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Original Article

Assessing Perceived Quality-of-Life of Patients with Cancer in Day-Care Setting from Southern India

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ABSTRACT

Background: Quality of Life (QoL) is a key outcome measure in cancer care demonstrating the multidimensional impact of disease burden and therapy beyond survival. While patients undergoing chemotherapy experience toxicities, their QoL is affected. However, longitudinal data describing within-patient change across chemotherapy course in day-care Indian setting are limited. **Materials and Methods:** This prospective observational study was conducted by including adult cancer patients receiving chemotherapy at day-care facility in three different pre-defined time points, baseline (pre-chemotherapy), early therapy phase (post-two cycles) and late therapy phase (end-of-therapy or ≥5-cycles). QoL was measured using self-designed, pre-validated questionnaire. **Results:** 110 participants completed QoL assessment at all three time points. Mean perceived QoL scores declined from baseline (56.8±8.5) to early therapy (49.9±9.9) and there was a partial recovery by the end (54.7±9.2) of the therapy (p<0.001). Domain wise analysis showed persistent impairment in physical and social functioning across therapy phase, whereas emotional well-being improved progressively during the therapy course. No significant association was observed among the age groups, however females reported to have worsened QoL than males at the end of the therapy. **Conclusion:** Perceived QoL during the chemotherapy follows a dynamic course with decline in the early phase and marginal recovery in the later/end phase of the therapy. QoL during later therapy phases appears to be driven by emotional adaptation rather than the resolution of physical or social functioning.

Keywords: Cancer, Day-Care Setting, Longitudinal Study, Oncology, Quality-of-Life.

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INTRODUCTION

Cancer is one of the major public health challenges globally, with an estimated incidence of 19.3 million and nearly 10.0 million mortalities in 2020 (Sung *et al.*, 2021). Health-related Quality of Life (HRQoL) is recognized and established endpoint in oncology with measures of direct implications of disease, drugs, cost on physical, social and mental status (Nayak *et al.*, 2017). The World Health Organization Quality of Life (WHOQOL) group defines Quality of Life (QoL) as an individual's perception of their position in life within the context of their culture, value systems, goals, expectations and concerns (World Health Organization, 1995).

Patient diagnosed with malignancies frequently experience a higher burden of physical symptoms, psychological distress and social disruption, additionally contributed by socio-economic reasons in Indian clinical setting. This substantially impairs QoL of patients. Chemotherapy, a central management of many solid and hematological malignancies, comes with adverse events that affect both physical and emotional wellbeing of patients (Chagani *et al.*, 2017). Several prospective clinical trials include HRQoL often and have shown that they decline during the chemotherapy due to various toxicities such as fatigue, nausea, neuropathy, sleep disturbances, alopecia, neutropenia, infections and role limitations, particularly in early and middle cycles of therapy (Binotto *et al.*, 2020).

In India and other Low-Middle Income Countries (LMIC), studies have documented low or compromised HRQoL among adults with cancer, specifically implicating on the symptom burdens, financial toxicities, and limited supportive care resources (Nayak *et al.*, 2017; Ramasubbu *et al.*, 2021; Korankulangara *et al.*, 2024). Studies from Southern India and other regions report that a large proportion of patients have average or below-average HRQoL during therapy, emphasizing the need for routine assessment and supportive interventions (Kannan *et al.*, 2011).

A recent systematic review of QoL studies among Indian cancer patients concluded that majority of the studies are cross-sectional in nature, where patient reported outcomes are captured at single

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time point during the course, thereby limiting the interpretation of how QoL is being affected (Korankulangara *et al.*, 2024; Kumari *et al.*, 2025). Longitudinal data evaluating within-patient changes in QoL across chemotherapy cycles remains limited. Outpatient chemotherapy is being practiced widely and been adopted in LMICs and day-care chemo units are increasing in numbers. However, data on patient-reported QoL from such settings are scarce. Day-care models differ from inpatient care in terms of treatment intensity, caregiver involvement, and continuity of supportive care, all of which may influence patients' perceived QoL during the therapy.

Current literatures consistently report decline in QoL during active chemotherapy, however over the time as they adapt to their diagnosis, therapy process and supportive care, individuals' perceptions of wellbeing may change. Particularly in India, QoL among patients with cancer is strongly influenced by socio-cultural factors, family support, and access to supportive care services. Given these limitations and perceptions, there is a need for prospective longitudinal studies that assess change in QoL within the clinical routine practice.

MATERIALS AND METHODS

Study Design and Setting

This was a prospective, observational, longitudinal study conducted in the oncology day-care unit of Kempegowda Institute of Medical Sciences (KIMS) Hospital and Research Centre, Bangalore, India. The study was conducted over a year from following the approval from Institutional Ethics Committee (KIMS/IEC/AO79/P/2023).

Study population

Adult patients of either sex diagnosed with any solid or hematological malignancies and receiving chemotherapy in the oncology day-care unit were screened for the participation. Patients were eligible if they were conscious, clinically stable, and willing to provide written informed consent. Patients with altered sensorium, hemodynamically unstable, or critically ill-patients with limited ability to participate were excluded.

Sampling method and sample size

A prospective convenience sampling strategy was employed over a period of one year. All eligible patients in the oncology day-care unit during the study period and consenting to participate were enrolled.

QoL Assessment Tool

Quality of life was assessed using a self-developed, structured questionnaire, designed to capture patient-reported perceptions of well-being. The questionnaire was developed after review of existing literature on cancer-related quality of life and consultation with clinicians experienced in oncology care. Face validity was established through expert review.

The instrument was designed to assess multidimensional aspects of QoL in 6 domains (Table 1). Each item was scored on a 4-point Likert scale ranging from 1 (not at all) to 4 (very much), with higher scores indicating better perceived quality of life. The questionnaire was available in English and Kannada. A pilot study was conducted in 20 patients to assess internal consistency, yielding a Cronbach's alpha of 0.88. Given that several items are framed to assess perceived change following treatment, the questionnaire primarily captures patients' subjective adaptation and appraisal of well-being rather than objective clinical outcomes.

Assessment time points

QoL assessment was performed at three predefined time points to evaluate the longitudinal changes during the chemotherapy course. A baseline QoL was assessed at the time of enrolment, during which patients were asked to rate their perceived QoL prior to the initiation of chemotherapy. The second assessment was carried out after two cycles of therapy to evaluate the QoL in the early phase of therapy. The endpoint QoL assessment was performed at the end of the therapy or after completion of at least five cycles of therapy, whichever occurred earlier. The questionnaire was self-administered by patients and only patients who completed assessments at all three time points were included in the final analysis (Figure 1).

Outcome Measures and Statistical Analysis

The primary outcome measure was the change in total perceived QoL scores across the three assessment time points. Secondary outcomes included domain-specific changes in QoL scores and their association with demographic variables. Continuous variables were expressed as mean ± standard deviation, while categorical variables were presented as frequencies and percentages. Associations between categorical variables were assessed using the Chi-square test. For all statistical analyses, a p-value of <0.05 was considered statistically significant. Statistical analyses were performed using SPSS version 20.0. Quality of life (QoL) scores were treated as continuous variables and assessed at baseline, after two cycles of therapy, and at the end of treatment. However, a formal repeated-measures statistical analysis (such as repeated-measures ANOVA or the Friedman test) was not performed in the present study. Therefore, the observed changes in QoL over time was interpreted as descriptive trends rather than statistically confirmed differences.

RESULTS

A total of 110 patients were included in the study and QoL data of all predefined time points were filled and included in the final analysis. The mean age of the participants was 56.0 ± 12.7 years. 60% of the population were female patients (Table 2).

Patient-reported perceived QoL measures indicated a constant variation across treatment phases. At baseline, prior to initiation of chemotherapy, the mean total QoL score was 56.8 ± 8.5. During the early phase of chemotherapy, assessed after completion of two cycles, the mean score declined to 49.9 ± 9.9. At the end of therapy, defined as completion of the planned chemotherapy regimen or at least five cycles, the mean perceived quality-of-life score increased to 54.7 ± 9.2 (Table 3). The early phase of chemotherapy was associated with the lowest median QoL scores, showing lower acceptance and adaptability to the therapy and disease. Although an increase in scores was observed during the later phase of therapy, end-of-treatment scores did not fully return to baseline levels.

The distribution of QoL categories across treatment phases is illustrated in Figure 2. At baseline, the majority of patients were categorized as having high perceived QoL. Following initiation of chemotherapy, a shift toward moderate and poor QoL categories was observed. At the end of therapy, there was a relative increase in the proportion of patients reporting high perceived quality of life compared to the early treatment phase, though this proportion remained lower than baseline.

Analysis of individual domain resulted in even more broader implications of the perception. General health conditions and physical activity domains showed a decline during early chemotherapy, with partial improvement noted at the end of therapy. Cognitive functioning depicted modest variation across phases, with scores remaining relatively stable compared to other domains. The social functioning domain consistently recorded the lowest scores across all three assessment points, with minimal improvement noted at the end of therapy. However, emotional well-being scores exhibited a gradual increase from baseline through early and late phases of chemotherapy, indicating improvement in emotional adaptation despite ongoing treatment (Table 4).

Comparative analysis across the different time points demonstrated a statistically significant decline in perceived QoL scores (Table 5). However, the difference between baseline and end-of-therapy scores was not statistically significant, possibly due to adverse events complicated by chemotherapy. No statistically significant association was observed between age group and QoL, however, sex was significantly linked with the Qol (Table 6).

DISCUSSION

In this longitudinal study of evaluating the perceived QoL in patients receiving chemotherapy in a day-care setting in India, baseline perceived QoL was highest before the therapy, declined significantly post 2 cycles and showed a partial recovery at the end of the therapy. This highlighted the pattern of perception of patients on the disease and therapy. Several Indian studies have shown that patients undergoing chemotherapy typically reports lower QoL during the active chemotherapy in view of chemotherapy induced toxicities (Singh *et al.*, 2014).

Our findings of lower perceived QoL during the early chemotherapy phase compared with baseline are consistent with studies in breast and mixed solid tumors where global health status and functional scales decline significantly post initiation of chemotherapy (S. *et al.*, 2025; Karimi and Brazier, 2016). Domain analysis showed that the general health and physical activity scores declined during early start chemotherapy and partially improved at the end of therapy. Prospective Indian studies have repeatedly identified certain factors that would be responsible for this, including anemia, fatigue, infections, repeated hospitalization and social stigma (S. *et al.*, 2025; Licu *et al.*, 2023; Islam *et al.*, 2023). Our pattern of persistent, though attenuated,

Table 1: Conceptual Framework and Interpretation of the Quality-of-Life Questionnaire.

Domain	Context	Clinical Relevance	Interpretation of Change
General Conditions	Symptom burden	Patients on chemotherapy experiences loss of appetite, sleep and symptom burden.	Better symptom relief and/or tolerance, rather than absence of toxicities.
Physical Activities	Role Limitations	Chemo drugs significantly alters one's physical status (mobility, fatigue)	Adaptation or maintenance to the therapy.
Cognitive Conditions	Attention, memory, and emotional isolation	Socio-economic factors along with therapy stresses the mental health of patients.	Emotional strength, Mental Clarity, and acceptance and adaptability to disease and therapy.
Social Activities	Social participation and occupational functioning	Physical and social stigma post diagnosis and therapy	Social acceptance and withdrawal.
Emotional Conditions	Psychological well-being, distress regulation, and hope	Diagnosis and familial support fear	Coping strategies.

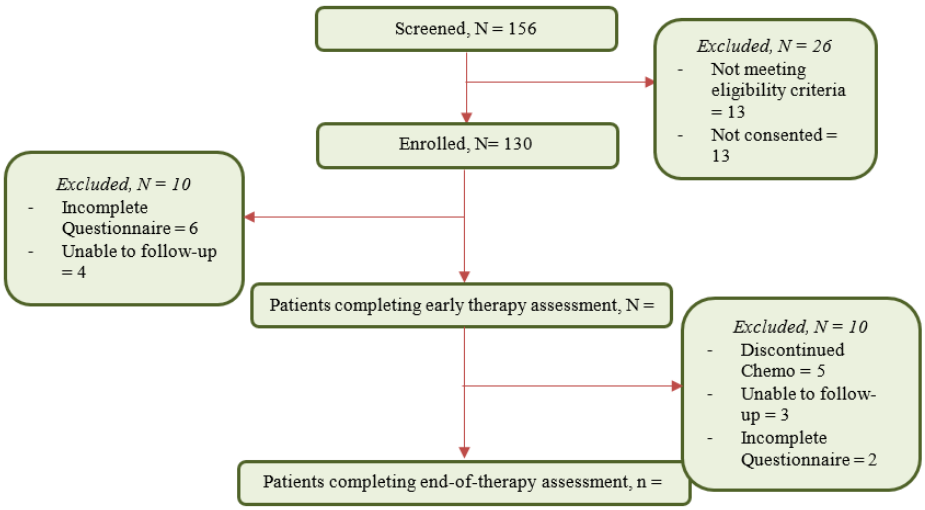


Figure 1: Flow of participants throughout the study.

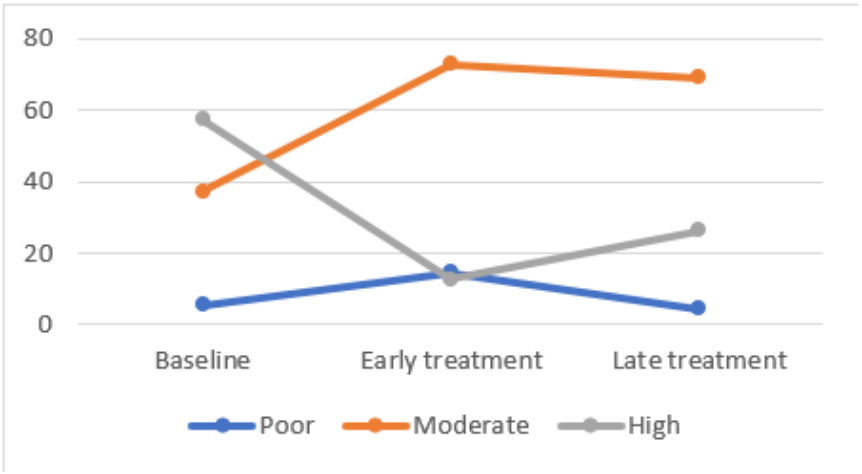


Figure 2: Distribution of QoL Categories Across Treatment Phases.

Table 2: Baseline Sociodemographic Characteristics.

Parameters	Value
Age in years, Mean ± SD	56 ± 12.7
Age in years, *n* (%)	
<50	32 (29.1)
50 – 59	32 (29.1)
60 – 69	28 (25.5)
>70	18 (16.4)
Sex	
Males	44 (40)
Females	66 (60)

physical compromise at the end of therapy is therefore similar to a chronic symptom state rather than acute symptom burden in cancer setting.

In contrast, emotional QoL scores were improved during and at the end of the therapy. Emotional adaptation, coping, and hope has improved over the study period. However, studies have reported high rates of depression, cognitive impairment, anxiety and existential distress during the diagnosis and therapy (Philipp *et al.*, 2025; An *et al.*, 2018). At the same time, structured counselling, family support, spiritual coping, and government financial supports have impacted on emotional status of patients (Fereidouni *et al.*, 2024).

One of the most concerning factors in our findings is social functioning, which remained the weakest domain across all time points in the study. Social and role functioning are especially vulnerable to the combined effect of stigma, financial hardship and body-image concerns. Southern Indian data from participants having cervical, head and neck and mixed cancer showed social isolation, decreased social gathering, especially seen more in lower socio-economic background individuals (Somanna *et al.*, 2022). Chemotherapy induced alopecia, skin discoloration, visible treatment aids act as barrier to social reintegration.

Table 3: Total Perceived Quality-of-Life Scores at Different Treatment Phases.

Time points	Mean ± SD	Median (IQR)	Minimum–Maximum
Baseline (Pre-Chemotherapy)	56.8 ± 8.5	57 (51–63)	35 – 78
Early Treatment Phase (post 2-cycles)	49.9 ± 9.9	49.5 (42–55)	28 – 76
Late Treatment Phase (End of therapy or ≥5 cycles)	54.7 ± 9.2	54 (49–61)	25 – 77

Table 4: Domain-wise Mean QoL Scores Across Treatment Phases.

Domain	Baseline Mean ± SD	Early treatment Mean ± SD	Late treatment Mean ± SD
General conditions	12.6 ± 2.1	10.1 ± 2.4	11.8 ± 2.3
Physical activities	11.2 ± 2.3	8.9 ± 2.6	9.7 ± 2.4
Cognitive conditions	9.8 ± 1.9	8.9 ± 2.0	9.5 ± 1.8
Social activities	8.5 ± 2.0	6.2 ± 2.1	6.8 ± 2.2
Emotional conditions	14.7 ± 2.8	15.8 ± 3.0	16.9 ± 2.7
Total QoL score	56.8 ± 8.5	49.9 ± 9.9	54.7 ± 9.2

Table 5: Comparison of Total QoL Scores Across Treatment Phases.

Comparison	Mean difference	Test	*p*-value
Baseline vs Early treatment	– 6.9	RM – ANOVA / paired	< 0.001
Early vs Late treatment	+ 4.8	Paired t-test	< 0.01
Baseline vs Late treatment	– 2.1	RM – ANOVA	0.08

Table 6: Association of Late-Treatment QoL with Sex.

Gender	Poor n (%)	Moderate n (%)	High n (%)	χ^2	p
Male	2 (4.5)	37 (84.1)	5 (11.4)		
Female	3 (4.5)	39 (59.1)	24 (36.4)	8.65	0.013

We did not find any correlation with age groups. Generally older patients tend to have decreased performance status, organ dysfunction, comorbidities, which contributes to poor treatment outcomes, increased chemotherapy induced toxicities directly affecting the QoL. Interestingly our study did not find any significance among the age groups. Sex differences were statistically significant which could be explained by the hormonal changes during the chemotherapy, decreased body mass surface in women, and organ functional capacity. Taken together, our study implicated that in Indian population, day-care chemotherapy patients are shaped by a complex interplay of disease-therapy related factors and socio-economic constraints. Off note, our day-care based approach, integrated within routine chemotherapy delivery, is consistent with the longitudinal direction and may be particularly relevant as decentralized chemotherapy services expand in India.

Limitation must be acknowledged when these results are being interpreted. First, this was the single-center study from a tertiary care teaching hospital with a day-care chemotherapy unit and used consecutive convenient sampling strategy, which may limit generalizability. Second, study included a heterogenous mix of malignancies and chemotherapy regimens without stratification of cancer type or stage or therapy, which would bias the interpretation of QoL across different cancer types. Finally, attrition bias can't be unnoticed, as only all completed patients were included for final analysis.

CONCLUSION

Our study demonstrated that perceived QoL among patients undergoing chemotherapy in day-care setting exhibit a dynamic trajectory, characterized by an initial decline post-two cycles with partial recovery at the end of therapy or >5 cycles. Importantly for an Indian context, physical and social functioning was a challenge. This longitudinal study reflects the complex interplay between treatment burden and therapy.

ABBREVIATIONS

QoL: Quality of Life; **HRQoL:** Health-related Quality of Life; **WHO:** World Health Organization; **WHOQOL:** World Health Organization Quality of Life; **LMIC:** Low- and Middle-Income

Countries; **KIMS:** Kempegowda Institute of Medical Sciences; **SPSS:** Statistical Package for the Social Sciences; **RM-ANOVA:** Repeated-measures Analysis of Variance; **SD:** Standard Deviation; **IQR:** Interquartile Range; **χ^2:** Chi-square; **p:** Probability Value; **n:** Number or Frequency.

CONFLICT OF INTEREST

The authors declare that there is no conflict of interest.

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