

Psychological distress in cancer patients receiving radiation therapy - A systematic review

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Abstract

Background: Psychological distress is a frequent but often under-recognized consequence of cancer diagnosis and treatment. Patients undergoing radiotherapy are particularly vulnerable due to treatment-related toxicities, prolonged treatment duration, and psychosocial challenges. This systematic review aimed to synthesize the available evidence on the prevalence, temporal pattern, and factors associated with psychological distress among adult cancer patients receiving radiotherapy.

Materials and Methods: A systematic review was conducted in accordance with the PRISMA 2020 guidelines. Electronic databases, including Pub Med/ MEDLINE, Scopus, Web of Science, and Google Scholar, were searched up to March 2026. Original

studies involving adult cancer patients receiving radiotherapy and assessing psychological distress using validated instruments were included. Two reviewers independently screened studies, extracted data, and assessed methodological quality using the Joanna Briggs Institute (JBI) Critical Appraisal Checklists. Owing to methodological heterogeneity, a narrative synthesis was performed.

Results: Ten original studies involving patients with head and neck, breast, esophageal, rectal, and other malignancies were included. Sample sizes ranged from 30 to 1,042 participants. The Distress Thermometer, Hospital Anxiety and Depression Scale, Depression Anxiety Stress Scale, and other validated instruments were commonly used to assess psychological outcomes. Psychological distress, anxiety, and depression were

consistently reported across studies, with several longitudinal studies demonstrating increased distress during active radiotherapy and partial improvement following treatment completion. Head and neck cancer patients experienced particularly high levels of distress. Frequently reported predictors included treatment-related toxicities such as mucositis, pain, fatigue, sleep disturbances, reduced quality of life, lower educational status, financial concerns, limited social support, and female gender. The methodological quality of the included studies was generally satisfactory, with an overall low to moderate risk of bias.

Conclusion: Psychological distress is highly prevalent among patients undergoing radiotherapy and is influenced by both treatment-related and psychosocial factors. Routine distress screening using validated assessment tools and timely psychosocial interventions should be incorporated into standard radiotherapy practice to facilitate early identification and management of distress, ultimately improving patient well-being and treatment outcomes.

Keywords: Psychological Distress, Radiotherapy, Cancer, Anxiety, Depression, Systematic Review.

Introduction

Cancer continues to represent a major global health challenge and is one of the leading causes of mortality worldwide. Advances in screening, diagnosis, and treatment have resulted in improved survival rates for many malignancies, leading to an increasing number of patients living with cancer and undergoing prolonged treatment. Among the available treatment modalities, radiotherapy remains a cornerstone of cancer management and contributes significantly to both curative and palliative treatment strategies. It has been estimated that approximately half of all cancer patients

will require radiotherapy at some stage during the course of their disease.^{1,2}

Although radiotherapy plays a crucial role in disease control and survival, the experience of undergoing treatment can be psychologically demanding. Patients frequently face uncertainty regarding treatment outcomes, fear of disease progression, concerns about adverse effects, disruption of daily activities, financial burden, and changes in social and family roles. These challenges may contribute to substantial emotional suffering throughout the treatment journey.³ Psychological distress has therefore emerged as an important component of comprehensive cancer care and is increasingly recognized as a determinant of treatment adherence, patient satisfaction, symptom burden, and overall quality of life.⁴

The National Comprehensive Cancer Network defines distress as a multifactorial unpleasant emotional experience that may include psychological, social, spiritual, and physical dimensions. Distress exists along a continuum ranging from common feelings of vulnerability and sadness to disabling conditions such as anxiety, depression, panic, and existential crisis.⁵ Because of its significant impact on clinical outcomes, psychological distress has been described as the “sixth vital sign” in oncology practice.⁶

Several international organizations have emphasized the importance of routine distress screening and psychosocial assessment as an integral component of cancer management. Despite these recommendations, psychological distress often remains under-recognized and undertreated in routine oncology settings.^{7,8}

Patients receiving radiotherapy may be particularly vulnerable because treatment is delivered over several weeks and is frequently accompanied by physical

symptoms that can adversely affect emotional well-being. However, the prevalence, severity, and determinants of psychological distress reported across studies vary considerably. Therefore, a systematic review was undertaken to synthesize the available evidence regarding psychological distress among cancer patients receiving radiotherapy and to identify factors associated with increased psychological burden during treatment.

Materials and Methods

A systematic review was conducted to evaluate psychological distress among adult cancer patients undergoing radiotherapy. The review was performed in accordance with the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA 2020) guidelines.

The review question was developed using the Population, Intervention/ Exposure, Comparison, Outcome (PICO) framework, where the population comprised adult cancer patients receiving radiotherapy, the exposure was radiotherapy with or without concurrent chemotherapy, and the outcomes included psychological distress, anxiety, depression, stress, emotional distress, and related psychosocial outcomes.

A comprehensive literature search was performed in Pub Med/ MEDLINE, Scopus, Web of Science, and Google Scholar for studies published up to March 2026. Additional relevant studies were identified through manual screening of the reference lists of eligible articles. The search strategy combined Medical Subject Headings (MeSH) and free-text keywords using Boolean operators (AND/OR). Keywords included combinations of cancer, neoplasm, malignancy, radiotherapy, radiation therapy, chemo radiotherapy, psychological distress, anxiety, depression, stress, emotional distress, and

Distress Thermometer. The search strategy was adapted according to the indexing system of each database.

Studies were eligible if they included adults (≥ 18 years) diagnosed with any type of cancer and receiving radiotherapy, either alone or in combination with chemotherapy. Only original research articles, including cross-sectional, prospective observational, cohort, and longitudinal studies, were considered. Studies were required to assess psychological distress or related psychological outcomes using validated instruments such as the Distress Thermometer (DT), Hospital Anxiety and Depression Scale (HADS), Depression Anxiety Stress Scale (DASS), Patient Health Questionnaire (PHQ), Generalized Anxiety Disorder (GAD) scale, or equivalent standardized measures. Only full-text articles published in English were included.

Systematic reviews, meta-analyses, narrative reviews, editorials, conference abstracts, letters to the editor, case reports, qualitative studies, studies involving pediatric or non-cancer populations, and studies evaluating patients receiving surgery or chemotherapy without a radiotherapy cohort were excluded. Studies that did not assess psychological distress using validated instruments or reported insufficient outcome data were also excluded. All retrieved records were imported into a reference management database, and duplicate records were removed. Two reviewers independently screened titles and abstracts, followed by full-text assessment of potentially eligible studies. Disagreements were resolved through discussion and consensus. The study selection process was documented using a PRISMA flow diagram. Data were extracted independently by two reviewers using a standardized data extraction form. Extracted information included author, year of publication, country, study design, sample size, cancer type,

radiotherapy modality, psychological assessment instrument, timing of assessment, prevalence of psychological distress, associated risk factors, and principal findings. The primary outcome was psychological distress among patients undergoing radiotherapy. Secondary outcomes included anxiety, depression, stress, psychosocial well-being, temporal changes in distress during treatment, and factors associated with increased psychological morbidity.

Methodological quality was assessed using the Joanna Briggs Institute (JBI) Critical Appraisal Checklists appropriate for each study design. Studies were evaluated for participant selection, validity of outcome measurement, management of confounding factors, completeness of follow-up, and appropriateness of statistical analysis. Based on the overall appraisal, studies were categorized as having low, moderate, or high risk of bias.

Because of considerable heterogeneity in study designs, cancer types, psychological assessment tools, and reported outcomes, a meta-analysis was not performed. Instead, a descriptive narrative synthesis was undertaken, summarizing the prevalence of

psychological distress, anxiety and depression during radiotherapy, temporal changes in distress, and factors associated with increased psychological burden.

Results

Ten original studies were included in the qualitative synthesis. The included studies were conducted across North America, Europe, Asia and the Middle East, and comprised prospective, longitudinal, observational and cross-sectional designs. The sample sizes ranged from 30 to 1042 patients. Most studies assessed psychological outcomes using validated tools such as the Distress Thermometer, HADS, DASS, STAI-Y1 and BDI-II.

Psychological distress, anxiety or depression was consistently reported among patients receiving radiotherapy, with several studies showing worsening distress during active treatment and partial improvement after completion of radiotherapy. Head and neck cancer patients appeared particularly vulnerable, especially in studies assessing patients longitudinally during treatment. Commonly reported associated factors included treatment-related toxicities, pain, mucositis, fatigue, sleep disturbance, lower quality of life, financial concerns, lower social support and female gender.

Table 1: Characteristics of included studies

Author	Country	Design	Cancer type	Sample size	Tool used	Assessment timing
Chen et al[9]	USA	Prospective observational	Head and neck cancer	40	HADS	Before, during and after radiotherapy
Lewis et al[10]	India	Prospective observational	Head and neck cancer	30	Distress Thermometer	Weekly during radiotherapy
Mackenzie et al[11]	Australia	Cross-sectional survey	Mixed cancer outpatients receiving RT	454	HADS	During RT treatment visit
Badr et al[12]	USA	Longitudinal study	Head and neck cancer	49	Distress Thermometer	Weekly during RT
Almigbal et al[13]	Saudi	Cross-sectional	Mixed cancers	148	HADS	During RT

	Arabia	study	receiving RT			
Mungase et al[14]	India	Cross-sectional observational	Mixed cancers receiving RT	100	DASS, CD-RISC	During RT
Nardone et al[15]	Italy	Prospective comparative observational	Mixed cancers receiving RT	458	STAI-Y1, SDT, BDI-II	During RT; pre-COVID vs COVID period
Piroth et al[16]	Germany	Monocentric observational	Breast cancer	NR	Anxiety/depression scales	Before, during and completion of RT
Fabian et al [17]	Germany	Prospective national cohort	Mixed cancers receiving RT	1042	Distress Thermometer	End of RT
Park et al[18]	South Korea	Prospective cohort	Esophageal, head and neck, rectal cancers	100	NCCN-DT, EORTC QLQ	Pre-RT, weeks 2/4/6, 1 month post-RT

Table 2: Outcome extraction table

Author, year	Main outcomes	Reported prevalence / key findings	Associated factors
Chen et al [9]	Anxiety/depression during HNC RT	Distress increased during RT and improved after treatment	Treatment-related symptoms and functional impairment
Lewis et al [10]	Distress during HNC RT	Distress increased progressively during RT	Mucositis, pain, skin reaction, nutrition-related concerns
Mackenzie et al [11]	Anxiety, depression, total distress	Anxiety 15%, depression 5.7%, overall distress 22%	Cancer type associated with HADS categories
Badr et al [12]	Distress in patients/caregivers during HNC RT	Distress increased during later weeks of RT	Symptom severity, caregiver distress, treatment burden
Almigbal et al [13]	Psychological distress in RT patients	Psychological distress was common among RT patients	Demographic and clinical factors including social concerns
Mungase et al [14]	Depression, anxiety, stress, resilience	Depression 24%, anxiety 25%, stress 5%	Female sex associated with higher DASS scores; resilience negatively correlated
Nardone et al [15]	Anxiety, distress, depression	Median SDT score 5; mood scores worse during COVID-19 period	COVID period, female sex, week of RT and disease site
Piroth et al [16]	Anxiety and depression in	Anxiety highest immediately	Chronic disease history, low

	breast RT	before RT and lowest at treatment completion	social support, intelligence/life history factors
Fabian et al [17]	Psychosocial distress	63% had distress at end of RT	Lower education, financial concerns, lower QoL, treatment burden
Park et al [18]	Distress and QoL dynamics	Marked distress: 33% pre-RT, 67% at weeks 2 and 4; QoL temporarily decreased	Sleep disturbance, fatigue, worry/anxiety, pain

Table 3: Risk of bias assessment

Author, year	Selection bias	Outcome measurement	Confounding	Statistical analysis	Overall risk
Chen et al [9]	Moderate	Low	Moderate	Low	Moderate
Lewis et al [10]	Moderate	Low	Moderate	Low	Moderate
Mackenzie et al [11]	Low	Low	Moderate	Low	Low–Moderate
Badr et al [12]	Moderate	Low	Moderate	Low	Moderate
Almigbal et al [13]	Moderate	Low	Moderate	Low	Moderate
Mungase et al [14]	Moderate	Low	Moderate	Low	Moderate
Nardone et al [15]	Low	Low	Moderate	Low	Low–Moderate
Piroth et al [16]	Moderate	Low	Moderate	Low	Moderate
Fabian et al [17]	Low	Low	Low	Low	Low
Park et al [18]	Low	Low	Low	Low	Low

Risk of Bias Assessment

The methodological quality of the included studies was assessed using the Joanna Briggs Institute (JBI) Critical Appraisal Checklist appropriate to each study design. Overall, the included studies demonstrated low to moderate risk of bias. Three prospective cohort studies were judged to have a low risk of bias, while the remaining studies showed moderate risk of bias, primarily due to potential selection bias and inadequate control of confounding variables. All studies employed validated psychological assessment instruments and appropriate statistical analyses, supporting the overall

methodological quality of the evidence included in this review.

Discussion

The present systematic review synthesized evidence from ten original studies evaluating psychological distress among cancer patients undergoing radiotherapy. Across different cancer types and healthcare settings, psychological distress emerged as a common concern, with several studies reporting increasing levels of distress during active treatment and partial improvement following completion of radiotherapy. These findings reinforce the importance of integrating psychosocial

assessment into routine oncological care for patients receiving radiotherapy.

Head and neck cancer patients consistently demonstrated higher levels of psychological distress than patients with other malignancies. Prospective studies by Chen et al. and Lewis et al. reported progressive increases in distress during the course of radiotherapy, largely attributable to treatment-related toxicities such as mucositis, pain, dysphagia, skin reactions, and functional impairment, which substantially affected patients' quality of life.^{9,10}

Similarly, Badr et al. observed that psychological distress increased during the later weeks of radiotherapy and was closely associated with symptom burden and caregiver distress, highlighting the cumulative emotional impact of prolonged treatment.¹²

Studies involving mixed cancer populations also demonstrated a considerable prevalence of anxiety, depression, and overall psychological distress during radiotherapy. Mackenzie et al. reported that approximately one-fifth of patients experienced clinically significant distress, while Almigbal et al. similarly identified psychological distress as a frequent finding among patients undergoing radiotherapy.^{11,13}

These observations indicate that emotional distress is not restricted to a particular cancer type but represents a common challenge across oncological populations.

Several studies consistently identified factors associated with increased psychological distress. Treatment-related symptoms, including fatigue, pain, mucositis, and sleep disturbance, were among the most frequently reported contributors.^{9,10,18} In addition, lower educational status, financial concerns, impaired quality of life, and limited social support were associated with greater distress, emphasizing the influence of socioeconomic and

psychosocial factors on patients' emotional well-being.^{13,17} Female gender was also associated with higher anxiety and depression scores in some studies.^{14,15}

The longitudinal studies included in this review demonstrated that psychological distress is dynamic throughout the treatment trajectory. Park et al. observed marked increases in distress during the second and fourth weeks of radiotherapy, accompanied by temporary deterioration in quality of life, followed by partial recovery after treatment completion.¹⁸

Likewise, Chen et al. reported improvement in distress following radiotherapy, suggesting that emotional burden may lessen once acute treatment-related symptoms resolve.⁹ These findings support the need for repeated psychological assessment rather than a single baseline evaluation.

The methodological quality of the included studies was generally satisfactory, with an overall low to moderate risk of bias. Most studies employed prospective or observational designs and utilized validated assessment instruments such as the Distress Thermometer, Hospital Anxiety and Depression Scale, Depression Anxiety Stress Scale, and other standardized measures, thereby strengthening the reliability of the reported findings. Although heterogeneity in cancer types, study designs, and assessment tools limited direct comparison across studies, the consistency of results highlights psychological distress as an important and prevalent consequence of radiotherapy.

Overall, this review demonstrates that psychological distress is highly prevalent among patients receiving radiotherapy and is influenced by both treatment-related and psychosocial factors. Routine distress screening using validated instruments and timely psychosocial interventions should be considered integral components

of comprehensive cancer care to improve patients' emotional well-being and overall treatment experience.

Conclusion

Psychological distress is a common and clinically significant problem among patients undergoing radiotherapy, particularly in those with head and neck cancer. The evidence synthesized in this systematic review indicates that distress often increases during active treatment and is influenced by treatment-related toxicities, physical symptoms, and psychosocial factors such as financial concerns, reduced social support, and impaired quality of life.

Routine screening using validated distress assessment tools, together with timely psychosocial support and multidisciplinary interventions, should be incorporated into standard radiotherapy care to facilitate early identification and management of distress, thereby improving patient well-being and overall treatment outcomes.

References

1. Sung H, Ferlay J, Siegel RL, Laversanne M, Soerjomataram I, Jemal A, Bray F. Global cancer statistics 2020: GLOBOCAN estimates of incidence and mortality worldwide for 36 cancers in 185 countries. *CA Cancer J Clin.* 2021; 71(3):209-249.
2. Barton MB, Jacob S, Shafiq J, Wong K, Thompson SR, Hanna TP, Delaney GP. Estimating the demand for radiotherapy from the evidence: a review of changes from 2003 to 2012. *Radi other Oncol.* 2014; 112(1):140-144.
3. Stanton AL. Psychosocial concerns and interventions for cancer survivors. *J Clin Oncol.* 2006; 24(32):5132-5137.
4. Carlson LE, Zelinski EL, Toivonen KI, Sundstrom L, Jobin CT, Damaskos P, Zebrack B. Prevalence of psychosocial distress in cancer patients across 55 North American cancer centers. *J Psychosoc Oncol.* 2019;37(1):5-21.
5. National Comprehensive Cancer Network. NCCN Clinical Practice Guidelines in Oncology: Distress Management. Version 3.2019. *J Natl Compr Canc Netw.* 2019; 17(10):1229-1249.
6. Bultz BD, Carlson LE. Emotional distress: the sixth vital sign in cancer care. *J Clin Oncol.* 2005; 23 (26): 6440-6441.
7. Holland JC, Andersen B, Breitbart WS, Buchmann LO, Compas B, Deshields TL, et al. Distress management. *J Natl Compr Canc Netw.* 2013; 11(2): 190-209.
8. Grassi L, Johansen C, Annunziata MA, Capovilla E, Costantini A, Gritti P, et al. Screening for distress in cancer patients: a multicenter, nationwide study in Italy. *Cancer.* 2013; 119(9):1714-1721.
9. Chen AM, Jennelle RLS, Grady V, Tovar A, Bowen K, Simonin P, et al. Prospective study of psychosocial distress among patients undergoing radiotherapy for head and neck cancer. *Int J Radiat Oncol Biol Phys.* 2009;73(1):187-193. Doi:10.1016/j.ijrobp.2008.04.010.
10. Lewis S, Salins N, Kadam A, Rao R. Distress screening using Distress Thermometer in head and neck cancer patients undergoing radiotherapy and evaluation of causal factors predicting occurrence of distress. *Indian J Palliat Care.* 2013; 19(2):88-92. Doi:10.4103/ 0973-1075.116703.
11. Mackenzie LJ, Carey ML, Sanson-Fisher RW, D'Este CA. Psychological distress in cancer patients undergoing radiation therapy treatment. *Support Care Cancer.* 2013; 21(4): 1043-1051. Doi: 10.1007/s00520-012-1624-3.

12. Badr H, Gupta V, Sikora A, Posner M. Psychological distress in patients and caregivers over the course of radiotherapy for head and neck cancer. *Oral Oncol.* 2014; 50 (10): 1005-1011. Doi: 10.1016/j.oraloncology.2014.07.003.
13. Almighal TH, Almutairi KM, Fu JB, Vinluan JM, Alhelih E, Alonazi WB, et al. Assessment of psychological distress among cancer patients undergoing radiotherapy in Saudi Arabia. *Psychol Res Behav Manag.* 2019; 12:691-700. doi:10.2147/PRBM.S209896.
14. Mungase M, Chaudhury S, Patil AA, Jagtap B, Jain V. Stress, anxiety, depression, and resilience in cancer patients on radiotherapy. *Ind Psychiatry J.* 2021;30 (2): 346-352. doi:10.4103/ipj.ipj_78_20.
15. Nardone V, Reginelli A, Vinciguerra C, Correale P, Calvanese MG, Falivene S, et al. Mood disorder in cancer patients undergoing radiotherapy during the COVID-19 outbreak. *Front Psychol.* 2021; 12:568839. doi:10.3389/fpsyg.2021.568839.
16. Piroth MD, Draia S, Jawad JA, Piefke M. Anxiety and depression in patients with breast cancer undergoing radiotherapy: the role of intelligence, life history, and social support. *Strahlenther Onkol.* 2022; 198:388-396. doi:10.1007/s00066-022-01904-7.
17. Fabian A, Rühle A, Domschikowski J, Trommer M, Wegen S, Becker JN, et al. Psychosocial distress in cancer patients undergoing radiotherapy: a prospective national cohort of 1042 patients in Germany. *J Cancer Res Clin Oncol.* 2023; 149(11):10021-10029. Doi: 10.1007/s00432-023-04837-5.
18. Park H, Kim YJ, Lee J, Kim SH, Choi EK, et al. Dynamics in distress and quality of life in patients undergoing radiation therapy: a prospective cohort study. *Support Care Cancer.* 2025; 33. Doi: 10.1007/s00520-025-09371-3.