

Health-Related Quality of Life in Patients with Cancer in India: A Systematic Review

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ABSTRACT

Introduction: Cancer poses numerous health-related threats to patients, significantly impacting their Quality of Life (QoL) and that of their caregivers. This systematic review aims to assess the prevalence and severity of QoL-related health issues among cancer survivors in India using the World Health Organization Quality of Life (WHOQOL) framework. The review will explore the patients' lived experiences that will ultimately manifest the importance of health-related QoL for cancer patients.

Method: The PRISMA guidelines were followed to conduct the review. PubMed, Embase, and Scopus were searched for eligible studies, resulting in the inclusion of 34 quantitative descriptive studies focusing on adult cancer patients in India.

Results: Most of the included studies reported low or below-average overall QoL of the patients. Factors such as pain, fatigue, emotional distress, social relationships, and financial burden significantly influenced overall QoL and its subdomains. Demographic factors (age, marital status, religion), cancer-related variables (stage, site, treatment type), and social determinants of health (education, information access) also played roles in affecting QoL. Due to study inconsistencies, conclusive comparisons were challenging.

Conclusion: The findings underscore the necessity for a comprehensive, culturally adapted approach to enhancing QoL, along with the development of standardized assessment tools and longitudinal study designs.

Keywords: Cancer, Health-related Quality of life (HRQoL), India, World Health Organization Quality of Life (WHOQOL)

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INTRODUCTION

Cancer represents a significant driver of morbidity and mortality on a global scale.¹ In the Indian context, the probability of an individual developing cancer within their lifetime is estimated to be one in nine. In 2022, it is estimated that there will be 1,461,427 new cases of cancer in India, with an incidence rate of 100.4 per 100,000 people.² The National Cancer Registry Programme Report 2020 confirmed a significant increase in India's cancer cases and projected a potential further increase of 12% over the next five years.³

Individuals diagnosed with cancer may experience a spectrum of symptoms due to their disease condition. The advancement of cancer following diagnosis substantially influences the quality of life (QOL) of patients, as well as that of their families and communities.⁴ As a result of medical advancements, particularly in early detection and treatment, the anticipated survival period for cancer patients has notably lengthened. This phenomenon has spurred increased interest in examining the quality of life (QOL) among individuals who are diagnosed with cancer.⁵ Although disease progression-free survival has been increasing with the advancement of cancer treatment, the disease and the adverse effects of curative treatment significantly affect the quality of life (QOL) of patients.⁶ In recent years, there has been a marked increase in interest among researchers and policymakers regarding the evaluation of quality of life (QOL) and its determinants in cancer patients.⁷

The World Health Organization (WHO) has defined quality of life, stating that "individuals' perceptions of their position in life in the context of the culture and value systems in which they live and about their goals, expectations, standards, and concerns".⁸ The main aim of this systematic review is to consolidate the findings concerning the prevalence and severity of both overall quality of life (QOL) and specific subdomains of QOL among cancer patients in India, as well as to analyze the factors that influence them. This review is guided by the World Health Organization Quality of Life (WHOQOL) framework, providing a comprehensive, multi-dimensional approach to evaluating QOL. The WHOQOL framework encapsulates the multi-faceted nature of QOL, it encompasses an assessment of physical health, psychological health, level of independence, social relationships, environmental factors, and spiritual/religious/ personal beliefs.⁹ By adopting this framework, the review aims to holistically assess not only the prevalence and severity of overall QOL but also its subdomains.

This systematic review would potentially fill the existing knowledge gap, offer insights into the patients' lived experiences, and ultimately guide interventions to improve their QOL. The findings could also provide a comparative perspective, contributing to the global discourse on the QOL of cancer patients.

METHODOLOGY

We followed the 2020 Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines to structure and conduct our review. These guidelines ensure a systematic and transparent approach to the literature review process, including search strategy, study selection criteria, data extraction, and synthesis.¹⁰ This review has been registered with PROSPERO, the International Prospective Register of Systematic Reviews, under the registration ID CRD42021295406.

Eligibility criteria: Studies were eligible for inclusion in this review if they met the following criteria: 1) the study population comprised adult cancer patients in India; 2) the research utilized quantitative descriptive methods; 3) the study measured and reported outcomes related to quality of life (either overall or specific subdomains); and 4) the studies were available as full-text articles in English.

Information sources and search strategy: Our search strategy encompassed the entire available period up to March 12, 2024, across several databases, including PubMed, Embase (Elsevier), and Scopus (Elsevier), to ensure the inclusion of all pertinent studies on the subject. The search strategy involved a combination of keywords and subject headings relevant to the research objective, specifically focusing on quality of life (QOL) or health-related quality of life (HRQOL), India, and cancer. This approach was designed to comprehensively identify studies that addressed the QoL of cancer patients in the Indian context. Excluded from consideration in this review were conference abstracts, narrative or systematic reviews, editorials, expert opinions, comments (commentary), methodological articles, and conference proceedings. Additionally, studies that assessed the impact of specific interventions on health-related quality of life (HRQoL), such as those involving sports, exercise, yoga, or focus groups, were not included. The search strategy was initially developed for PubMed and then tailored to fit the specific requirements of the other databases. This sequential approach ensured consistency and thoroughness in searching across all databases.

Study selection: The search results were transferred to Rayyan (<http://rayyan.qcri.org>), a systematic review tool, where duplicates were identified and eliminated. This step was crucial for ensuring that each study was only included once in the review, maintaining the integrity and accuracy of the results.¹¹ Each title and abstract were screened independently by two researchers for the eligibility.

Subsequently, each full-text article was independently evaluated for eligibility by two researchers. Conflicts were resolved through group discussions at both screening stages. This method ensured the consistent application of inclusion criteria and a thorough evaluation of each article's suitability for inclusion in the review.

Quality Assessment: The methodological quality of the included studies was assessed using the 2018 version of the Mixed Methods Appraisal Tool (MMAT). This tool is designed to evaluate the quality of studies that use qualitative, quantitative, and mixed methods, ensuring a comprehensive assessment of the included studies.¹² This tool consists of five quality criteria, each rated as "yes," "no," or "could not determine" for individual criteria, rather than producing an aggregate score. Two researchers conducted independent assessments of the studies' quality, resolving discrepancies through discussions. Ratings for each criterion were determined based on the detailed guidance provided in the MMAT tool.

Data extraction and synthesis: Following the WHOQOL framework, covering a range of domains and subdomains related to quality of life.¹³ (Table 1), our research team independently extracted and documented data using Excel. The data included dimensions such as physical health, psychological health, level of independence, social relationships, environment, and spirituality/religious beliefs. Discrepan-

cies were settled through discussion. Due to the inconsistent and incomplete nature of information across studies, including differences in populations, measurements, and outcomes, conducting a meta-analysis of the outcomes was deemed unfeasible. Therefore, we chose to perform a narrative analysis to synthesize and consolidate our findings.

RESULTS

Study characteristics: The initial database search resulted in 1237 research articles (Figure 1).¹⁴ Following the elimination of duplicate papers and studies that did not meet the eligibility criteria, a total of 34 articles were included in the review (N = 34 studies).¹⁵⁻⁴⁸ The characteristics of these studies are detailed in Table 2. The included studies employed various study designs, including prospective cross-sectional studies (n = 29), not-prospective (n = 29), cross-sectional (n = 1), case-control (n = 2), longitudinal (n = 1), descriptive case series (n = 1), and clinical trial (n = 1).

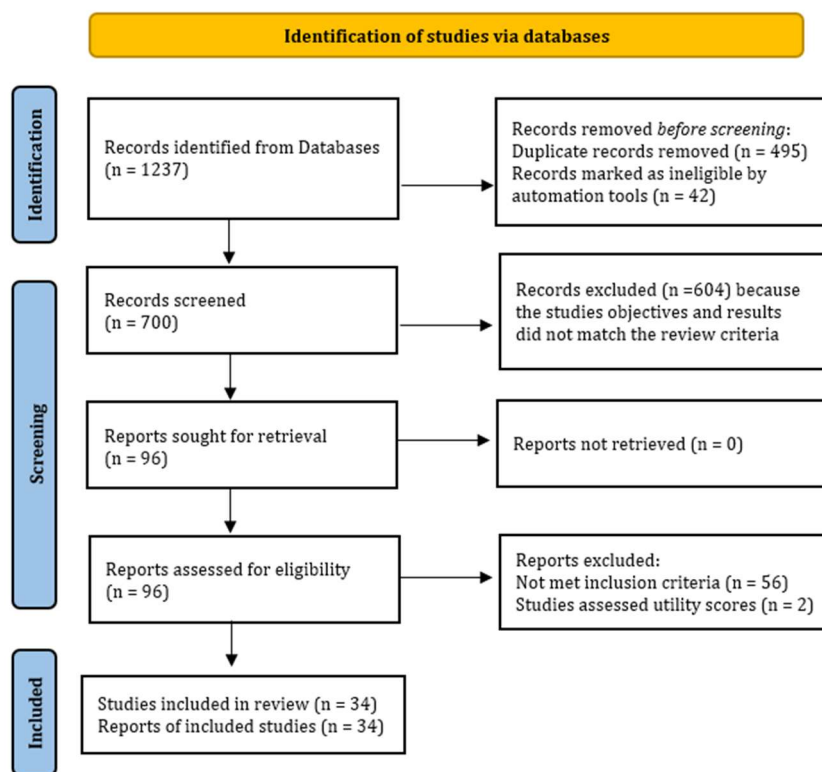


Figure 1: PRISMA flow chart for study selection

Table 1: Structure of WHOQOL domains and facets

Domain	Facets
Physical Health	Pain and Discomfort; Energy and Fatigue; Sleep and Rest
Psychological	Positive Feelings; Thinking, memory, learning, and concentration; Self-esteem; Bodily Image and Appearance; Negative Feelings
Levels of Independence	Mobility; Activities of Daily Living; Dependence on Medication and Treatment; Work Capacity
Social Relationships	Personal Relationships; Practical Social Support; Sex
Environmental	Physical Safety and Security; Home Environment; Financial Resources; Health and Social Care: availability and quality; Opportunities for Acquiring New Information and Skills; Participation in, and new opportunities for Recreation and Leisure; Physical Environment; Transport
Spirituality, Religion and Personal Beliefs	

Table 2: Characteristics of included studies

S.No	First Author, Year	Study Aim	Sample size	Study Design	Cancer Type and Stage of Survivorship	Mean age	Gender
1	Sarkar S, 2022 ¹⁵	To assess the QoL of Indian OC patients undergoing first-line treatment in a high-volume tertiary care hospital in Eastern India.	110	Longitudinal study	Advanced epithelial ovarian cancer (FIGO stages III-IV)	49.15±10.8	Female 110
2	Asthana S, 2019 ¹⁶	To assess the quality of life, problems, and needs of advanced cancer patients receiving palliative care	100	Cross-sectional	Different types of advanced Cancer	Males 47 ± 13.9 yrs, Females 42.2 ± 9.4 yrs	49 males, 51 females
3	Kamatchinathan P, 2016 ¹⁷	To assess the QoL of Oral Cancer patients in the pre-operative period to provide psychological support	171	Cross-sectional	Oral Cancer	50.2 ± 10.4	122 men, 49 women
4	Somanna SN, 2022 ¹⁸	To determine QoL and its determinants among cervical cancer patients	210	Cross-sectional	Cervical cancer patients	Not mentioned	210 women
5	Deb Barma M, 2021 ¹⁹	To assess the quality of life among treated head and neck cancer patients.	225	Cross-sectional	Head and neck cancer	53.1 ± 12.51	162 males, 63 females
6	Singh GK, 2021 ²⁰	To estimate the cancer related fatigue (CSF) scores in patients with CNS tumors	100	Cross-sectional	CNS tumors	Median age 40	72 men, 28 women
7	Gandhi AK, 2014 ²¹	To assess symptom burden and quality of life (QOL) in advanced incurable HNCa patients	100	Cross-sectional	Locally advanced head and neck cancer patients	Median age 55	83 males, 17 females
8	Paksherest, 2011 ²²	To assess the Quality of life of women with breast cancer at the time of diagnosis.	172	Descriptive – Case series	Newly detected primary breast cancer patients	Mean age 46.99, median 45	172 females
9	Ramasubbu SK, 2020 ²³	To assess the QoL & factors affecting it in adult cancer patients undergoing chemotherapy in Uttarakhand region	120	Cross-sectional analytical	Different types of cancer	Mean age 49.68	55 males, 65 females
10	Kumar A, 2021 ²⁴	To determine the time taken by patients for seeking care from registered medical practitioners, time to definitive diagnosis and treatment initiation, expenditure incurred, and Quality of Life.	192	Cross-sectional descriptive	Head and neck cancer	Not mentioned	128 males, 64 females
11	Jacob J, 2019 ²⁵	To assess HRQoL in terms of general well-being, pain experiences, psychological state, and spiritual well-being	210	Cross-sectional	Different types of solid tumor stage 4	Mean age 49	100 males, 110 females
12	Sudarisan SSP, 2019 ²⁶	To assess the prevalence of depression, its correlates and impact on quality of life of individuals in a palliative care setting in Tamil Nadu	234	Cross-sectional	Different types of advanced stages of cancer.	57.36 ± 10.8	140 females
13	Joad ASK, 2022 ²⁷	To examine the relationship between desire to live (DTL) and physical, psychological, spiritual, and social factors measuring patients' QoL alongside their awareness of their late cancer stage.	192	Cross-sectional	Different types of stage 4 solid cancer	Mean age 51.56	112 males, 80 females
14	Kannan G, 2011 ²⁸	To measure the quality of life of cancer patients during their cancer treatment	32	Cross-sectional Prospective	Different types of Cancer patients	Not mentioned	Males 15, Females 17
15	Dubashi B, 2010 ²⁹	To describe the QOL among breast cancer women, determine the contribution of sociodemographic, medical, and psychosocial factors on the QOL, and study the impact of breast conservation treatment and mastectomy on the QOL	51	cross-sectional	Breast cancer	Mean age 35	51 females
16	Gupta B, 2017 ³⁰	To measure quality of life (QOL) in upper aero-digestive tract (UADT) cancer patients in comparison to hospital-based controls	480	Case-control	lip and oral cavity, oropharynx, hypopharynx, larynx and upper third of oesophagus	56.35 ± 11.64 for cases, 58.23 ± 10.38 for controls	322 males, 158 females
17	Kaur N, 2018 ³¹	To estimate prevalence of various survivorship issues, and to	230	Cross-sectional	Breast Cancer	49.76 ± 9.58	230 females

S.No	First Author, Year	Study Aim	Sample size	Study Design	Cancer Type and Stage of Survivorship	Mean age	Gender
18.	Shaheed R, 2019 ³²	identify those which are most predictive of limitations in QOL after completion of primary therapy To assess QOL and mental status in cancer patients undergoing treatment	42	Cross-sectional	Various malignancies	Not mentioned	24 males, 18 females
19.	Khanum RS, 2021 ³³	To assess the quality of life among cancer patients	380	Cross-sectional	Different types of cancer	50±7.9 years	380 women
20.	Sunderam S, 2016 ³⁴	To assess the quality of life among cancer patients about type of treatment and determine the quality of life in relation to number of chemotherapy cycle	113	Cross-sectional	Not mentioned	48.41±11.35 years	67 females, 46 males
21.	Gangane N, 2017 ³⁵	To assess socio-demographic and clinical factors, as well as the role of self-efficacy, in relation to QOL among women with breast cancer in rural India.	208	Cross-sectional	Breast Cancer	Not mentioned	208 females
22.	Khandelwal A, 2017 ³⁶	To assess the QOL Of oral cancer survivors 1–5 years after the treatment	50	Cross-sectional	Oral cancer	45.0 ± 9.0	38 males, 12 females
23.	Kumar R, 2023 ³⁷	To determine the QOL and psychosocial well-being among women with breast cancer.	244	Cross-sectional	Breast Cancer	Mean age 45.06	244 women
24.	Parkar S, 2021 ³⁸	To explore the QoL using among HNC patients using EORTC QoL questionnaires in context to Indian culture.	400	Cross-sectional	Head and Neck Cancer	45.47 ± 10.31	Male 350, Females 50
25.	Pathak N, 2023 ³⁹	To compare the QoL between Germ cell tumors (GCT) survivors (disease-free > 2 years) and healthy matched controls	55 cases, 100 controls	Case-control study	Testicular non-seminomatous germ cell tumor (NSGCT)	Median age Cases 32 years, controls 35 years	155 men
26.	Jain S, 2023 ⁴⁰	To assess the health-related quality of life in patients suffering from oral cavity and throat cancer and to find out factors associated with quality of life.	90	Cross-sectional	Oral and Throat cancer	Mean age 56 years	Males 76, Females 14
27.	Madan R, 2021 ⁴¹	To evaluate the QoL in OCS (who survived at least 2 years following primary therapy and were disease free at the time of enrolment) to understand the need for support services and to identify the factors associated with poor QoL	84	Clinical Trial	Ovarian cancer	Median age 45 years	84 females
28.	Sultan A, 2022 ⁴²	To explore the effects of socio demographics, consumption of tobacco, alcohol or sleeping medicine, and clinical characteristics on HRQoL of cancer patients	1000	Cross-sectional	Different types of cancer	46.67 ± 12.51 years	375 males, 625 females
29.	Soni N, 2022 ⁴³	To understand the various QoL domains in our older patients with cancer.	360	Cross-sectional	Different types of cancer	66 ± 6.2 years	238 males, 122 females
30.	Das Adhikari S, 2022 ⁴⁴	To evaluate the QoL and pain in cancer patients registered with the palliative medicine department during the lockdown during the COVID 19 pandemic.	51	Cross-sectional	Palliative care cancer patients	Not mentioned	30 males, 21 females
31.	Kshirsagar AS, 2020 ⁴⁵	To evaluate the health-related QOL in patients operated with breast cancer and undergoing chemotherapy	50	Cross-sectional	Breast cancer	54.02 ± 10.86 year	50 females
32.	Raghavan V, 2019 ⁴⁶	Quality of life issues of multiple myeloma patients treated at a tertiary cancer center	64	Cross-sectional	Multiple myeloma	Median age 60 years	26 males, 38 females
33.	Sowmya SKR, 2013 ⁴⁷	To grade the adverse events (AEs) and to explore the findings of QOL in posttherapy cancer patients	70	Cross-sectional	Different types of cancer	Not mentioned	23 men, 47 women
34.	Dar MA, 2022 ⁴⁸	To evaluate the magnitude of financial toxicity among radiation oncology patients and its association with HRQoL in Indian health care settings.	350	Cross-sectional	Different types of cancer	49.3 ± 11.89	57.7% males, 42.3% females

Table 3: WHOQOL Related findings

S.No	Study	QOL Measurements	Reported Domain	WHOQOL Related Findings
1	Sarkar S, 2022 ¹⁵	Fact- O, FACI	Physical Capacity Psychological	# Physical well-being was associated with anemia and constipation. # Emotional well-being was associated with anemia, constipation, granulocytopenia, nausea, anxiety, weight loss, indigestion, and abdominal pain.
2	Asthana S, 2019 ¹⁶	EORTC QLQ-C30	Independence Social Relations Physical Capacity Psychological	# Functional well-being was associated with anemia, constipation, weight loss, and diarrhoea. # Social well-being was associated with thrombocytopenia and weight loss. ^ Fatigue (82%) ^ Afraid of physical suffering (71%) ^ Difficulty in remembering what was said during the consultation (60%) ^ Difficulties in usual activities (77%) ^ Issues regarding others being overconcerned (47%) ^ Felt the need to be informed about the possibility of treatment and side effects (80%) ^ Happy that their physicians involved family members in the care (90%) ^ Difficulty in maintaining faith in religion or God (32%)
3	Kamatchinathan P, 2016 ¹⁷	FACT-G and FACT - H & N	Spirituality/Religion Physical Capacity Psychological	# Age and physical well-being showed a statistical significance. ^ Very poor emotional wellbeing (19%) ^ Poor emotional well-being (81%)
4	Somanna SN, 2022 ¹⁸	EORTC core module, QLQ-C30	Independence Social Relations Overall QOL Physical Capacity	# Age and functional well-being showed a statistical significance. # Age and social well-being showed a statistical significance. * Low overall QOL (median: 50.0). #The patient's age and stage of cancer significantly affected the overall QOL. * High level of pain, fatigue, and constipation symptoms scale scores (median 83.3, 77.8, and 66.7) #The pain symptom score domain was significantly affected by the cancer stage.
5	Deb Barma M, 2021 ¹⁹	EORTC QLQ C-30, Quality of Life Head and Neck35 (QLQ-HN35)	Independence Environment Overall QOL Physical Capacity	# Functional capacity on the physical scale was significantly affected by the patient's age. * High level of financial concerns item score (median 66.7) ^ 71.4% were financially dependent for livelihood * Higher overall QOL (mean 76.33) * Higher mean scores were seen with fatigue (mean 16.44), insomnia (mean 12), and pain (mean 10.66)
6	Singh GK, 2021 ²⁰	FACT-G and FACIT Fatigue Scale	Overall QOL Physical Capacity	*High overall QOL (median score was 72) ^ High level of severe fatigue (34%) # Fatigue score had a significant correlation with Physical well-being score. # Age of the patient, poor ECOG PS, low payment ability, ongoing treatment status, and the presence of disease recurrence were significantly associated with fatigue score.
7	Gandhi AK, 2014 ²¹	EORTC QLQ-C15-PAL, EORTC-HN35 questionnaire	Psychological Independence Social Relations Overall QOL Physical Capacity Psychological Environment	# Fatigue score had a significant correlation with Emotional well-being score. # Fatigue score had a significant correlation with Functional well-being score. # Fatigue score had a significant correlation with Social well-being score. * Low overall QOL (median 50) ^ pain (98%), insomnia (89%), loss of appetite (89%) ^ Emotional functioning was affected by 50%
8	Paksherest,	Quality of Life - Cancer Sur-	Overall QOL	* High score for requirement of painkillers (median 66.67) *Overall QOL was 6.04 (mean)

S.No	Study	QOL Measurements	Reported Domain	WHOQOL Related Findings
	2011 ²²	vivor's (QOL-CS) instrument	Physical Capacity Psychological Social Relations Spirituality/Religion Overall QOL	* High-level mean physical well-being (7.24) * Low mean psychological well-being score (4.98) * The mean score of social well-being was the lowest among all domains (4.61) * High mean score for spiritual well-being (7.34) * Low overall QOL (mean 61.93) # Being illiterate and engaged in agriculture/business significantly affected the overall QOL.
9	Ramasubbu SK, 2020 ²³	FACT-G	Physical Capacity Psychological Independence	# Number of ADRs were negatively associated with Physical well-being. # Number of ADRs were negatively associated with Emotional well-being. * Low functional well-being (mean 13.95) # Occupation of agriculture/business negatively associated with functional well-being
10	Kumar A, 2021 ²⁴	Fact-G, FACT-H and N scales	Social Relations Overall QOL Independence Environment	# Being illiterate was negatively associated with social well-being. # The patients were employed, were heads of their families, and were in the early stages of nasal, nasopharyngeal, parotid, and thyroid cancer is positively associated with overall QOL. * Severe impairment in functional wellbeing ^ High expenditure on indirect cost.
11	Jacob J, 2019 ²⁵	FACT-G, FACIT-SP	Overall QOL Physical Capacity Psychological Independence Social Relations Environment Spirituality/Religion	* Low overall QOL (mean 62) # Pain severity and pain interference were significantly associated with overall QOL. # non-Hindu pts reported lower physical well-being and higher pain severity compared to Hindu patients. # Higher financial difficulty was negatively associated with Emotional well-being. # Higher financial difficulty was positively associated with anxiety and depressive symptoms. * Low functional well-being (mean 9.2) # Higher financial difficulty was negatively associated with functional well-being. # Unmarried patients reported higher social/family well-being compared to those who are married. * High financial difficulties score (mean 7.9) * Low spiritual well-being (mean 33) # Higher financial difficulty negatively associated with the meaning/peace subscale of spiritual well-being.
12	Sudarisan SSP, 2019 ²⁶	WHOQOL-BREF	Physical Capacity Psychological	# The presence of depression showed a significant negative correlation with physical health. ^ High prevalence of major depression in the study population was 70%. # The presence of depression showed a significant negative correlation with psychological health. # The presence of major depression was significantly associated with being a resident of the nuclear family, unavailability of insurance, presence of financial difficulties, and in those without a history of cancer recurrence.
13	Joad ASK, 2022 ²⁷	FACIT-Sp, FACT- SWB	Environment Psychological	# The presence of depression showed a significant negative correlation with the environmental domain. ^ Desire to Live (DTL) (86%) # Pain severity negatively associated with DTL # Psychological distress (anxiety & depression) was negatively associated with DTL. # SES was significantly associated with DTL
14	Kannan G, 2011 ²⁸	QOL questionnaire designed and validated by Vidhubala E, et al.	Social Relations Spirituality/Religion Overall QOL Psychological Social Relations	* Low Social Well Being (mean 14.80) * High spiritual well-being (mean 24.4) * Overall QOL (mean 122.38) ^ Average QOL (56.25%) ^ Little or not affected by the feeling of depression or loneliness (80%) ^ Felt that they had the complete support of family, spouse, friends, and relatives (80%).

S.No	Study	QOL Measurements	Reported Domain	WHOQOL Related Findings
15	Dubashi B, 2010 ²⁹	EORTC module QLQ – C30 and the BR 23 Questionnaire	Overall QOL Physical capacity Social Relations	* High overall QOL (mean 77.93) # Overall QOL was better in the mastectomy group when compared to the breast conservation group. # The arm symptoms were statistically higher in the breast conservation group * Low functional scores for sexual function (mean 61.54) and sexual enjoyment (mean 58.15) # Sexual functioning and sexual enjoyment were significantly better in the mastectomy group when compared to the breast conservation group.
16	Gupta B, 2017 ³⁰	The University of Washington Quality of Life Questionnaire	Environment Overall QOL Psychological	* High financial difficulties (mean 40.5) * Cases had a significantly lower mean score across all domains of QOL as compared to controls. # QOL was significantly influenced by the stage of cancer at diagnosis. * The most affected domain for cases as compared to control was anxiety (Mean=21.63) and mood (Mean=22.29).
17	Kaur N, 2018 ³¹	FACT-B	Overall QOL Physical capacity Independence Social Relations	# Longer duration of follow-up significantly affects the overall QOL. #fatigue, emotional distress, treatment-induced menopause, body and joint pains, and post-mastectomy chronic pain are negatively correlated with the overall QOL of survivors. ^ fatigue (60%), restriction of shoulder movement (59.6%), and body and joint pain (63.5%). ^ Chemotherapy-induced cessation of menstruation (73.3%). ^ Loss of sexual desire (60%).
18	Shaheed R, 2019 ³²	WHOQOL-BREF	Overall QOL Physical capacity Psychological Social Relations Environment	# A significant positive correlation was observed between Overall QOL and mental well-being. # Physical health domain showed a significant correlation with psychological, social relationship, and environmental domains. # Mental well-being score was found to be positively associated with physical health. # Psychological domain showed a significant correlation with physical health and environment domains. # Mental well-being score was found to be positively associated with psychological health * Low Social relationship score (mean 10) # Social relationship domain showed a significant correlation with the physical health domain # Environment domain showed a significant correlation between physical health and the psychological domain.
19	Khanum RS, 2021 ³³	EORTC QLQ-C30	Overall QOL Physical capacity Independence	^ 74% had good overall QOL. ^ 62.1% had good physical functioning. ^67.1% had mild symptomatology/problems, ^71.3% had good functioning
20	Sunderam S, 2016 ³⁴	QOL questionnaire designed under EORTC guidelines and validated in Indian scenario by Vidhubala E, et al.	Overall QOL Independence	^ 54% had below-average quality of life. # Patients undergoing radiotherapy had a significantly better quality of life than those undergoing chemotherapy. # Those patients who had taken 3 or more cycles had significantly better quality of life than those who had taken less than 3 cycles
21	Gangane N, 2017 ³⁵	WHOQOL – BREF	Overall QOL Independence Physical capacity Psychological	# Patients undergoing radiotherapy had a significantly Mobility than those undergoing chemotherapy. * Low overall QOL (59.3 mean) # Housewives had a significant positive association with all components of QOL. # Higher monthly family income had a positive association with all components of QOL. # Self-efficacy had a positive relationship with all components of QOL. # Casual/industry/office workers had a positive relationship with the physical domain # Casual/industry/office workers had a positive relationship with the psychological domain.

S.No	Study	QOL Measurements	Reported Domain	WHOQOL Related Findings
22	Khandelwal A, 2017 ³⁶	QLQC-30 and QLQHandN-35	Social Relations	# Divorced/widowed/unmarried women had a negative association with psychological health. # Higher monthly income was associated with higher score in psychological domain. # Age above 61 years had a significant negative association with social relationships. # Other than Hindus have a significant negative association with social relationships.
			Environment	# Divorced/widowed/unmarried women had a negative association with social relationship dimensions. # Higher monthly income was associated with higher score in social domain. # Casual/industry/office workers had a positive relationship with the environmental domain. # Age above 50 years was significantly associated with environmental factors. # lower education and environmental factors are negatively associated.
23	Kumar R, 2023 ³⁷	EORTC-QLQ-C30, and the Breast Module (EORTC-QLO-BR2)	Overall QOL	# Higher monthly income was associated with higher scores in the environmental domain. * Low overall QOL (55.5 mean) # Cancer stage is significantly associated with overall QOL # Tumour size is significantly associated with overall QOL
			Physical capacity Independence	# Cancer stage is significantly associated with symptoms scale score. # Cancer stage is significantly associated with functional scale score.
			Overall QOL	* High overall QOL (70.97 mean) # Statistically better overall QOL score in patients who had attended psychological counseling after cancer diagnosis and those who had not.
24	Parkar S, 2021 ³⁸	EORTC QLQ-C30, EORTC QLQ-H and N35	Physical capacity	# There is a statistically significant difference in physical functioning between women who undergo lumpectomy and those who experience a total mastectomy. # Women diagnosed with the regional stage of cancer and those who were in the local stage have significant differences in physical functioning. # statistically fewer problems in women who had attended psychological counselling after cancer diagnosis on managing diarrhoeal symptoms than those who had not.
			Psychological	^ mild symptoms of depression (39%) ^ Mild symptoms of anxiety (15.6%) # There is a statistically significant difference in emotional functioning between women who undergo lumpectomy and those who experience a total mastectomy. # Women diagnosed with the regional stage of cancer and those who were in the local stage have significant differences in emotional functioning.
			Independence Social Relations Environment	# Significant relationship of psycho-social well-being with emotional functioning # Significant relationship of psycho-social well-being with role functioning # Significant relationship of psycho-social well-being with social functioning # Statistically fewer problems in women who had attended psychological counseling after cancer diagnosis on managing financial difficulties than those who had not.
24	Parkar S, 2021 ³⁸	EORTC QLQ-C30, EORTC QLQ-H and N35	Overall QOL	* High overall QOL (74.22 mean) * Low emotional function (82.62 mean)
25	Pathak N, 2023 ³⁹	EORTC QLQ-C30 (version 3)	Overall QOL	* High overall QOL among cases (80.4 mean) # statistically significant difference in overall QOL score among cases and control.
			Physical capacity	# Among cases and control difference in symptom burden was statistically significant for nausea and vomiting, pain, dyspnea, and appetite loss.
			Psychological Social Relations	# Statistically significant difference in emotional score among cases and control. # Statistically significant difference in social score among cases and control.

S.No	Study	QOL Measurements	Reported Domain	WHOQOL Related Findings
26	Jain S, 2023 ⁴⁰	University of Washington – Quality of Life Questionnaire version 4(UW-QOL)	Environment Physical capacity Social Relations	# Cases had statistically greater financial toxicity as compared to their matched controls. # Education and cancer sites were significantly associated with physical component. # Employment and Activity of Daily Living were significantly associated with social component.
27	Madan R, 2021 ⁴¹	EORTC QLQ-C30, QLQ OV-28	Environment Overall QOL Physical capacity Psychological Social Relations	^ 58.9% did not have any independent source of income. * High overall QOL (median 83.3) # Overall QOL was significantly affected by age, co-morbidities and number of chemotherapy cycles. # Physical functioning was significantly affected by age and co-morbidities. # Emotional functioning was significantly affected by the cancer stage. # Social activity was significantly affected by cancer stage and advanced age. # The sexual score was significantly affected by the presence of co-morbidities, higher number of chemotherapy cycles, and fear of recurrence.
28	Sultan A, 2022 ⁴²	EORTC QLQ- C30.	Physical capacity Psychological Independence	#Age was positively associated with symptom scales. # Sleeping medicine, Tobacco, Performance status, and Radiotherapy had significant effects on physical functioning, # Chronotype and Sleeping medicine had significant effects on emotional functioning. #Age was significantly negatively correlated with functioning scales. # Alcohol, Age, and Tobacco had significant effects on role functioning.
29	Soni N, 2022 ⁴³	EORTC QLQ-C30	Overall QOL Physical capacity Psychological Independence Environment	^ 66% of patients reported low overall QOL ^ 55.5% of patients reported poor physical functioning. ^ 74% of patients reported poor emotional functioning. ^ 68.9% of patients reported poor role scale. ^ 66.4% of patients reported financial constraints.
30	Das Adhikari S, 2022 ⁴⁴	FACT G7	Overall QOL Independence Environment	* Low overall QOL (Mean 14) # Statistically significant negative correlation between pain and overall QOL. ^ 35.29% of patients required morphine for their pain relief. ^ 33.33% had difficulty in accessing morphine
31	Kshirsagar AS, 2020 ⁴⁵	EORTC QLQ-BR2, EORTC QLQ-C30	Overall QOL Psychological	* Low overall QOL (45.94 mean) * Maximum impairment in cognitive functioning (65.24 mean)
32	Raghavan V, 2019 ⁴⁶	EORTC QLQ-C30, EORTC QLQ MY 20.	Overall QOL Physical capacity Environment	* Low overall QOL 55.3 (mean) ^ 60% reported pain ^ 55% reported having financial issues
33	Sowmya SKR, 2013 ⁴⁷	EORTC QLQ-C30	Physical capacity	^ 27.98% with insomnia
34	Dar MA, 2022 ⁴⁸	FACT-G	Overall QOL Environment	* Low overall QOL 69.63 (mean) # Significant positive correlation between financial toxicity and overall QOL. ^ 7.4% of participants reported grade 3 and 44.9% reported grade 2 financial toxicity. ^ 95.7% had no health insurance # Lower household income, employment status, cancer stage, treatment modality, rural residence, and younger age were reported as significant predictors of financial toxicity.

* Level (mean); ^ prevalence; # Correlates/influencing factors

FACT-G: Functional Assessment of Cancer Therapy – General; EORTC QLQ- C30: European Organization for Research and Treatment of Cancer Quality of Life Questionnaire

FACIT-Sp: Functional Assessment of Chronic Illness Therapy – Spiritual Well-being

Table 4: Quality assessment of studies

Criteria	Yes	No	Could not determine
Is the sampling strategy relevant to address the research question?	30	0	4
Is the sample representative of the target population?	34	0	0
Are the measurements appropriate?	32	2	0
Is the risk of non-response bias low?	4	6	24
Is the statistical analysis appropriate to answer the research question?	30	0	4

Participant characteristics: The included studies varied in sample size, ranging from 32 to 1000 patients, with a total of 6640 patients across all studies and a mean sample size of 195.2. All 34 studies focused on cancer patients, with three specifically targeting patients receiving palliative care. The types of cancer studied were diverse, with some studies including patients with various types of cancer (n = 13), while others focused on specific types such as head/neck cancer (n = 7), breast cancer (n = 6), ovarian cancer (n = 2), cervical cancer (n = 1), multiple myeloma (n = 1), CNS tumors (n = 1), and non-seminomatous germ cell tumor (NSGCT) (n = 1).

Regarding the cancer stage, 26 studies included patients at various stages of cancer, six studies focused on patients with advanced cancer, and one study enrolled newly diagnosed primary breast cancer patients. Gender distribution varied across studies, with 11 studies including only females, one study including only males, and 22 studies including both genders.

QOL measurements: The studies included in this review employed a diverse array of Quality of Life (QOL) assessment measures. Out of the 34 studies, 32 utilized previously developed and validated QOL measurements, while two studies used a QOL questionnaire specifically designed and validated for the Indian context by Vidhubala E, et al. Additionally, some studies employed a combination of different survey types in their assessments. The European Organisation for Research and Treatment of Cancer Quality of Life Questionnaire (EORTC QLQ-C30) emerged as the most commonly used questionnaire among the included studies (n=18). The Functional Assessment of Cancer Therapy - General (FACT-G) questionnaire was utilized in 10 studies. Further details regarding the specific QOL measurements used in each study are provided in Table 3.

WHOQOL-related findings

Overall Quality of Life (QOL). Twenty-five studies provided findings on the overall Quality of Life (QOL) among cancer patients, as summarized in Table 3. Among these, eighteen studies reported mean overall QOL scores, with eleven studies indicating low scores and seven studies indicating high scores. Additionally, one study noted that 66% of patients had low QOL, while another reported that 54% had below-average QOL. A single study found that 56.25% of patients had average QOL.

Two case-control studies compared cases and controls, finding that cases had significantly lower mean scores across all QOL domains. Thirteen studies ex-

plored factors influencing overall QOL. Positive correlations were found between overall QOL and mental well-being (n=1), higher monthly family income (n=1), and self-efficacy (n=1). Conversely, negative correlations were observed with cancer stage (n=2), pain (n=3), fatigue, emotional distress, and comorbidities (n=1). Financial toxicity was significantly positively correlated with overall QOL (n=1).

Moreover, better overall QOL was associated with being employed, literate, a housewife, in the early stage of cancer, receiving longer follow-ups, receiving chemotherapy, and attending counseling after diagnosis.

Physical health. Ten studies provided data on the prevalence of physical health-related problems among cancer patients, revealing a range of issues. Pain was reported by 60%-98% of participants in five studies, while fatigue was experienced by 34%-82% (n=5). Insomnia was prevalent in 89% of patients in one study, while shoulder movement restriction affected 59.6% (n=1) and poor physical functioning was reported by 55.5% (n=1).

Three studies reported mean scores for the physical health domain of QOL. One study indicated a high level of physical well-being (n=1), while three studies reported unfavorable mean scores for physical health, including symptoms such as pain, fatigue, and constipation (n=1).

Fifteen studies investigated factors that influence physical health. The physical health domain was significantly correlated with psychological, social relationships, and environmental domains (n=1). Better physical health was positively associated with mental well-being scores and being employed as casual/industry/office workers (n=1). Other significant factors affecting physical functioning included education, age, co-morbidities, cancer sites, stage, use of sleeping medicine, tobacco use, performance status, and receipt of radiotherapy.

Psychological health. Eight studies presented data on the prevalence of psychological health-related issues among cancer patients, highlighting a range of challenges. Depression was reported by 39%-70% of participants in two studies, while symptoms of anxiety were reported by 15.6% (n=1). Desire to Live (DTL) was noted in 86% of patients, difficulty in remembering consultations affected 60%, and fear of physical suffering was reported by 71% (n=1).

Three studies provided mean scores for the psychological health domain. One study indicated that anxiety and mood were the most affected domains for

cancer patients compared to the control group (n=1). Another study reported favorable psychological QOL, including a high level of emotional well-being (n=1), with 80% reporting little or no feelings of depression or loneliness (n=1).

Twelve studies explored the factors that impact psychological health. Emotional well-being was negatively associated with cancer stage, anemia, constipation, granulocytopenia, depression, nausea, anxiety, weight loss, indigestion, fatigue, and abdominal pain (n=4). The number of adverse drug reactions (ADRs) and higher financial difficulty were negatively associated with emotional well-being, while higher financial difficulty was positively associated with anxiety and depressive symptoms (n=1). Divorced, widowed, or unmarried women were found to have a negative association with psychological health (n=1), while a positive correlation was observed between higher monthly income and the psychological domain (n=1).

Level of independence. Five studies presented data on the prevalence of issues related to independence among cancer patients, highlighting a variety of challenges. Difficulties in usual activities were reported by 77% of patients, while 73.3% experienced chemotherapy-induced cessation of menstruation, and 35.29% required morphine for pain relief (n=1). Two studies reported low mean scores for functional well-being.

Ten studies explored factors affecting the level of independence among cancer patients. Functional well-being was negatively related to age (n=4), cancer stage (n=2), higher financial difficulty, anemia, constipation, weight loss, diarrhea, fatigue, and agricultural occupation. One study found that patients undergoing radiotherapy had better mobility compared to those undergoing chemotherapy.

Social relationship. Four studies presented data on the frequency of issues related to the social relationships domain of Quality of Life (QOL) among cancer patients. These studies revealed that 47% of patients had issues with others being overconcerned (n=1), 80% felt they had complete support from family, spouse, friends, and relatives (n=1), and 60% experienced a loss of sexual desire (n=1).

Three studies reported mean scores for the social relationships' domain of QOL. These studies indicated low levels of social well-being among patients (n=3), with one study specifically noting low functional scores for sexual function and enjoyment.

Eleven studies explored factors influencing the social relationships domain of QOL among cancer patients. Social relationships showed significant correlations with the physical health domain and psychosocial well-being (n=2). Factors such as age, fatigue, thrombocytopenia, weight loss, and cancer stage were linked to social well-being. Being illiterate was negatively linked to social well-being scores (n=1), while a higher monthly income was associated with higher scores in the social domain.

Furthermore, contradictory findings were reported regarding the relationship between marital status and social/family well-being. One study indicated that unmarried women had higher social/family well-being, while another study suggested that unmarried women were negatively associated with social relationship dimensions. Sexual functioning and enjoyment were found to be better in the mastectomy group compared to the breast conservation group (n=1). Another study indicated that sexual scores were significantly impacted by the presence of co-morbidities, a higher number of chemotherapy cycles, and fear of recurrence. A case-control study reported a statistically significant difference in social scores between cases and controls.

Environmental. Nine studies provided data on issues related to the environmental domain of Quality of Life (QOL) among cancer patients. These studies highlighted various challenges, including high expenditure on indirect costs reported in two studies, financial dependence for livelihood among 71.4% of patients (n=1), and financial constraints reported by 55% to 66.4% of patients (n=2). Additionally, 58.9% of patients did not have any independent source of income (n=1), 7.4% reported grade 3 and 44.9% reported grade 2 financial toxicity, 95.7% had no health insurance, and 33.33% of patients had difficulty accessing morphine (n=1).

Three studies reported mean scores for the environmental domain of QOL, indicating high levels of financial concerns (n=1), a high score for the requirement of painkillers (n=1), and high financial difficulties (n=1).

Six studies examined factors influencing the environmental domain of QOL among cancer patients. The environmental domain was significantly correlated with physical health and the psychological domain (n=1). The presence of depression and lower education showed a significant negative correlation with the environmental domain of QOL (n=2). A positive association was found between higher monthly income and the domain score (n=1).

Additionally, one study reported statistically fewer problems in women who had attended psychological counseling after cancer diagnosis on managing financial difficulties than those who had not. A case-control study found that cases had significantly greater financial toxicity compared to their matched controls (n=1). Another study identified lower household income, employment status, cancer stage, treatment modality, rural residence, and younger age as significant predictors of financial toxicity.

Spirituality, Religion, and Personal Beliefs. Three studies explored the spirituality and religious beliefs domain of Quality of Life (QOL) among cancer patients. These studies revealed that 32% of patients experienced difficulty in maintaining faith in religion or God (n=1).

Two studies reported a high level of spiritual well-

being among patients, while one study noted a low level of spiritual well-being. Additionally, one study found that higher financial difficulty was negatively associated with the meaning/peace subscale of spiritual well-being.

Risk of bias assessment: In total, thirty studies (88%) satisfied the sampling strategy criterion relevant to addressing the research question (Table 4). All studies' samples were representative of the target population; 30 studies (88%) employed appropriate measurements, and 30 studies (88%) used suitable statistical analyses to address the research question. However, the risk of nonresponse bias could not be determined in 24 studies (70%).

DISCUSSION

This review provides a comprehensive analysis of the quality of life (QOL) among cancer patients in India, including an exploration of overall quality of life (QOL) and its subdomains, as well as various influencing factors. It highlights significant variations in QOL measurements and reporting methods among the included studies, making direct comparisons challenging. The review also underscores the growing focus on quality of life (QOL) issues related to cancer in India, with twenty-three studies published since 2019, indicating a growing research focus in this area. Additionally, the review notes that most studies included middle-aged females, with breast cancer being the most common type, followed by head and neck cancer.

The factors that most commonly influenced both the overall quality of life (QOL) and its subdomains were symptoms (pain, fatigue, insomnia), reduced functional capacity, psychological distress (anxiety and depression), and poor social relations. Moreover, the demographics (age, marital status, religion), cancer-related factors (cancer stage, site, and type of treatment), and social determinants of health (education, financial toxicity, access to information) also affected the overall QoL and its subdomains.

The most common physical health symptoms reported by Indian cancer patients were pain, fatigue, insomnia, loss of appetite, and constipation. In the psychological domain, the majority of the patients experienced fear, anxiety, and depression. Four studies reported poor emotional well-being of the patients. For the social domain of QoL, the patients had low sexual desire and sexual enjoyment. However, most of the patients were satisfied with the social and family support. Sixteen studies that evaluated the level of independence showed that more than half of the patients had difficulties in usual activities and inability to work. Of the fifteen studies that examined the environmental domain of QoL, most of the patients reported high financial constraints and educational issues. Low to very low spiritual well-being was noted for most of the patients in the case of the spiritual domain of QoL.

These findings highlight the complex interplay of physical, psychological, social, environmental, and spiritual factors that contribute to the QOL of cancer patients in India, emphasizing the need for a comprehensive and holistic approach to improve their QOL.⁴⁹ Similar studies identified that the overall QOL of cancer patients is influenced by various factors such as age, stage of cancer, marital status, education, and occupation.⁵⁰⁻⁵² The type of cancer treatment affected the physical and functional well-being of the patients in our included studies. This finding is congruent with a previous study which expressed that chemotherapy reduced the functional capacity and increased the fatigue levels in cancer patients.⁵³ The severity of physical symptoms such as pain and fatigue levels was responsible for the psycho-social distress among the patients.⁵⁴ Similar findings have been reported where increased financial toxicity worsened the emotional and spiritual well-being.⁵⁵

Due to the predominantly cross-sectional nature of the included studies, we were unable to track the longitudinal patterns of change in the quality of life (QoL) among cancer patients. Future research on QoL in this population would benefit from employing standardized assessment tools and analytical approaches that adhere to a longitudinal study design.⁵⁶ Despite the current limitations identified in our study related to the assessment tools, a tool by Vidhubala et al has proved to be valid for assessing the QOL among Indian cancer patients. This tool can be used in the future for measuring QOL-related multiple domains for Indian cancer patients.⁵⁷

This review has identified several modifiable factors to improve the QOL of cancer survivors. The overall QoL can be improved through better communication (access to information), adequate physical symptom management (pain, fatigue), decreased financial dependency, and supporting various religious beliefs. These modifiable factors can be considered as moderators for developing any strategy or programs in the future to improve the cancer patient's QOL.⁹ Consistent with the findings of previous studies, our findings from these 34 studies indicated the likely interventions that can be used to enhance QoL are: managing physical, emotional, and functional well-being, encouraging spiritual care, enriching the patient's coping mechanisms, guidance on financial choices and improving access to health information.⁵⁸

This review has certain limitations. We have included the studies despite their quality as there are very few researches done on the QoL of cancer patients in India. Most of our included studies did not measure the non-response bias risk information which includes the non-response rate, reasons for non-response, and statistical compensation for non-response which may reduce the validity of our findings. Due to the significant variations observed in the research methodology (target population, assessment tools, statistical analysis), it is difficult to precisely conclude the QoL findings.

CONCLUSION

In conclusion, this review provides a comprehensive analysis of the quality of life (QOL) among cancer patients in India, highlighting the complexity of factors influencing their QOL. The review identified significant variations in QOL measurements and reporting methods among the included studies, making direct comparisons challenging. The review underscores the need for a comprehensive and holistic approach to improve the QOL of cancer patients in India. Future research should consider employing standardized assessment tools and analytical approaches that follow a longitudinal study design to track longitudinal patterns of change in QOL among these patients. Review findings align with previous studies and suggest interventions that can enhance QOL, including managing physical, emotional, and functional well-being, encouraging spiritual care, enriching coping mechanisms, providing guidance on financial choices, and improving access to health information.

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