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Prevalence and Severity of Anxiety and Depression Among Cancer Patients Undergoing Radiotherapy in Iraq

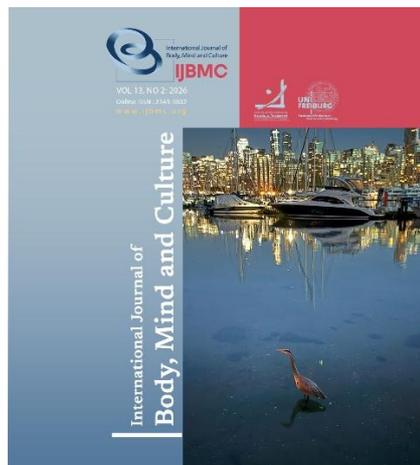Mortadha Handhal. Hussein[1], Ali Kareem. Al-Juboori[2]

ABSTRACT

Objective: To assess the prevalence and severity of anxiety and depression before and during radiotherapy among cancer patients in Karbala, Iraq.

Methods and Materials: A prospective descriptive quantitative study was conducted at Al-Hassan Al-Mujtaba Teaching Hospital (Oncology and Blood Diseases Center), Karbala, from September 2024 to June 2025. Of 100 eligible adults (≥18 years) scheduled for external beam radiotherapy, 81 completed both assessments and were included in the analysis. Patients with severe cognitive impairment, pre-existing psychiatric illness (before cancer), or concurrent chemotherapy during data collection were excluded. Anxiety and depression were measured using the Hospital Anxiety and Depression Scale (HADS; Cronbach's α=0.837). Because the distributions were non-normal, pre-treatment and during-treatment scores were compared using the Wilcoxon signed-rank test; effect sizes were calculated as $r = Z/\sqrt{N}$.

Findings: Participants had moderate anxiety and depression at both time points, with higher scores during radiotherapy. Anxiety increased from pre-treatment (mean=11.38, SD=3.30) to during treatment (mean=12.29, SD=3.12) (p=0.025; r=0.175). Depression increased from pre-treatment (mean=10.19, SD=2.97) to during treatment (mean=11.55, SD=3.01) (p=0.008; r=0.209). Effect sizes were small.

Conclusion: Radiotherapy was associated with statistically significant increases in anxiety and depression; integrating routine psychological screening and supportive care into oncology services is recommended.

Keywords: Cancer, Radiotherapy, Anxiety, Depression, Hospital Anxiety and Depression Scale, Iraq.

Introduction

Anxiety and depression are among the most prevalent psychological challenges faced by cancer patients, with their prevalence and severity often escalating during active treatment, such as radiation therapy (Nikoloudi et al., 2020). These emotional disturbances are not merely a reaction to the cancer diagnosis but are deeply rooted in the treatment experience itself. They can stem from specific fears related to the radiotherapy procedure, a lack of adequate patient education, and the cumulative burden of physical side effects like fatigue, mucositis, nausea, and diarrhea (Firouzbakht et al., 2020).

In this study, psychological distress is conceptualized as the manifestation of anxiety and depression, which are influenced by a complex interplay of demographic factors (e.g., age, gender) and clinical variables (e.g., disease stage, presence of metastases) (Subramaniam et al., 2018). The clinical significance of these conditions is profound, as they have been consistently linked to prolonged hospital stays, reduced adherence to treatment protocols, and, ultimately, poorer survival outcomes (Yan et al., 2019).

Although numerous international studies have documented the psychological impact of cancer and its treatments (Fernandes et al., 2020; Miller & Scherbak, 2021), a notable research gap exists in the context of Iraq, particularly regarding the psychological response of patients undergoing radiotherapy. Most prior research in this region has either addressed the general cancer population or focused predominantly on chemotherapy, thereby failing to delineate the temporal psychological response patterns specific to radiotherapy (Oh & Cho, 2020). This gap is particularly critical in Karbala, where unique cultural and infrastructural challenges may affect patient well-being but remain under-researched. This lack of specific data limits local healthcare providers' ability to design and implement targeted, culturally sensitive psychosocial interventions.

Therefore, this study aims to assess the prevalence and severity of anxiety and depression before and during radiation therapy among cancer patients in Karbala. It is hypothesized that levels of anxiety and depression will significantly increase during the course of radiotherapy compared to pre-treatment levels.

Methods and Materials

Study Design

This study utilized a prospective cohort observational design to assess the psychological impact of radiation therapy. Data were collected from the same group of patients at two distinct time points: a baseline assessment pre-treatment and a follow-up assessment during the active treatment phase. The study was conducted at the Oncology and Hematology Center at Imam Hassan Al-Mujtaba Teaching Hospital in Karbala, Iraq. The prospective timeline, with data collection planned from September 2024 to June 2025, reflects the study's forward-looking design.

Participants

A non-probability convenience sample of 100 adult cancer patients was initially recruited. However, 19 patients were excluded due to incomplete questionnaires or failure to complete the follow-up assessment, resulting in a final sample of 81 participants. The convenience sampling method, while practical, is acknowledged as a significant methodological limitation, as it may introduce selection bias and limit the generalizability of the findings to the broader cancer patient population in Iraq.

Inclusion criteria were: adult patients (≥18 years old) diagnosed with any cancer, scheduled to undergo external beam radiation therapy at the study center, and able to provide informed consent. Exclusion criteria were: patients with a pre-existing psychiatric illness diagnosed before their cancer diagnosis, individuals with severe cognitive impairment that would hinder their ability to complete the questionnaire, and patients receiving concurrent chemotherapy during the data collection period.

Instruments

The study employed a structured questionnaire with two main parts. Part one, developed by the researchers, collected demographic and clinical data. Part two utilized the Hospital Anxiety and Depression Scale (HADS) to measure psychological distress. The HADS is a widely validated instrument for clinical populations, consisting of 14 items (seven for anxiety, HADS-A; seven for depression, HADS-D). Each item is scored on a 4-point Likert scale (0–3), yielding subscale scores from 0 to 21. While the HADS has established validity and is widely used worldwide, its cultural validity in the Iraqi context

was not formally assessed before this study. The reliability of the HADS was confirmed for the current sample, yielding a Cronbach's α of 0.837, indicating good internal consistency. The scores were used as continuous variables for statistical analysis, rather than the conventional categorical thresholds.

Data Analysis

Data were analyzed using SPSS version 27. Descriptive statistics (frequencies, percentages, means, and standard deviations) were used to summarize the sample characteristics. To justify the choice of non-parametric tests, the Kolmogorov–Smirnov (K-S) test was performed on the data, which indicated a non-normal distribution ($p < 0.05$). Given this violation of normality assumptions for paired data, the Wilcoxon Signed-Rank Test was appropriately selected to compare the continuous anxiety and depression scores before and during treatment. To interpret the magnitude of the observed changes, effect sizes (r) were calculated as $Z/\sqrt{N}$, where Z is the Wilcoxon test statistic, and N is the number of participants. The effect sizes were interpreted using Cohen's criteria: $r = 0.10$ is considered a small effect, $r = 0.30$ a medium effect, and $r = 0.50$ a large effect. A significance level of $p < 0.05$ was set. No missing-data imputation was performed; instead, participants with incomplete questionnaires were excluded from the analysis, as per the protocol.

Ethical Considerations

This study was granted ethical approval from the Institutional Review Board (IRB) of both the College of Nursing at the University of Karbala and Al-Hassan Al-Mujtaba Teaching Hospital. Before participation, all patients received a clear explanation of the study's purpose, their right to withdraw at any time without affecting their medical care, and the confidentiality of their data. Written informed consent was obtained from every participant. The data were handled with strict confidentiality and used solely for research purposes.

Findings and Results

In Table 1, the results show the distribution of 81 cancer patients undergoing radiation therapy in Holy Karbala, with the majority (33.3%) aged 55-64 years, and a mean age of 52.05. Regarding sex, most (71.6%) were female, and married (50.6%). By educational level, most (33.3%) had completed college or higher. Regarding occupation, most were housewives (46.9%). The results also showed the highest (43.2%) with inadequate monthly income.

Regarding the clinical information, the most, 53.1% with moderate nutritional status, 46.9% diagnosed with breast cancer, 61.7% without tumor metastasis, 74.1% with a curative treatment goal, and 56.8% radiation therapy in the chest area.

Table 1.

The results of the distribution of cancer patients undergoing radiation therapy

Age group	Adult (25 - 34 years)	f.	%
	Middle-aged adult (35 - 44 years)	7	8.6
	Early middle-aged (45 - 54 years)	17	21.0
	Late middle-aged (55 - 64 years)	20	24.7
	Older adults (≥ 65 years)	27	33.3
	Total	10	12.3
	Min- Max	81	100.0
	Mean ± SD	27 y	80 y
Sex	Male	52.05	12.27
	Female	23	28.4
	Total	58	71.6
Educational level	Cannot read or write	81	100.0
	Can read and write	10	12.3
	Elementary School Certificate	12	14.8
	Intermediate School Certificate	12	14.8
	Preparatory School Certificate	4	4.9
	College or above	16	19.8
	Total	27	33.3
Marital Status	Single	81	100.0
	Married	7	8.6
	Widowed	41	50.6
	Divorced	23	28.4

	Total	10	12.3
Occupation	Employee	81	100.0
	Retired	18	22.2
	Unemployed	17	21.0
	Housewife	8	9.9
	Total	38	46.9
Monthly income	Adequate	81	100.0
	Somewhat Adequate	16	19.8
	Not Adequate	30	37.0
	Total	35	43.2
Nutritional status	Good	81	100.0
	Average	13	16.0
	Poor	43	53.1
	Total	25	30.9
Medical diagnosis	Breast cancer	81	100.0
	Brain cancer	38	46.9
	Lung cancer	5	6.2
	Prostate cancer	9	11.1
	Colon cancer	3	3.7
	Bladder cancer	2	2.5
	Pancreatic cancer	6	7.4
	Uterine cancer	1	1.2
	Soft tissue cancer	7	8.6
	Rectal cancer	1	1.2
	Bone cancer	6	7.4
	Thyroid cancer	1	1.2
	Bile cancer	1	1.2
	Total	1	1.2
Is the tumor metastatic?	Yes	81	100.0
	No	31	38.3
	Total	50	61.7
Treatment goal	Palliative	81	100.0
	Adjuvant	10	12.3
	Curative	11	13.6
	Total	60	74.1
Radiation therapy area	Abdomen	81	100.0
	Head and Neck	12	14.8
	Extremities	8	9.9
	Pelvis	2	2.5
	Chest	13	16.0
	Total	46	56.8

f= frequencies, %=Percentages, M = Mean of score, S.D = Standard Deviation, Min= minimum and Max= maximum

The results in Table 2 show that there was a statistically significant impact of radiation therapy on the anxiety and depression of patients with cancer (increased) at ($p < 0.05$).

Table 2

*Examine the impact of radiation therapy on the anxiety and depression of cancer patients.*

N	Items	Pre				During			
		Mean	S.D	Median	level.	Mean	S.D	Median	level.
1	I feel tense or anxious.	1.68	.94	2	M	2.15	1.08	3	H
4	I have butterflies in my stomach.	1.33	.92	1	M	1.38	1.13	1	M
5	I feel scared, as if something is going to happen	1.53	1.01	1	M	1.48	1.07	2	M
8	I feel restless, as if I need to move constantly.	1.73	.77	2	M	1.99	1.05	2	M
9	I have anxious thoughts running through my mind.	1.99	.98	2	M	2.41	.95	3	H
12	I suddenly feel scared unexpectedly.	1.56	.92	2	M	1.36	.82	1	M
13	I can sit quietly and feel comfortable ®	1.57	.98	2	M	1.65	.95	2	M
	Overall mean of Anxiety (7 items)	**1.63**	**.47**	**1.71**	**M**	**1.77**	**.36**	**1.86**	**M**

P. value= 0.025
Z= -2.239-
- =r0.175

2	I feel like I've slowed down	1.72	1.72	2	M	1.91	1.05	2	M
3	I still enjoy things I used to enjoy ®	1.51	1.51	2	M	1.73	1.03	2	M
6	I have lost interest in my personal appearance	1.33	1.33	1	M	1.52	1.10	2	M
7	I can laugh and see the funny side of things ®	1.28	1.28	1	M	1.58	1.01	1	M
10	I look at things and enjoy them ®	1.32	1.32	1	M	1.30	1.04	1	M
11	I feel cheerful and happy ®	1.54	1.54	2	M	1.78	0.97	2	M
14	I enjoy reading a good book or listening to the radio or television ®	1.48	1.48	2	M	1.74	1.02	2	M
	Overall mean of Depression (7 items)	**1.46**	**.42**	**1.57**	**M**	**1.65**	**.36**	**1.71**	**M**

P. value= 0.008

Z= -2.665-

- =r0.209

M= mean, Med= Median, Ass. = Assessment items, L = low (0 – 1), M = Moderate (1.01-2) and H= High (2.01 - 3) (Low score = less worse and high score= more worse). P=probability value, NS: Non-Significant at P ≥ 0.05, Z= Wilcoxon Signed Ranks Test

Figure 1.

The impact of radiation therapy on the anxiety and depression of cancer patients

	Pre	During
Anxiety	1.63	1.77
Depression	1.46	1.65
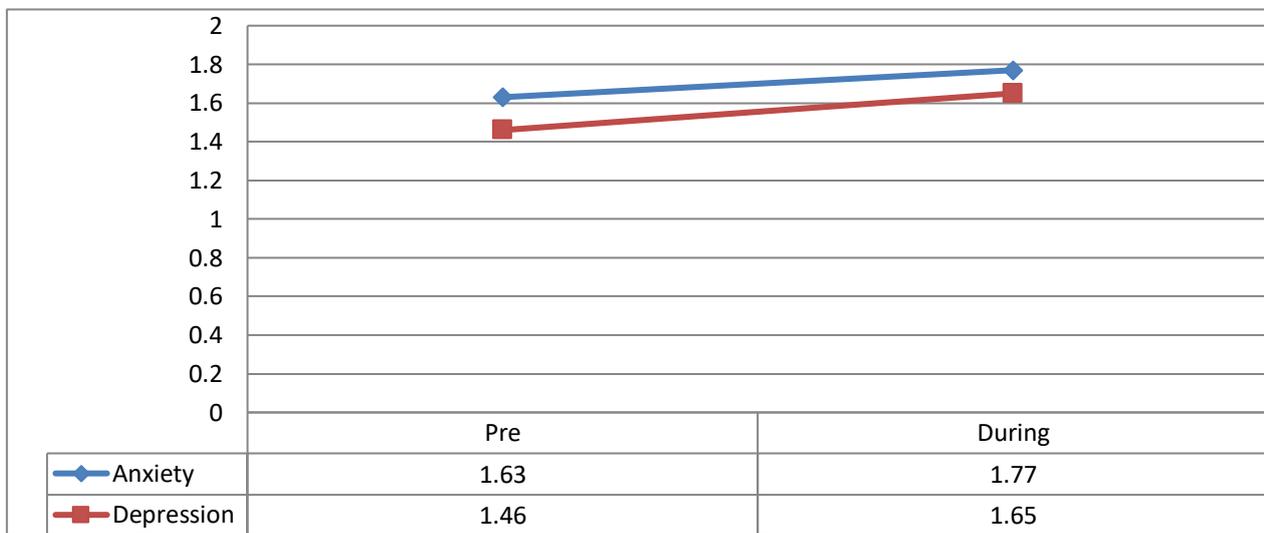
Discussion and Conclusion

The present study, which assessed psychological distress in a cohort of 81 cancer patients undergoing radiation therapy in Karbala, revealed a significant increase in both anxiety and depression during treatment compared to pre-treatment levels. This finding is consistent with a substantial body of international literature (Parvizi et al., 2023; Takahashi et al., 2008) and reinforces the well-established notion that active cancer treatment is a period of heightened psychological vulnerability. From a theoretical standpoint, these results can be interpreted through the lens of stress-coping models, where the physical and emotional burden of radiation therapy serves as a stressor that overwhelms the patients' coping resources,

leading to a rise in anxiety and depression (Mungase et al., 2021).

While our findings align with global trends, the unique characteristics of our sample—predominantly female (71.6%), married, and homemakers—highlight the importance of considering local context. The socioeconomic and cultural factors specific to Karbala likely intensify this distress. The high proportion of homemakers, for instance, may face additional psychological burdens stemming from financial dependence and the struggle to balance domestic responsibilities with the demands of treatment, which can be a significant source of stress. Furthermore, the prevalence of breast cancer (46.9%) in our cohort is a critical factor, as concerns related to body image, potential disfigurement, and fear of recurrence are well-

documented triggers for anxiety and depression in this patient group (Naser et al., 2021; Saini et al., 2021). It is important to note that although the observed changes were statistically significant ($p = 0.025$ for anxiety, $p = 0.008$ for depression), the small effect sizes suggest that the rise in distress is real. Still, its clinical magnitude may be modest for many individuals.

A critical evaluation of the study's methodology is essential for a complete interpretation of the findings. The reliance on convenience sampling and a single-center design limits the generalizability of our results to other regions in Iraq. Furthermore, the use of a self-reported questionnaire introduces the possibility of response bias, in which participants may under- or over-report their symptoms. The observational nature of the study prevents us from establishing a definitive causal relationship between radiation therapy and the rise in distress, as other confounding variables, such as disease progression or unmeasured social stressors, could have played a role.

Despite these limitations, our findings carry important practical and clinical implications for oncology care in Iraq. The results underscore the critical need for integrating psychological support services into standard cancer treatment protocols. Oncology teams, particularly nurses, should implement routine mental health screening using validated tools like the HADS to identify at-risk patients early. Providing patient education on the expected side effects of radiation therapy and proactive coping strategies could mitigate some of the anticipatory fear. Culturally sensitive interventions, such as incorporating family-based counseling or establishing peer-support groups tailored to the needs of female patients in Karbala, could also be highly effective in improving patient well-being (Jaglowski et al., 2006; Sharma & Purkayastha, 2021).

In summary, although the increase in anxiety and depression during radiation therapy in this cohort aligns with global literature (Parvizi et al., 2023; Takahashi et al., 2008), local cultural norms, financial constraints, and healthcare-system limitations in Karbala likely intensify these effects. Addressing these determinants through targeted interventions could significantly improve patient well-being during cancer treatment (Arıkan et al., 2023; Takahashi et al., 2008).

Conclusion:

In this study, our findings confirmed the hypothesis that anxiety and depression levels significantly increase in cancer patients during radiation therapy compared to their pre-treatment state. While this observation aligns with international literature, it provides critical, localized data from a specific patient cohort in Karbala, Iraq. The results fill a notable research gap by providing empirical evidence on the temporal psychological trajectory of patients undergoing radiation therapy in a region where such data have been scarce.

This study's findings underscore the urgent need for a paradigm shift in oncology care within Karbala and similar settings. We must move beyond a purely clinical approach to one that systematically integrates psychological support. We recommend the implementation of routine mental health screening for all oncology patients, allowing for early identification of psychological distress. Furthermore, healthcare systems should develop and deliver culturally sensitive psychosocial interventions, including patient education, family-based counseling, and peer-support groups tailored to the specific social and economic realities of this population.

For future research, we suggest a move toward more robust, longitudinal designs to track psychological well-being over a longer period, including post-treatment. Qualitative studies are also needed to gain a deeper understanding of the patient's lived experience with anxiety and depression during therapy. Finally, conducting randomized controlled trials (RCTs) to test the effectiveness of specific psychosocial interventions in this population would provide the evidence base needed to improve patient care and quality of life.

Declaration of Interest

The authors of this article declared no conflict of interest.

Ethical Considerations

The study protocol adhered to the principles outlined in the Helsinki Declaration, which provides guidelines for ethical research involving human participants.

Ethical considerations in this study included the fact that participation was entirely optional.

Transparency of Data

In accordance with the principles of transparency and open research, we declare that all data and materials used in this study are available upon request.

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Authors' Contributions

All authors equally contribute to this study.

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