mystakidou K, Tsilika E, Parpa E, et al. The Hospital Anxiety and Depression Scale in Greek cancer patients: psychometric analyses and applicability. *Support Care Cancer*. 2004;12(12):821-825.
doi: 10.1007/s00520-004-0698-y
 32. Nikolovski A, Gamgoum L, Deol A, et al. Psychometric properties of the Hospital Anxiety and Depression Scale (HADS) in individuals with stable chronic obstructive pulmonary disease (COPD): a systematic review. *Disabil Rehabil*. 2024;46(7):1230-1238.
doi: 10.1080/09638288.2023.2182918
 33. Hyland KA, Hoogland AI, Gonzalez BD, et al. Evaluation of the psychometric and structural properties of the Spanish version of the Hospital Anxiety and Depression Scale in Latina cancer patients. *J Pain Symptom Manag*. 2019;58(2):289-296.e2.
doi: 10.1016/j.jpainsymman.2019.05.003
 34. Vilela-Estrada AL, Villarreal-Zegarra D, Copez-Lonzoy A, et al. Psychometric properties of the Spanish version of the Hospital Anxiety and Depression Scale in cancer patients. *Front Psychol*. 2025;15.
doi: 10.3389/fpsyg.2024.1497946
 35. Beaton DE, Bombardier C, Guillemin F, et al. Guidelines for the process of cross-cultural adaptation of self-report measures. *Spine*. 2000;25(24):3186-3191.
doi: 10.1097/00007632-200012150-00014
 36. Hobbs C, Lewis G, Dowrick C, et al. Comparison between self-administered depression questionnaires and patients' own views of changes in their mood: a prospective cohort study in primary care. *Psychol Med*. 2021;51(5):853-860.
doi: 10.1017/S0033291719003878
 37. Pimenta CJ, Bezerra TA, Silva CR, et al. Evidence of validity of the Brazilian version of the Cancer Behavior Inventory - Brief Version. *Rev Gaucha Enferm*. 2024;45.
doi: 10.1590/1983-1447.2024.20230107.en
 38. Murari J, Sharma I, Atwal SA, et al. Understanding cancer-related pain: pathophysiology, classification, and treatment modalities. *Cureus*. 2025;17(9).
doi: 10.7759/cureus.91395
 39. Wang M, Han B, Liu Y, et al. Effects of posttraumatic stress symptoms on anxiety and depression in breast cancer patients. *BMC Psychol*. 2025;14(1).
doi: 10.1186/s40359-025-03741-6
 40. Lloyd-Williams M, Friedman T, Rudd N. An analysis of the validity of the Hospital Anxiety and Depression Scale as a screening tool in patients with advanced metastatic cancer. *J Pain Symptom Manag*. 2001;22(6):990-996.
doi: 10.1016/S0885-3924(01)00358-X
 41. Galindo O, Benjet C, Juárez García F, et al. ropiedades psicométricas de la Escala Hospitalaria de Ansiedad

- y Depresión (HADS) en una población de pacientes oncológicos mexicanos [Psychometric properties of the Hospital Anxiety and Depression Scale in a Mexican oncological population]. *Salud Ment.* 2015;38(4):253-258. [In Spanish]
doi: 10.17711/sm.0185-3325.2015.035
42. Villoria E, Lara L. Assessment of the Hospital Anxiety and Depression Scale for cancer patients. *Rev Med Chil.* 2018;146(3):300-307.
doi: 10.4067/s0034-98872018000300300
43. Li Q, Lin Y, Hu C, *et al.* Psychometric properties of the Chinese version of the Hospital Anxiety and Depression Scale in cancer patients and their family caregivers. *Eur J Oncol Nurs.* 2016;25:16-23.
doi: 10.1016/j.ejon.2016.09.004
44. Yusoff N, Low WY, Yip CH. Psychometric properties of the Malay version of the Hospital Anxiety and Depression Scale: a study of husbands of breast cancer patients in Kuala Lumpur, Malaysia. *Asian Pac J Cancer Prev.* 2011;12(4):915-917
45. Ramírez Orozco M, Vázquez OG, Bargalló Rocha JE, *et al.* Propiedades psicométricas de la Escala Hospitalaria de Ansiedad y Depresión (HADS) en sobrevivientes de cáncer de mama mexicanas [Psychometric properties of the Hospital Anxiety and Depression Scale (HADS) in Mexican breast cancer survivors]. *Psicol Salud.* 2022;32(2):313-324. [In Spanish]
doi: 10.25009/pys.v32i2.2752
46. Akuratiyage LY, De Silva P, Dissanayake U, *et al.* Cultural validation of the Sinhala version of the hospital anxiety and depression scale (HADS-S) in Sri Lanka. *Sri Lanka J Psychiatry.* 2025;16(1):27-33.
doi: 10.4038/slpsyc.v16i1.8616
47. Şahin G, Yuksel HC, Acar C, *et al.* Assessment of the fear of progression in Turkish cancer patients: a validation and reliability study fear of progression questionnaire short form. *BMC Psychol.* 2025;13(1).
doi: 10.1186/s40359-025-02650-y
48. Park H, Kim KE, Moon E, *et al.* Psychometric properties of assessment tools for depression, anxiety, distress, and psychological problems in breast cancer patients: a systematic review. *Psychiatry Investig.* 2023;20(5):395-407.
doi: 10.30773/pi.2022.0316
49. Tian X, Li H, Li F, *et al.* Development and validation of a web-based calculator for determining the risk of psychological distress based on machine learning algorithms: A cross-sectional study of 342 lung cancer patients. *Support Care Cancer.* 2024;33(1).
doi: 10.1007/s00520-024-09127-5
50. Maheu C, Singh M, Tock WL, *et al.* The Cancer and Work Scale (CAWSE): Assessing Return to Work Likelihood and Employment Sustainability After Cancer. *Curr Oncol.* 2025;32(3):166.
doi: 10.3390/curroncol32030166
51. Luckett T, Butow PN, King MT, *et al.* A review and recommendations for optimal outcome measures of anxiety, depression and general distress in studies evaluating psychosocial interventions for adults with cancer. *Support Care Cancer.* 2010;18(10):1241-1262.
doi: 10.1007/s00520-010-0932-8
52. Miraglia Raineri A, Lauro Grotto R, Fioravanti G, *et al.* Assessing psychological needs in female cancer patients: a tailored model. *Acta Biomed.* 2021;92(S2):e2021005.
doi: 10.23750/abm.v92iS2.11284
53. Aburub A, Al-Sharman A, Hijazi H. Exploring Factors Associated with Fear of Falling among Women with Breast Cancer: Findings from a Cross-Sectional Study. *Asian Pac J Cancer Prev.* 2025;26(11):3967-3974.
doi: 10.31557/APJCP.2025.26.11.3967
54. Horan MR, Sim JA, Krull KR, *et al.* A Review of Patient-Reported Outcome Measures in Childhood Cancer. *Children.* 2022;9(10):1497.
doi: 10.3390/children9101497
55. Perez NB, Sierra PG, Taylor B, *et al.* Selecting a depression measure for research: A critical examination of five common self-report scales. *J Affect Disord.* 2026;394:120542.
doi: 10.1016/j.jad.2025.120542
56. Lemos R, Costa B, Frasilheiro D, *et al.* Cross-cultural adaptation and psychometric evaluation of the perceived ability to cope with trauma scale in Portuguese patients with breast cancer. *Front Psychol.* 2022;13.
doi: 10.3389/fpsyg.2022.800285
57. Zhou B, Kang J, Zhao L, *et al.* Development and validation of a risk prediction model for post-traumatic stress disorder among Chinese breast cancer survivors. *Sci Rep.* 2025;15(1).
doi: 10.1038/s41598-025-92137-y
58. Liu X, Shi J, Gu H, *et al.* Psychological impacts of thyroid cancer diagnosis and treatment-a retrospective study. *Front Psychol.* 2025;16.
doi: 10.3389/fpsyg.2025.1697978
59. Knaul FM, Arreola-Ornelas H, Kwete XJ, *et al.* The evolution of serious health-related suffering from 1990 to 2021: an update to The Lancet Commission on global access to palliative care and pain relief. *Lancet Glob Health.* 2025;13(3):e422-e436.
doi: 10.1016/S2214-109X(24)00476-5
60. Bray F, Laversanne M, Sung H, *et al.* Global cancer statistics

2022: GLOBOCAN estimates of incidence and mortality worldwide for 36 cancers in 185 countries. *CA Cancer J Clin.* 2024;74(3):229-263.

doi: 10.3322/caac.21834

61. Liu Y, Zheng Z. Understanding the global cancer statistics 2022: growing cancer burden. *Sci China Life Sci.* 2024;67(10):2274-2276.

doi: 10.1007/s11427-024-2657-y