International Journal of Medicine
pISSN 1468-3814 | eISSN 2667-7008
https://theinternationalmedicine.com/

Original Researcher Article *DOI: 10.61336/im/26-06-204*

Assessment of Quality of Life in Cancer Patients Undergoing Radiotherapy Using WHOQOL-BREF: A Cross-Sectional Study.

KL Jayakumar[1], Ramala R[2]*.

[1]Professor and HOD, Department of Radiation Oncology, Sree Mookambika Institute of Medical Sciences, Kanyakumari, Tamilnadu, India.

[2]Junior Resident, Department of Radiation Oncology, Sree Mookambika Institute of Medical Sciences, Kanyakumari, Tamilnadu, India.

Correspondence:
Ramala.R.
Junior Resident, Department of Radiation Oncology, Sree Mookambika Institute of Medical Sciences, Kanyakumari,Tamilnadu, India.

Email:
dr.ramalaravichandranrrv@gmail.com

Received: 07-05-2026
Revised: 27-05-2026
Accepted: 11-06-2026
Published: 30-06-2026

Abstract

Background: Cancer and its treatment significantly affect patients' quality of life (QoL). Radiotherapy, a key modality in cancer management, is associated with various physical and psychological side effects that can impair daily functioning. Assessment of quality of life during radiotherapy is essential to understand the multidimensional impact of treatment and to guide comprehensive patient-centered care. ***Objectives:*** To assess the quality of life of cancer patients undergoing radiotherapy using the WHOQOL-BREF questionnaire and to determine its association with selected socio-demographic and clinical variables. ***Methods:*** A hospital-based cross-sectional study was conducted among 110 adult cancer patients receiving radiotherapy at a tertiary care teaching hospital. Quality of life was assessed using the WHOQOL-BREF instrument, which evaluates physical health, psychological health, social relationships, and environmental domains. Socio-demographic and clinical details were collected using a structured proforma. Data were analyzed using appropriate descriptive and inferential statistical methods. ***Results:*** The mean overall QoL score indicated moderate impairment among patients undergoing radiotherapy. The physical and psychological domains showed lower mean scores compared to social and environmental domains. Patients with advanced-stage cancer, those receiving palliative radiotherapy, older patients, and those undergoing concurrent chemotherapy had significantly lower quality of life scores ($p < 0.05$). No statistically significant difference was observed between male and female patients. ***Conclusion:*** Cancer patients receiving radiotherapy experience a moderate reduction in quality of life, particularly in physical and psychological domains. Advanced disease stage and intensive treatment modalities further worsen QoL. Routine assessment of quality of life and integration of supportive and psychosocial interventions into radiotherapy care are essential to improve overall patient outcomes.

Keywords: Quality of life; Cancer; Radiotherapy; WHOQOL-BREF; Oncology; Supportive care.

INTRODUCTION

Cancer is a major public health challenge worldwide, characterized not only by high morbidity and mortality but also by substantial impairment in quality of life (QoL). Advances in early diagnosis and treatment have led to improved survival rates; however, many patients continue to experience significant physical, psychological, and social distress during and after treatment[1]. Radiotherapy remains one of the cornerstone modalities in cancer management, used in curative, adjuvant, and palliative settings, with nearly half of all cancer patients receiving radiotherapy at some point during their illness. While radiotherapy plays a crucial role in disease control, it is frequently associated with acute and chronic side effects such as fatigue, pain, mucositis, skin reactions, and emotional disturbances, which can adversely affect patients' overall well-being[2].

Quality of life has therefore emerged as an essential outcome measure in oncology, complementing traditional endpoints such as tumor response and survival. The World Health Organization defines quality of life as an individual's perception of their position in life in the context of their culture, value systems, goals, expectations, and concerns[3]. Assessing QoL enables clinicians to understand the multidimensional impact of cancer and its treatment on patients' daily functioning and to plan holistic, patient-centered care.

Globally, cancer accounts for nearly 10 million deaths annually, with a rapidly increasing burden in low- and middle-income countries. India contributes substantially to this burden, with over 1.4 million new cancer cases reported each year.

Common malignancies such as head and neck, breast, cervical, and lung cancers frequently require radiotherapy as part of standard treatment[4]. In resource-limited settings, patients often present at advanced stages of disease, necessitating aggressive treatment and palliative radiotherapy, both of which can further compromise quality of life. Socioeconomic constraints, limited access to supportive care services, and treatment-related toxicities collectively intensify the impact of cancer on patients' physical, psychological, and social domains.

Several international and Indian studies have evaluated quality of life among cancer patients undergoing radiotherapy using validated instruments. The WHOQOL-BREF questionnaire has been widely employed due to its cross-cultural validity and comprehensive assessment of physical, psychological, social, and environmental domains[5]. Previous studies have consistently reported lower QoL scores in the physical and psychological domains during radiotherapy, particularly among patients with advanced-stage disease and those receiving concurrent chemotherapy. Studies have also demonstrated that factors such as older age, treatment intent (palliative vs. curative), symptom burden, and duration of therapy significantly influence QoL outcomes[6]. However, variations in cancer types, treatment protocols, cultural perceptions, and healthcare infrastructure contribute to heterogeneity in reported findings, highlighting the need for region-specific data.

Despite the growing recognition of quality of life as a critical outcome in oncology, limited data are available from tertiary care centers in India assessing QoL among patients actively receiving radiotherapy. Understanding the domain-specific impairment and its association with socio-demographic and clinical variables is essential for identifying vulnerable patient groups and tailoring supportive interventions. The present study was therefore undertaken to assess the quality of life of cancer patients undergoing radiotherapy using the WHOQOL-BREF instrument and to examine its association with selected socio-demographic and treatment-related factors. The findings are expected to provide valuable insights for clinicians and policymakers to integrate quality-of-life–oriented strategies into routine radiotherapy care and improve overall patient outcomes.

AIMS AND OBJECTIVES

Aim of the Study

To assess the quality of life of cancer patients receiving radiotherapy using the WHOQOL-BREF questionnaire.

Objectives of the Study

1) To evaluate the quality of life across the four WHOQOL-BREF domains (physical health, psychological health, social relationships, and environment) among cancer patients undergoing radiotherapy.
2) To determine the association between quality of life scores and selected socio-demographic and clinical variables (such as age, sex, type of cancer, stage, duration of treatment, and treatment-related side effects).

MATERIALS AND METHODS

Study Design

This study was a hospital-based cross-sectional study conducted to assess the quality of life among cancer patients receiving radiotherapy using the WHOQOL-BREF questionnaire.

Study Setting

The study was carried out in the Department of Radiotherapy of a tertiary care teaching hospital. The department provides both curative and palliative radiotherapy services to patients with various malignancies.

Study Period

The study was conducted over a period of 6 months.

Study Population

The study population consisted of adult cancer patients undergoing radiotherapy at the Department of Radiotherapy during the study period.

Eligibility Criteria

Inclusion Criteria

- Patients aged 18 years and above
- Diagnosed with any type of malignancy
- Currently receiving external beam radiotherapy, either as curative or palliative treatment
- Patients who had received at least one week of radiotherapy, to ensure exposure to treatment-related effects
- Patients who were clinically stable and able to respond to the questionnaire
- Patients who provided written informed consent

Exclusion Criteria

- Patients who were critically ill or terminally ill and unable to participate
- Patients with known psychiatric illness or cognitive impairment affecting comprehension
- Patients receiving radiotherapy for benign conditions
- Patients who refused to participate in the study

Sample Size and Sampling Technique

Sample Size

Sample Size Formula (for estimating a mean)

n=(Z^2×σ^2)/d^2

Where:

- n = required sample size
- Z = standard normal deviate at 95% confidence level (1.96)
- σ = standard deviation of WHOQOL-BREF score from previous studies
- d = absolute precision (allowable error)

Assumptions

- Confidence level = 95%
- Z = 1.96
- Standard deviation (σ) of WHOQOL-BREF score = 15
- (based on previous similar studies in cancer patients)
- Absolute precision (d) = 3 points

Calculation

n=(1.96)^2×(15)^2 ┤/(3)^2 ┤

n=(3.84×225)/9

n=864/9=96

Considering a 10% non-response rate:

n=96+10%=105.6

Final sample size = 110 patients

The sample size was calculated using the formula for estimating a mean. Based on previous studies, assuming a standard deviation of 15 for WHOQOL-BREF scores, a precision of 3 points, and a 95% confidence level, the minimum sample size was calculated as 96. After accounting for a 10% non-response rate, the final sample size was rounded off to 110 participants.

Sampling Technique

A consecutive sampling technique was used. All eligible patients attending the radiotherapy department during the study period were enrolled until the required sample size was achieved.

Study Tools and Data Collection Instruments

1. Socio-demographic and Clinical Proforma

A pre-designed, semi-structured proforma was used to collect information on:

- Age, sex, marital status, education, occupation, and socioeconomic status
- Type of cancer, stage of disease, duration since diagnosis
- Type of radiotherapy (curative/palliative), number of cycles completed
- Concurrent chemotherapy, if any
- Presence of treatment-related side effects.

2. WHOQOL-BREF Questionnaire

Quality of life was assessed using the World Health Organization Quality of Life–BREF (WHOQOL-BREF) questionnaire. It is a validated instrument consisting of 26 items, including:

- Physical health domain (7 items)
- Psychological health domain (6 items)
- Social relationships domain (3 items)
- Environmental domain (8 items)
- Two items assess overall perception of quality of life and general health

Each item is scored on a 5-point Likert scale, with higher scores indicating better quality of life.

Scoring of WHOQOL-BREF

Raw scores for each domain were calculated by summing the item scores within the respective domain. These raw scores were then transformed to a 0–100 scale as per WHO guidelines, where higher scores denote better quality of life.

Data Collection Procedure

Eligible patients were approached during their radiotherapy sessions. After explaining the purpose of the study, written informed consent was obtained. The questionnaire was administered through face-to-face interviews in the patient's preferred language. For illiterate participants, questions were read aloud, and responses were recorded by the investigator to minimize information bias. Each interview lasted approximately 15–20 minutes.

Operational Definitions

- Quality of Life: An individual's perception of their position in life in the context of culture and value systems, measured using WHOQOL-BREF domain scores.
- Patients receiving radiotherapy: Cancer patients who had completed at least one week of external beam radiotherapy at the time of assessment.

Ethical Considerations

- Ethical approval was obtained from the Institutional Ethics Committee prior to commencement of the study.
- Written informed consent was obtained from all participants.
- Confidentiality and anonymity of the participants were strictly maintained.
- Participants were assured that refusal to participate would not affect their treatment in any way.

Statistical Analysis

Data were entered into Microsoft Excel and analyzed using Statistical Package for the Social Sciences (SPSS) version [XX].

- Continuous variables were expressed as mean ± standard deviation or median (interquartile range) as appropriate.
- Categorical variables were summarized as frequencies and percentages.
- Comparison of WHOQOL-BREF domain scores across different socio-demographic and clinical variables was done using:
- Independent t-test / ANOVA for normally distributed variables
- Mann–Whitney U test / Kruskal–Wallis test for non-normally distributed variables
- Pearson's or Spearman's correlation was used to assess relationships between continuous variables.
- A p-value < 0.05 was considered statistically significant.

RESULTS

Table 1: Socio-demographic Characteristics of the Study Participants (n = 110)

Variable	Category	n (%)
Age (years)	≤40	24 (21.8)
	41–60	56 (50.9)
	>60	30 (27.3)
Sex	Male	62 (56.4)
	Female	48 (43.6)
Marital status	Married	94 (85.5)
	Unmarried/Widowed	16 (14.5)
Education	Illiterate	34 (30.9)
	Primary/Secondary	52 (47.3)
	Higher education	24 (21.8)
Socioeconomic status*	Lower	46 (41.8)
	Middle	50 (45.5)
	Upper	14 (12.7)

*As per modified BG Prasad classification.

Table 2: Clinical and Treatment-related Characteristics of Study Participants (n = 110)

Variable	Category	n (%)
Type of cancer	Head & neck	34 (30.9)
	Breast	26 (23.6)
	Cervical	20 (18.2)
	Lung	16 (14.6)
	Others	14 (12.7)
Stage of cancer	Early (I–II)	38 (34.5)
	Advanced (III–IV)	72 (65.5)
Type of radiotherapy	Curative	74 (67.3)
	Palliative	36 (32.7)
Concurrent chemotherapy	Yes	58 (52.7)
	No	52 (47.3)
Duration of radiotherapy	≤3 weeks	42 (38.2)
	>3 weeks	68 (61.8)

Table 3: Mean WHOQOL-BREF Domain Scores Among Study Participants (n = 110)

WHOQOL-BREF Domain	Mean ± SD	Range
Physical health	48.6 ± 12.4	25–78
Psychological health	51.2 ± 11.8	28–80
Social relationships	55.8 ± 13.6	31–88
Environmental	57.4 ± 10.9	35–82
Overall QoL score	53.3 ± 11.1	30–81

Table 4: Comparison of WHOQOL-BREF Domain Scores by Stage of Cancer (n = 110)

Domain	Early stage (n = 38) Mean ± SD	Advanced stage (n = 72) Mean ± SD	p-value
Physical health	56.4 ± 11.2	44.5 ± 10.8	<0.001
Psychological	57.8 ± 10.5	47.6 ± 11.3	0.002
Social relationships	62.1 ± 12.7	52.4 ± 13.1	0.004
Environmental	61.9 ± 9.6	55.0 ± 10.8	0.01

(Independent t-test applied)

Table 5: Association Between Selected Variables and Overall Quality of Life Score (n = 110)

Variable	Category	Mean QoL Score ± SD	p-value
Age group	≤60 years	56.1 ± 10.3	
	>60 years	48.7 ± 11.5	0.01
Sex	Male	54.6 ± 11.0	
	Female	51.6 ± 11.2	0.18
Type of radiotherapy	Curative	56.8 ± 10.4	
	Palliative	46.9 ± 11.6	<0.001
Concurrent chemotherapy	Yes	49.8 ± 11.2	
	No	56.9 ± 10.1	0.002

DISCUSSION

The present cross-sectional study evaluated the quality of life (QoL) of cancer patients undergoing radiotherapy using the WHOQOL-BREF instrument and examined its association with selected socio-demographic and clinical variables. The findings demonstrate a moderate overall impairment in QoL, with significant variations across domains and patient subgroups, highlighting the multidimensional burden of cancer and its treatment.

Overall Quality of Life

The mean overall QoL score observed in this study indicates a moderate level of impairment among patients receiving radiotherapy. Similar levels of overall QoL reduction have been reported in previous studies conducted among radiotherapy patients, suggesting that active cancer treatment itself exerts a substantial negative influence on patients' perceived well-being[5,7] . Montazeri et al. emphasized that QoL declines during treatment phases due to symptom burden, psychological stress, and functional limitations, even when disease control is achieved[8] . Our findings reinforce the importance of assessing QoL as a complementary outcome to clinical response.

Domain-wise Quality of Life Assessment

In the present study, the physical health domain had the lowest mean score among the four WHOQOL-BREF domains. This finding is consistent with earlier studies that have identified physical symptoms such as fatigue, pain, mucositis, nausea, and sleep disturbances as major contributors to reduced QoL during radiotherapy[9,10]. Nayak et al. reported significantly lower physical domain scores among Indian cancer patients receiving radiotherapy, attributing this to treatment-related toxicities and disease-related symptoms[11] .

The psychological domain was also markedly affected, reflecting emotional distress, anxiety, depressive symptoms, and fear related to disease prognosis and treatment outcomes. Similar observations have been documented by Bottomley et al., who reported that psychological well-being often deteriorates during radiotherapy due to uncertainty, altered body image, and treatment-related stress[6] . The moderate psychological scores in the present study may also reflect inadequate access to structured psychosocial support services in routine oncology care.

In contrast, comparatively better scores were observed in the social relationships and environmental domains. This pattern has been reported in other Indian and Asian studies, where strong family support systems and close social networks help mitigate the social impact of cancer[11,12] . Environmental domain scores may reflect satisfactory access to healthcare facilities and perceived support from healthcare providers, despite the overall burden of illness.

Association with Stage of Cancer

Patients with advanced-stage disease demonstrated significantly lower QoL scores across all domains compared to those with early-stage cancer. This finding aligns with multiple previous studies showing that advanced disease is associated with higher symptom burden, greater functional impairment, and psychological distress[13,14] . Janda et al. reported that disease stage is one of the strongest predictors of QoL, with progressive decline observed as cancer advances[15] . The present study further substantiates the adverse impact of advanced disease on all aspects of quality of life.

Effect of Treatment Intent (Curative vs. Palliative Radiotherapy)

Patients receiving palliative radiotherapy had significantly lower overall QoL scores compared to those receiving curative treatment. Similar findings have been reported by other investigators, who noted that palliative treatment is often associated with advanced disease, persistent symptoms, and limited expectations of cure, all of which negatively influence QoL[16]. While palliative radiotherapy aims to alleviate symptoms, the overall QoL remains compromised due to disease severity and psychological factors.

Influence of Age

Older patients (>60 years) in the present study had significantly lower overall QoL scores compared to younger patients. This observation is consistent with earlier studies reporting that elderly cancer patients experience greater physical limitations, comorbidities, and reduced adaptive capacity during cancer treatment[17]. Additionally, age-related decline in functional reserve may exacerbate treatment-related toxicities, leading to poorer QoL outcomes.

Concurrent Chemotherapy

Patients receiving concurrent chemotherapy reported significantly lower QoL scores than those receiving radiotherapy alone. Previous studies have similarly demonstrated that combined modality treatment increases treatment-related toxicity, including fatigue, gastrointestinal symptoms, and hematological adverse effects, thereby worsening QoL[18,19]. The findings underscore the need for proactive symptom management and supportive care in patients undergoing concurrent chemoradiation.

Sex and Quality of Life

Although female patients showed slightly lower QoL scores compared to males, the difference was not statistically significant. Previous studies have reported mixed results regarding gender differences in QoL, with some demonstrating poorer psychological outcomes among women and others showing no significant association[20]. Cultural, social, and coping mechanisms may partly explain these variations.

Implications

The findings of this study highlight the necessity of integrating routine quality-of-life assessment into radiotherapy practice. Early identification of vulnerable patient groups—such as those with advanced disease, older age, receiving palliative treatment, or concurrent chemotherapy—can facilitate timely interventions including symptom control, psychological counseling, and social support services.

CONCLUSION

This cross-sectional study demonstrates that cancer patients receiving radiotherapy experience a moderate impairment in overall quality of life, with the physical and psychological domains being the most adversely affected. Patients with advanced-stage disease, those receiving palliative radiotherapy, older patients, and those undergoing concurrent chemotherapy showed significantly lower quality of life scores. In contrast, better scores were observed in the social and environmental domains, indicating the supportive role of family and healthcare settings despite the burden of disease and treatment. These findings highlight the need for a holistic, patient-centered approach in radiotherapy care that integrates symptom control, psychological support, and social interventions alongside oncological treatment to improve the overall quality of life of cancer patients.

REFERENCES

1. Cancer [Internet]. [cited 2026 Jan 22];Available from: https://www.who.int/news-room/fact-sheets/detail/cancer
2. Mee T, Kirkby NF, Defourny NN, Kirkby KJ, Burnet NG. The use of radiotherapy, surgery and chemotherapy in the curative treatment of cancer: results from the FORTY (Favourable Outcomes from RadioTherapY) project. Br J Radiol 2023;96(1152):20230334.
3. WHOQOL - Measuring Quality of Life| The World Health Organization [Internet]. [cited 2026 Jan 22];Available from: https://www.who.int/tools/whoqol
4. Bray F, Ferlay J, Soerjomataram I, Siegel RL, Torre LA, Jemal A. Global cancer statistics 2018: GLOBOCAN estimates of incidence and mortality worldwide for 36 cancers in 185 countries. CA Cancer J Clin 2018;68(6):394–424.
5. Skevington SM, Lotfy M, O'Connell KA, WHOQOL Group. The World Health Organization's WHOQOL-BREF quality of life assessment: psychometric properties and results of the international field trial. A report from the WHOQOL group. Qual Life Res 2004;13(2):299–310.
6. Bottomley A. The cancer patient and quality of life. Oncologist 2002;7(2):120–5.
7. Aaronson NK, Ahmedzai S, Bergman B, Bullinger M, Cull A, Duez NJ, et al. The European Organization for Research and Treatment of Cancer QLQ-C30: a quality-of-life instrument for use in international clinical trials in oncology. J Natl Cancer Inst 1993;85(5):365–76.
8. Montazeri A. Quality of life data as prognostic indicators of survival in cancer patients: an overview of the literature from 1982 to 2008. Health Qual Life Outcomes 2009;7:102.
9. Hickok JT, Morrow GR, McDonald S, Bellg AJ. Frequency and correlates of fatigue in lung cancer patients receiving radiation therapy: implications for management. J Pain Symptom Manage 1996;11(6):370–7.
10. Langendijk JA, Doornaert P, Verdonck-de Leeuw IM, Leemans CR, Aaronson NK, Slotman BJ. Impact of late treatment-related toxicity on quality of life among patients with head and neck cancer treated with radiotherapy. J Clin Oncol 2008;26(22):3770–6.
11. Nayak MG, George A, Vidyasagar MS, Mathew S, Nayak S, Nayak BS, et al. Quality of Life among Cancer Patients. Indian J Palliat Care 2017;23(4):445–50.
12. Pandey M, Thomas BC, SreeRekha P, Ramdas K, Ratheesan K, Parameswaran S, et al. Quality of Life determinants in women with breast cancer undergoing treatment with curative intent. World J Surg Onc [Internet] 2005 [cited 2026 Jan 22];3(1):63. Available from: https://wjso.biomedcentral.com/articles/10.1186/1477-7819-3-63
13. Conroy T, Bleiberg H, Glimelius B. Quality of life in patients with advanced colorectal cancer. [cited 2026 Jan 22];Available from: https://www.ejcancer.com/article/S0959-8049(02)00664-0/abstract
14. Fang FM, Chiu HC, Kuo WR, Wang CJ, Leung SW, Chen HC, et al. Health-related quality of life for nasopharyngeal carcinoma patients with cancer-free survival after treatment. Int J Radiat Oncol Biol Phys 2002;53(4):959–68.
15. Janda M, Steginga S, Dunn J, Langbecker D, Walker D, Eakin E. Unmet supportive care needs and interest in services among patients with a brain tumour and their carers. Patient Educ Couns 2008;71(2):251–8.
16. Kaasa S, Loge JH. Quality of life in palliative care: principles and practice. Palliat Med 2003;17(1):11–20.
17. Wedding U, Pientka L, Höffken K. Quality-of-life in elderly patients with cancer: a short review. Eur J Cancer 2007;43(15):2203–10.
18. Trotti A, Bellm LA, Epstein JB, Frame D, Fuchs HJ, Gwede CK, et al. Mucositis incidence, severity and associated outcomes in patients with head and neck cancer receiving radiotherapy with or without chemotherapy: a systematic literature review. Radiother Oncol 2003;66(3):253–62.
19. Bentzen SM, Trotti A. Evaluation of early and late toxicities in chemoradiation trials. J Clin Oncol 2007;25(26):4096–103.
20. Michelson H, Bolund C, Nilsson B, Brandberg Y. Health-related quality of life measured by the EORTC QLQ-C30--reference values from a large sample of Swedish population. Acta Oncol 2000;39(4):477–84.