

Original Article

# Assessing the Quality of Life of Patients With Radiation and Chemotherapy

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### ABSTRACT

**Objectives:** Cancer ranks as the second leading cause of death globally, responsible for approximately one in six deaths. Around 70% of these cancer-related deaths occur in low- and middle-income countries. Cancer impacts all aspects of an individual's life, and a diagnosis can significantly diminish a patient's quality of life (QoL), often due to the aggressive nature of treatment. The objective of this study is to assess the QoL of cancer patients with radiation and chemotherapy.

**Material and Methods:** A quantitative approach using a descriptive cross-sectional study design was conducted among 132 cancer patients aged 20 years and above who underwent either radiation or chemotherapy treatment. Purposive sampling was used for data collection. Patients undergoing radiation or chemotherapy for first and second-stage cancer were included, while those undergoing combined interventions or surgery were excluded from the study.

**Results:** The QoL of patients receiving radiation therapy (Group 1) showed that, among the seven domains assessed, psychological well-being had the highest mean score ( $6.90 \pm 1.57$ ), indicating better QoL in this domain. In patients receiving chemotherapy (Group 2), the highest QoL was observed in the domain of general well-being, with a mean score of  $6.79 \pm 2.98$ .

**Conclusion:** A cancer diagnosis is one of the most serious health challenges, significantly impacting the general well-being of patients throughout the treatment process. The QoL may vary depending on the treatment modality.

**Keywords:** Cancer, Chemotherapy, Quality of life, Radiation therapy, Treatment modality

### INTRODUCTION

Cancer is the second leading cause of death globally, accounting for one in six deaths, with nearly 70% occurring in low- and middle-income countries. In India, cancer mortality has doubled between 1990 and 2016. In 2018, the country recorded about 1.15 million new cancer cases, and this number is projected to almost double by 2040 due to demographic changes. Globally, lung cancer remains the leading cause of cancer-related deaths, accounting for 18% of all cancer fatalities, while in India, it has an incidence rate of 5.5% and contributes to nearly 8% of cancer deaths.<sup>[1]</sup>

Radiation therapy is a widely used cancer treatment, but it may produce long-term morbidities that emerge months or years after exposure, often becoming permanent. These adverse effects significantly influence patients' quality of life

(QoL), making its assessment vital yet complex. Evaluating toxicities requires careful differentiation between acute and chronic effects and consideration of varied follow-up durations. Clear reporting is needed as most acute effects gradually resolve over time. With improved survival and advances in treatment, there is an increasing focus on patient-reported outcomes and QoL.<sup>[2]</sup> Ionizing radiation damages both cancerous and normal cells within the treatment field; unlike surgery, which is invasive, and chemotherapy, which produces systemic effects, radiotherapy is localised and non-invasive.<sup>[3]</sup>

While radiotherapy can help patients maintain relatively good QoL, it may also induce stress and psychological symptoms. Side effects differ by radiation technique and treatment site. Many arise from cytotoxicity and inflammatory responses,

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leading to nausea, vomiting, fatigue, edema, or erythema. Although these are generally mild and self-limiting, they can evoke psychological distress, including anxiety and depression. Frequent treatment sessions may further remind patients of their illness, contributing to emotional burden and social withdrawal.<sup>[3]</sup>

In India, evidence on QoL among cancer patients remains limited, with most research emerging from Western populations. Scanty reports indicate poor QoL among patients receiving chemotherapy.<sup>[4]</sup> Some studies indicate that lower income was linked to reduced physical, social, and psychological well-being.<sup>[5]</sup> Studies on breast cancer patients noted overall good QoL but highlighted concerns regarding sexual functioning. Research is concentrated mainly in southern and eastern India, with fewer studies from northern regions. Significant associations between socio-demographic and clinical variables and breast cancer QoL have been reported.<sup>[6]</sup> Lung cancer patients in North India experienced declines in overall QoL and social functioning post-treatment.<sup>[7]</sup> Chemotherapy administered orally, intravenously, or subcutaneously affects QoL depending on cancer type and treatment stage.<sup>[8]</sup>

Cancer impacts all aspects of an individual's life. The diagnosis of malignancy profoundly diminishes a patient's QoL, which can persist due to the aggressive nature of treatment. Patients often undergo chemotherapy and radiation therapy as part of their treatment regimen.<sup>[9]</sup> The objective was to find the QoL of patients with radiation and chemotherapy.

## MATERIAL AND METHODS

A quantitative approach using a descriptive cross-sectional study design was conducted among 132 cancer patients aged 20 years and above who underwent either radiation or chemotherapy treatment. Ethical consent was obtained from the NUINS/CON/NU/IEC/2019–20/1471 ethical committee of the institute on April 10, 2019. The study took place at a selected tertiary care hospital in Mangaluru, a 1000-bed facility with an oncology department offering radiation and chemotherapy. The study procedures were explained, and informed consent was obtained from all participating patients. The sample size was calculated based on the estimation of the proportion, and purposive sampling was used for data collection. The study inclusion criteria were all the radiation therapy or chemotherapy patients with stage I and II cancer, and those willing to participate were included in the study. Those patients undergoing combined interventions of radiation and chemotherapy or surgery were excluded from the study.

The data were collected by using the two tools. The investigator reviewed the article and prepared the demographic and QoL

assessment tool. The first tool focused on demographic characteristics, including 12 items including types of cancer. The second tool was used to assess the QoL of patients with radiation and chemotherapy by using a four-point rating scale. This tool focused on seven domains: general well-being, physical well-being, economic well-being, cognitive well-being, spiritual well-being, rest and sleep, and psychological well-being. Participants rated each domain on a scale from 0-3, with higher scores indicating better QoL and those with lower scores indicating poor QoL, which was estimated based on the review of literature.<sup>[9,10]</sup> The tool was validated by seven nursing experts. A pilot study was conducted, and the data were analysed. The reliability of the tool was assessed by using Cronbach's alpha = 0.82, and it was found to be reliable. The data was collected after explaining the purpose of the study and obtaining consent. Collected data were entered into a Microsoft Excel spreadsheet, and analyses were done using SPSS version 20 for Windows.

## RESULTS

This study focuses on the QoL of cancer patients in the radiation and chemotherapy group. The collected data were analysed for normality using the Shapiro-Wilk test, and it was found that the data followed normality as the  $p > 0.05$  value for the Shapiro-Wilk test.

### Description of demographic characteristics of radiation (Group-1) and Chemotherapy (Group-2)

The demographic characteristics of the study participants are summarised in Table 1. Most participants (40, 61%) were aged 41-60 years, with a mean age of  $53 \pm 3$  years in the radiation group (1) and  $52 \pm 2$  years in the chemotherapy group (2). Homemakers constituted 43 (65%) in Group 1 and 30 (46%) in Group 2. The majority in both groups had education below secondary level, were married, and belonged to nuclear families (40 [61%] in Group 1 and 31 [47%] in Group 2). Most had a monthly income below ₹10,000 (40 [61%] in Group 1 and 35 [53%] in Group 2). Smoking and alcohol use were reported by 10 (15%) in Group 1, while 4 (6%) and 8 (12%) in Group 2, respectively. A family history of cancer was noted among 6 (9%) in Group 1 and 11 (17%) in Group 2. The majority had been diagnosed within the past 1-6 months (40 [61%] in Group 1 and 32 [48%] in Group 2), and most were in the first stage of cancer (50 [76%] in Group 1 and 52 [79%] in Group 2).

### Description of the type of cancer among the radiation and chemotherapy groups

The present study depicts that among those who underwent radiation therapy, the types of cancer were as follows: Cervical

**Table 1:** Frequency and percentage distribution of cancer patients according to the demographic characteristics

	n = 132				
	Demographic characteristics	Group-1 Radiation therapy patients (n = 66) Frequency (%)	Group-2 Chemotherapy patients (n = 66) Frequency (%)	Chi square test	p-value
Age (years)	20-40	12 (18)	11 (16)	2.37	0.49
	41-60	40 (61)	40 (61)		
	61-80	12 (18)	15 (23)		
	>80	2 (3)	0		
Sex	Male	30 (45)	34 (52)	0.4	0.48
	Female	36 (55)	32 (48)		
Occupation	Private employee	12 (18)	14 (21)	0.5	0.52
	Government employee	10 (15)	10 (15)		
	Home maker	43 (65)	30 (46)		
	Self employed	1 (2)	12 (18)		
Education	No formal education	5 (7)	8 (12)	6.09	0.19
	Primary education	33 (50)	23 (35)		
	Secondary education	23 (35)	24 (36)		
	Undergraduate	2 (3)	8 (12)		
	Graduate	3 (5)	3 (5)		
Marital status	Single	10 (15)	9 (14)	1.23	0.74
	Married	50 (75)	52 (78)		
	Divorced	3 (5)	1 (2)		
	Widow	3 (5)	4 (6)		
Type of family	Nuclear	40 (61)	30 (45)	3.6	0.16
	Joint	24 (36)	31 (47)		
	Extended	2 (3)	5 (8)		
Income per month (Rs)	<10,000	40 (61)	35 (53)	0.4	0.46
	10001-20000	10 (15)	20 (30)		
	20001-50,000	13 (20)	2 (3)		
	>50,001	3 (4)	9 (14)		
Personal habit	None	40 (60)	43 (65)	8.10	0.08
	Smoking	10 (15)	4 (6)		
	Alcohol	10 (15)	8 (12)		
	Pan chewing	3 (5)	8 (12)		
	Snuffing	3 (5)	0		
Family history of cancer	No	60 (91)	55 (83)	1.67	0.19
	Yes	6 (9)	11 (17)		
Duration of cancer	1-6 months	40 (61)	32 (48)	0.56	0.58
	6-12 months	10 (15)	23 (35)		
	12-18 months	6 (9)	7 (11)		
	18-24 months	10 (15)	4 (6)		
Stages of cancer	Stage-1	50 (76)	52 (79)	0.17	0.67
	Stage-2	16 (24)	14 (21)		

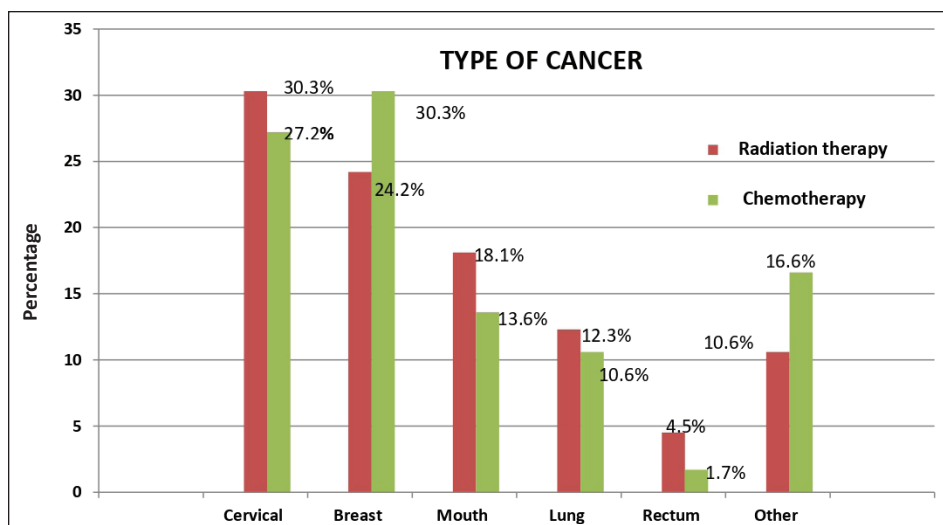


Figure 1: Type of cancer among radiation and chemotherapy groups.

cancer (20, 30.3%), Breast cancer (16, 24.2%), Mouth cancer (12, 18.1%), Lung cancer (8, 12.3%), Rectal cancer (3, 4.5%), and other cancers (7, 10.6%). In the chemotherapy group, the types of cancer were: Cervical cancer (18, 27.2%), Breast cancer (20, 30.3%), Mouth cancer (9, 13.6%), Lung cancer (7, 10.6%), Rectal cancer (1, 1.7%), and other cancers (11, 16.6%) [Figure 1].

#### Assessment of QoL of cancer patients in the radiation and chemotherapy groups

The QoL of patients receiving radiation therapy (Group 1) showed that, among the seven domains assessed, psychological well-being had the highest mean score ( $6.90 \pm 1.57$ ), indicating better QoL in this domain. In patients receiving chemotherapy (Group 2), the highest QoL was observed in the domain of general well-being, with a mean score of  $6.79 \pm 2.98$ . When comparing the two groups, a statistically significant difference was found in the domains of general well-being, economic well-being, cognitive well-

being, spiritual well-being, and psychological well-being ( $p < 0.05$ ) [Table 2].

#### DISCUSSION

This study focused on subjects who were majority aged 41-60 years. A similar study was conducted to assess the QoL of cancer patients, which depicts that the mean age at diagnosis was 57 years (range, 16-86 years).<sup>[11]</sup>

The present study result depicts the reported cases of smoking and alcohol consumption in both groups. These results were congruent with the study concluding that alcohol and tobacco, alone or in combination, are associated with an increased risk of various cancers.<sup>[12]</sup>

In this study had a family history of cancer this was similar to the study report it shows that 08 (51.08%) reporting first degree relatives with cancer.<sup>[12]</sup> The majority of participants in both groups had been diagnosed with cancer for less than 1-6 months, these findings were supported by the cohort

Table 2: Quality of life of patient receiving radiation therapy and chemotherapy

QoL domain	n = 132			
	Radiation therapy (Mean $\pm$ SD)	Chemotherapy (Mean $\pm$ SD)	t-value	p-value
General wellbeing	3.79 $\pm$ 0.98	6.79 $\pm$ 2.98	7.7	0.001
Physical wellbeing	2.90 $\pm$ 0.76	3.00 $\pm$ 0.26	1.01	0.31
Economic wellbeing	2.64 $\pm$ 1.34	4.64 $\pm$ 0.24	11.9	0.001
Cognitive wellbeing	4.86 $\pm$ 1.44	3.86 $\pm$ 1.44	3.98	0.001
Spiritual wellbeing	4.88 $\pm$ 1.32	2.08 $\pm$ 1.02	13.6	0.001
Rest and sleep	4.45 $\pm$ 3.75	3.45 $\pm$ 1.75	1.96	0.05
Psychological wellbeing	6.90 $\pm$ 1.57	4.00 $\pm$ 1.07	12.4	0.001

QoL: Quality of Life, SD: Standard deviation.

study results it depicts the cancers with the shortest median diagnostic intervals were breast (26 days), testicular (44 days), and lung (112 days), cervical (232 days) The 90th centile diagnostic intervals were 4–7 months for both cohorts for breast and testicular cancers.<sup>[13]</sup>

Present study depicts that radiation or chemotherapy treatment given for different types of cancer like breast cancer, cervical cancer, rectal cancer, and ovarian cancer, obtained similar findings to the study conducted by Seol KH *et al.*, it also depicts breast cancer in 7 (26.9%), cervical cancer in 4 (15.4%), rectal cancer in 2 (7.7%), ovarian cancer in 1 (3.8%), and lung cancer in 1 (3.8%).<sup>3</sup> Another study also supported that most were diagnosed with cervical (32.7%) and breast cancer (14.5%).<sup>[14]</sup>

The results show that the QoL of patients receiving radiation therapy showed that out of seven domains, physical and economic well-being were more worsened compared to other domains. Similar findings were observed in a study conducted by Seol KH *et al.*, which also indicated that economic imbalance and financial difficulty were significantly associated with a lower QoL score ( $p = 0.010$ ).<sup>[3]</sup>

In chemotherapy (Group 2), the affected domain was physical and spiritual well-being. In another study, findings indicated that the emotional domain was minimally impacted in both study groups ( $p = 0.800$ ). Specifically, 92% of patients undergoing radiotherapy reported mild effects on their physical domain, compared to 47% of patients receiving chemotherapy who reported moderate effects.<sup>[15]</sup>

The findings of the other study involving chemotherapy patients showed a statistically significant enhancement was observed in the overall QoL score ( $p = 0.005$ ). Conversely, cognitive functioning notably declined ( $p = 0.01$ ). Despite improvements in physical (PF) and emotional functioning (EF) scores, role (RF) and social functioning (SF) scores exhibited a decrease.<sup>[16]</sup>

In this study, significant differences between the two groups were found in general, economic, cognitive, spiritual, and psychological domains. A similar pattern has been reported in the literature: Raof *et al.* compared QoL in cancer patients treated with chemotherapy versus radiotherapy and found that patients receiving chemotherapy experienced more impairment in several QoL domains compared to the radiotherapy group.<sup>[16]</sup>

### Limitations of the study

One of the limitations of the study is its relatively small sample size and its focus on a single centre. Additionally, the study was restricted to patients with stage I and II cancer and did not use any standardised tool to assess QoL.

## CONCLUSION

A cancer diagnosis presents one of the most profound health challenges, deeply affecting patients' overall well-being throughout their treatment journey. Radiation therapy and chemotherapy remain the most commonly used cancer treatments. This chapter explores the QoL in patients undergoing these therapies and highlights areas for future research. The QoL domains differ between patients undergoing radiation therapy and those receiving chemotherapy.

**Ethical approval:** The research/study was approved by the Institutional Review Board at Nitte Usha Institute of Nursing Sciences, number NUINS/CON/NU/IEC/2019–20/1471, dated 10th April 2019.

**Declaration of patient consent:** The authors certify that they have obtained all appropriate patient consent forms. In the form, the patient has given consent for clinical information to be reported in the journal. The patient understands that the patient's names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

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