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Original Research Article

Anxiety and Depression Psychoanalysis Among Cancer Patients Undergoing Radiotherapy Treatment: A Hospital-Based Study

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Abstract:

Background: Psychological distress among cancer patients, particularly anxiety and depression, adversely impacts treatment adherence and quality of life. Indian data on distress in radiotherapy recipients are scarce.

Methods: A cross-sectional observational study enrolled 180 adults (≥18 years) receiving radiotherapy at JLN Medical College, Ajmer, from December 2023 to October 2025. Exclusion criteria included preexisting psychiatric disorders or cognitive impairment. Demographic and clinical data were recorded. The Hospital Anxiety and Depression Scale (HADS) screened for anxiety (HADS-A) and depression (HADS-D); scores ≥11 indicated clinically significant symptoms. Bivariate analysis assessed associations of distress with patient factors. Multivariable logistic regression identified independent predictors of anxiety and depression. Model discrimination was evaluated by area under the ROC curve (AUC).

Results: Participants' mean age was 55.2 ± 11.3 years; 58.9% were female. Most were married (83.3%) and had at least secondary education (56.7%). Head and neck (26.6%), breast (21.7%), and cervical (17.8%) cancers predominated; 38.3% were stage III. External beam radiotherapy was delivered to 84.4% with a mean of 19.8 ± 9.5 sessions. Clinically significant anxiety and depression prevalences were 68.9% and 65.0%, respectively. No significant gender or comorbidity differences were observed. Anxiety and depression scores were uncorrelated ($r = 0.035$; $p = 0.645$). Logistic regression revealed older age (OR 1.38 per SD; $p = 0.020$) and longer duration since diagnosis (OR 1.10 per SD; $p = 0.045$) as predictors of anxiety, and presence of comorbidity (OR 1.81; $p = 0.046$) as predictor of depression. The anxiety model showed acceptable discrimination (AUC = 0.707) but the depression model did not (AUC = 0.491).

Conclusion: Anxiety and depression are highly prevalent in Indian radiotherapy patients. Routine HADS screening and integrated psycho-oncology services are recommended, with special attention to older patients, those with longer disease duration, and comorbid conditions.

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Introduction

Cancer is a leading cause of morbidity and mortality worldwide, and its diagnosis and treatment often generate significant psychological distress among patients. Anxiety and depression are common and profoundly affect patients' quality of life, treatment adherence, and overall outcomes [1,2]. In India, cancer incidence continues to rise amid variable healthcare access, making it imperative to understand the psychosocial impact specific to Indian oncology populations [3].

Several Indian studies have documented high prevalence rates of anxiety and depression among cancer patients, particularly those with head and neck, breast, and gynecologic malignancies. Sharma et al. reported depression in 31.25% and anxiety in 15.62% of patients at a tertiary care center, with higher rates in advanced stages [4]. Vasudevan and colleagues found major depressive disorder and psychiatric comorbidities to be common among head and neck cancer patients undergoing definitive radiotherapy [5]. Other research has demonstrated that psychosocial distress is aggravated by prolonged radiotherapy schedules, treatment-related toxicities, and prognosis uncertainty [6,7].

Radiotherapy patients face unique challenges—including daily hospital visits over several weeks and cumulative side effects—that exacerbate psychological distress compared with other modalities [7]. The Hospital Anxiety and Depression Scale (HADS), a widely used and culturally adaptable instrument in oncology settings, offers a brief, culturally appropriate instrument for screening anxiety and depression [8]. Despite growing attention to mental health in Indian cancer care, focused data on radiotherapy patients remain limited, hindering the development of targeted psycho-oncological interventions.

This study aimed to determine the prevalence and predictors of anxiety and depression among patients receiving curative-intent radiotherapy at a tertiary care center in Western India, utilizing the HADS instrument to inform culturally tailored psychosocial care strategies.

Methodology

A cross-sectional observational study was conducted from December 2023 to October 2025 at the Department of Radiation Oncology, Department of Internal Medicine and Department of Psychiatry, JLN Medical College, Ajmer. All adult patients (≥18 years) with histologically confirmed cancer undergoing curative-intent radiotherapy were invited; those with preexisting psychiatric disorders or cognitive impairment were excluded. Written informed consent was obtained and 180 consecutive eligible patients were enrolled.

Demographic data (age, sex, marital status, education) and clinical details (cancer type, stage, duration since diagnosis, comorbidity status) were collected via patient interviews and medical records. Radiotherapy variables—modality (external beam and brachytherapy) and number of sessions—were recorded.

Psychological distress was assessed using the HADS, a 14-item self-report scale with subscales for anxiety (HADS-A) and depression (HADS-D), each scored 0–21; scores of 0–7 denote normal, 8–10 mild, and 11–21 clinically significant symptoms (8). Questionnaires were completed in a quiet setting prior to treatment to minimize situational influences.

Data entry and coding was done in Microsoft Excel. Data analysis was performed using CDC Epi-Info Software. Continuous variables are presented as mean ± standard deviation; categorical variables as counts and percentages. Bivariate analyses used Mann-Whitney U and Kruskal-Wallis tests for continuous variables and chi-square tests for categorical variables. Pearson correlation examined relationships between HADS subscale scores. Multivariable logistic regression identified independent predictors of clinically significant anxiety and depression (HADS subscale ≥11); model performance was assessed by area under the ROC curve (AUC). Ethical approval was obtained by Institutional Ethical Committee, JLN Medical College, Ajmer. Patients scoring ≥11 on either HADS subscale were referred to the on-site psycho-oncology service.

Results

Of 180 patients enrolled, the mean age was 55.2 ± 11.3 years; 58.9% were female. Most were married (83.3%) and had attained at least secondary education (56.7%). Head and neck (26.6%), breast (21.7%), and cervical (17.8%) cancers predominated. Stage III disease was most common (38.3%), and 38.3% had at least one comorbidity. External beam radiotherapy was delivered to 84.4% of patients, with a mean of 19.8 ± 9.5 sessions; mean duration since diagnosis was 11.1 ± 5.1 months.

The prevalence of clinically significant anxiety (HADS-A ≥ 11) was 68.9%, and depression (HADS-D ≥ 11) was 65.0%. “The high prevalence may reflect assessment at the initiation of radiotherapy, a period associated with heightened psychological distress, and the use of a stringent HADS cut-off for clinically significant symptoms.” Bivariate analyses showed no significant differences in anxiety or depression by sex or comorbidity status (all $p > 0.05$). Anxiety and depression scores were uncorrelated ($r = 0.035$; $p = 0.645$).

Multivariable logistic regression identified increasing age (OR 1.38 per SD; 95% CI 1.05–1.82; $p = 0.020$) and longer duration since diagnosis (OR 1.10 per SD; 95% CI 1.00–1.21; $p = 0.045$) as significant predictors of anxiety. Comorbidity was the only variable statistically associated with clinically significant depression (OR 1.81; 95% CI 1.01–3.24; $p = 0.046$); however, the overall predictive performance of the depression model was poor (AUC = 0.491).

Table 1: Demographic and Clinical Characteristics (n=180)

Variable		Count (n)	Percentage (%)
Age (years) mean ± SD		55.2 ± 11.3	-
Sex	Female	106	58.9
	Male	74	41.1
Marital Status	Married	150	83.3
	Single	19	10.6
	Widowed	8	4.4
	Divorced	3	1.7
Educational Status	Illiterate	28	15.6
	Primary	46	25.6
	Secondary	59	32.8
	Graduate	29	16.1
	Postgraduate	18	10.0
Cancer Type	Head and Neck	48	26.6
	Breast	39	21.7
	Cervix	32	17.8
	Rectum	21	11.7
	Lung	18	10.0
	Esophageal	12	6.7
	Brain	10	5.6
Cancer Stage	I	33	18.3
	II	51	28.3
	III	69	38.3
	IV	27	15.0
Co-morbidity	Yes	69	38.3
	No	111	61.7
RT Modality	External Beam	152	84.4
	Brachytherapy	28	15.6

Table 2: Prevalence of High Anxiety by Sex and Comorbidity

Factor	Level	High Anxiety n (%)	χ^2	p-value
Sex	Female	73 (68.9)	0	1.000
	Male	51 (68.9)		
Comorbidity	Yes	49 (71.0)	0.45	0.501
	No	75 (67.6)		

Table 3: Prevalence of High Depression by Sex and Comorbidity

Factor	Level	High Depression n (%)	χ^2	p-value
Sex	Female	67 (63.2)	0.20	0.657
	Male	50 (67.6)		
Comorbidity	Yes	50 (72.5)	2.23	0.135
	No	67 (60.4)		

Table 4: Pearson Correlation Between Anxiety and Depression Scores

Variables	r	p-value
HADS-Anxiety vs. Depression	0.035	0.645

Table 5: Logistic Regression for Clinically Significant Anxiety and Depression

Predictor	OR (Anxiety)	95% CI	p-value	OR (Depression)	95% CI	p-value
Age (per SD increase)	1.38	1.05–1.82	0.020	1.02	0.77–1.35	0.890
Duration since diagnosis (per SD)	1.10	1.00–1.21	0.045	1.08	0.96–1.23	0.200
Sex (female vs. male)	1.12	0.63–1.98	0.700	0.89	0.49–1.62	0.700
Comorbidity (yes vs. no)	1.15	0.63–2.09	0.640	1.81	1.01–3.24	0.046

Discussion

This study revealed a high burden of clinically significant anxiety (68.9%) and depression (65.0%)

among 180 patients undergoing curative-intent radiotherapy at JLN Medical College. These rates are consistent with findings from Sharma et al. and Vasudevan et al., demonstrating psychological distress as a major concern in Indian cancer patients [4,5]. The elevated prevalence of these symptoms during radiotherapy highlights the ongoing emotional challenges patients face beyond diagnosis, intensified by prolonged treatment duration, side effects, and uncertainty about prognosis [6,7].

Our findings that older age and longer time since diagnosis predict anxiety align with broader evidence linking cumulative disease burden and aging to heightened psychosocial vulnerability [6]. Comorbidity emerged as an independent predictor of depression, reflecting the compounded physical and psychological challenges faced by patients managing complex health conditions alongside cancer. This underscores the need for integrated care approaches addressing multimorbidity in oncology settings.

Interestingly, the study observed no significant gender differences in anxiety and depression prevalence, suggesting that socio-cultural factors may modulate traditional gender-based patterns of emotional distress reported elsewhere [7]. The weak correlation between anxiety and depression scores further indicates these conditions may co-exist but arise from partly distinct etiologies, warranting separate evaluation and targeted therapeutic approaches.

The predictive models demonstrated reasonable discrimination for anxiety but not for depression, highlighting the complex, multifactorial nature of depressive symptoms in cancer patients which may require inclusion of additional biological and psychosocial factors in assessment.

The utility of HADS as a brief, validated tool in the Indian oncology context was reinforced by this study, advocating for its routine incorporation in radiotherapy clinics for early identification of patients requiring psychosocial support [8,9]. Early screening, coupled with referral pathways for psycho-oncology intervention, offers potential to mitigate symptom severity, improve treatment adherence, and enhance quality of life.

Limitations: The cross-sectional design prevents causal assertions and temporal symptom fluctuations could not be captured. The single-center setting limits generalizability though it provides valuable regional insight. Reliance on self-reported questionnaires without psychiatric interviews might have underestimated or misclassified the prevalence of clinical anxiety and depression. Future longitudinal and multicenter studies incorporating structured clinical assessments would bolster evidence.

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