RESEARCH ARTICLE

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Unveiling Health-Related Quality of Life (HRQOL) and Sociodemographic Factors Predicting HRQOL among Cancer Patients in Eastern India: A Community-based Cross-Sectional Study

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Abstract

Background: The significant strides in cancer treatment is primarily directed towards achieving a cure. However, the well-being and quality of life of cancer patients during and after treatment are often overshadowed. Hence, this study assessed cancer patients' Health-Related Quality of Life (HRQOL) and found the association between HRQOL and sociodemographic factors. **Materials and Methods:** A community-based cross-sectional study was done among cancer patients in the Bhubaneswar Municipal Corporation (BMC) area enrolled in the Hospital Based Cancer Registry (HBCR) of an Institute of National Importance (INI) from July 2021 to December 2022. Patients aged ≥ 18 years diagnosed with malignant solid tumors were included in the study. The list of cancer patients obtained from the Radiation Oncology department was sorted as per the inclusion criteria. The participants were selected using convenient sampling. 187 cancer patients were interviewed using the European Organization for Research and Treatment of Cancer Quality of Life Questionnaire (EORTC QLQ C30). **Results:** The cancer patients' global health status score was 58.1 ± 17.2. Cognitive functioning achieved the highest score, while social functioning obtained the lowest score. Among the cancer-affected individuals, breast cancer patients had the highest global health status score, while gastrointestinal cancers received the lowest score. The global health status of the study participants was significantly associated with their caste, education, socioeconomic status, stage of cancer, and health insurance availability. Physical functioning was associated with age, marital status, education, and family type. The individual's overall health status, physical well-being, emotional state, and social functioning were also significantly associated with financial difficulties. **Conclusion:** The quality of life of cancer patients was satisfactory, except in social functioning, where it was less satisfactory. Therefore, in clinical practice, the interventions should be need-based and patient-centric, which may provide complete care for cancer patients and enhance their Quality of Life.

Keywords: Cancer- Quality of Life- Sociodemographic factors- Cross-sectional study

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Introduction

Globally, cancer is the second leading cause of death after cardiovascular diseases [1]. Asia had almost half of the cancer cases (49.2%) and the majority of cancer deaths (56.1%) in 2020 [2]. In India, the age standardized incidence rate and mortality rate of cancer is 98.5 and 64.4 per 1 lakh population. The commonest cancers in male are oral cancers and lung cancers whereas in females breast cancers and cervical cancers are predominant [3]. Cancer-affected individuals in low- and middle-income countries, like India, have a worse prognosis than patients in high-income nations due to a lack of awareness about cancer and its severity, a late diagnosis, and inequitable access to affordable therapeutic services [3]. Cancer incidence and outcomes are influenced by health determinants such as biological characteristics, and physical, socioeconomic, and environmental factors. Various endpoints are employed in cancer treatment to evaluate the efficacy of interventions or treatments. The importance of QOL concerning health has increased in recent years since therapeutic interventions help patients survive but can degrade QOL [4]. The chronic nature of the disease can affect the QOL of the patients and their families [5]. QOL is acknowledged as a significant endpoint in addition to the conventional endpoints like response rate, disease-free survival, and overall survival [6]. These traditional measurements ignore the patient's point of view. However, Health-Related Quality of Life (HRQOL) is a self-perceived method of assessing one's

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health status [7].

Health-Related Quality of Life (HRQOL) is "how well an individual functions in some predefined activities in their life and their well-being in the physical, mental, and social domains of health." 'Functioning' pertains to an individual's ability to carry out pre-defined activities. The term 'well-being' depicts an individual's subjective sentiments [8]. Four factors make up HR-QOL. First, a person with cancer has complete access to medical information, which enables the patient to comprehend the diagnosis and prognosis, anticipate what will happen, and be prepared. Secondly, the individual receives social, emotional, and spiritual support with pain and symptom management. Thirdly, the person's autonomy is maintained, and their preferences for the type, timing, and location of care are acknowledged. Fourth, the patient can access high-quality, calm, dignified end-of-life care and receive person-centered, comprehensive care across various settings, including treatment in the hospital, at home, or in hospice [9]. HRQOL assessments are particularly relevant in chronic disease management. They help healthcare providers monitor the impact of chronic conditions on an individual's quality of life over time, guiding adjustments to treatment plans and support strategies. This study aimed to assess the health-related Quality of Life (HRQOL) of cancer patients using the European Organization for Research and Treatment of Cancer Quality of Life Questionnaire (EORTC QLQ-C30) version 3, including overall well-being (physical, emotional, cognitive, and social well-being), and also finds the association of HRQOL with sociodemographic factors of study participants.

Materials and Methods

Study design and setting

We did a community-based cross-sectional study to assess cancer patients' health-related quality of life. The study was conducted in the Bhubaneswar Municipal Corporation area in the Khordha district of Odisha. According to the 2011 census, the district has a population of around 22.5 million, with 48.16 percent living in urban areas, versus the state average of 16.69 percent. Bhubaneswar Municipal Corporation has 67 wards, which extend to an area of 186 sq km with a population of 8,40,834 [10].

Recruitment of study participants

The study participants were those enrolled in the HBCR of AIIMS Bhubaneswar from July 2021 to December 2022, residing in the BMC area for at least a year. Patients aged ≥ 18 years diagnosed with malignant solid tumors were included in the study. Patients with hematological malignancies and those who cannot communicate due to hearing loss, cognitive impairment, or severity of illness were excluded from the study.

Study period

The study was conducted from July 2021 to December 2022.

Sample size

The sample size for the study was calculated using the formula: (Z α/2) 2 *(SD) 2 /d2, by taking Zα/2 as 1.96 considering a confidence interval 95%, with a relative error of 15% and a standard deviation of 3.85. The standard deviation of Global Health Status score of cancer patients was taken from a recent study conducted in Delhi by Upadhyay et al. [12]. After considering 10% non-response rate, the final sample size was calculated to be 187.

Study procedure

The line list of cancer patients enrolled in the HBCR of AIIMS Bhubaneswar was obtained from the Radiation Oncology department. The patients were sorted from the list according to the inclusion criteria and contacted over the phone. The study was explained to them, and their willingness to participate was asked. As per convenient sampling, the investigator visited those who agreed to participate at their homes on the available date and time. The study had a non-response rate of 7%. A semi-structured questionnaire was administered for data collection, including the participants' sociodemographic profile, medical profile, and HRQOL scoring.

Statistical Analysis

Data analysis was performed using the IBM SPSS ver. 26 (Statistical Package for Social Science ver.26). Categorical variables were presented as percentages or proportions. Continuous parametric variables were presented as mean and standard deviation and non-parametric variables were expressed as medians with an interquartile range. The association was found in parametric data using the ANOVA test and independent t-test. In contrast, the Kruskal Wallis and Mann Whitney U tests were applied for non-parametric data. A p-value less than 0.05 was considered significant. Bonferroni post hoc analysis was done if found significant in the ANOVA test to identify which groups were significant. When the Kruskal-Wallis test showed significance, Dunn's post hoc analysis was done to determine which groups were statistically significant. Ethical clearance was sought from the Institute Ethics Committee before the start of the study.

Results

In this study, we examined health-related quality of life (HRQOL) among cancer patients, utilizing data sourced from the Hospital-Based Cancer Registry (HBCR). Over the study period, HBCR documented a total of 2,678 cases, of which approximately 243 were from the BMC area. From this cohort, we employed a convenience sampling method to select 187 participants for our analysis. The study participants fulfilling the inclusion criteria were contacted over the phone for their consent to participate in the study. Those who were not reachable over phone were excluded and were proceeded to the next individual in the list. The various reasons for dropping out were unavailability at the time of the visit, death among the listed participants, and temporary address given in the HBCR.

The study participants' mean (SD) age was 55.5 ±

(11.6) years. Most study participants (59%) fall under the age category of 40-60 years. About 63% were females, and 93% were married. Of the study participants, the majority (98%) were Hindus. About 74% belonged to the general caste, followed by 18% belonging to OBC/SEBC, and the remaining were minority castes. In the present study, almost half of the study participants (54%) were homemakers, whereas 44% were involved in different levels of skilled work. According to the Modified Kuppusamy classification of socioeconomic status, most of the participants belonged to the lower middle class (46%), followed by the upper middle class (33%), and upper lower class (19%) (Table 1).

Among the study participants, most of them had gastrointestinal cancers (31%), breast cancers (30%), and genitourinary cancers (20%). Head and neck cancers (14%) and lung cancers (5%) were less prevalent. On gender-wise distribution, the most common cancers among the male study population were gastrointestinal cancers (42%), followed by head and neck cancers (32%), lung cancers (13%), and genitourinary cancers (13%). The most common cancers among female study participants were breast cancer (47.5%), followed by gastrointestinal cancers (24.6%) and genitourinary cancers (23.7%). Relapses of cancer were found in 6 (3.2%) participants. A total of 100 (53.5%) participants were suffering from various comorbidities, out of which the majority had CVD or hypertension (64%), followed by diabetes (50%) and thyroid disorders (16%). The treatment modality availed by the study participants varied. Among the study participants, 54 (29%) received chemotherapy only, 19 (10.2%) received surgery only, and 4 (2.1%) received radiotherapy only. The rest of the study participants received a combined mode of therapy (Table 2).

The study participants who approached public and private facilities for diagnosis were almost equal, but this proportion shifted during treatment. During the treatment phase, most of the study participants visited public health facilities (84.5%). Among the study participants, only 44% were availing the health insurance schemes.

The Global Health Status score of the study participants, according to the EORTC QLQ C30 score, was 58.1 ± 17.2. Among the functional scales, cognitive functioning (95.1 ± 13.4) had the highest mean score, followed by role functioning (89.2 ± 21.3), emotional functioning (84.4 ± 19), and physical functioning (81.7 ± 23.7). The lowest mean functional score was seen in social functioning (57 ± 19.8). Among the symptom scales, fatigue exhibited the highest symptomatology, followed by pain (Table 3).

The Global Health Status score was higher among male participants (58.4 ± 17.8) when compared to female participants (57.9 ± 16.9). The symptomatology was found to be higher among males than females. The Global Health Status score of different cancers in descending order is breast cancer (60.7 ± 16.5) followed by genitourinary cancers (59.5 ± 15.6), lung cancer (59.2 ± 22), head and neck cancers (59 ± 20.3), and gastrointestinal cancers (54.2 ± 16.3) (Table 4).

Association of HR-QOL Scores with sociodemographic factors

Global Health Status was found to be significantly associated with caste (p-0.006), education (p-0.001), and socioeconomic status (p-0.005). (Table 5) On Bonferroni's correction, those belonging to the SC/ST caste, those educated up to middle school, and those belonging to lower socioeconomic classes were found to have lower GHS scores.

Global health status (GHS) was also found to have a significant association with the stage of cancer (p<0.001), health insurance availability (p-0.03), and financial difficulty (p-0.008). GHS score was lower in those in the

Table 1. Sociodemographic Characteristics of Cancer Patients in Eastern India (N=187)

Variables	Category	Frequency n (%)
Age (in years)	<40	15 (8)
	40-60	111 (59)
	>60	61 (33)
Gender	Male	69 (37)
	Female	118 (63)
	Hindu	183 (98)
Religion	Non-Hindu	4 (2)
Caste	General	138 (74)
	OBC/SEBC	34 (18)
	SC/ST	15 (8)
Marital status	Living with partner	174 (93)
	Not living with partner	13 (7)
Education of study subjects	Illiterate	10 (5)
	Primary school	11 (6)
	Middle school	24 (13)
	High school and intermediate	86 (46)
	Graduate or professionals	56 (30)
Occupation of the study subjects*	Unemployed	3 (2)
	Homemaker	100 (54)
	Level 1 skilled	8 (4)
	Level 2 skilled	47 (25)
	Level 3 skilled	8 (4)
	Level 4 skilled	21 (11)
Total monthly family income (in rupees)	<30,000	72 (38.5)
	30,000-60,000	87 (46.5)
	>60,000	28 (15)
Socioeconomic status	Upper & upper middle	63 (34)
	Lower middle	87 (46)
	Lower & upper lower	37 (20)
Type of Family	Nuclear	100 (54)
	Joint	87 (46)
Ownership of House	Own house	132 (71)
	Rented house	55 (29)

* As per the National Classification of Occupations (NCO) 2015, the occupations are categorized into skill levels. Level 1, elementary occupation; Level 2, plant and machine operators and assemblers, craft and related trades workers, skilled agricultural and fishery workers, skilled workers and shop and market sales workers, clerks; Level 3, associate professionals; Level 4, professionals.

Table 2. Clinical Profile of Cancer Patients from Eastern India (N=187)

Variable	Category	Male (N=69) n (%)	Female (N=118) n (%)	Total (N=187) n (%)
Type of cancer	Gastrointestinal cancer	29 (42)	29 (24.6)	58 (31)
	Breast cancer	-	56 (47.5)	56 (30)
	Genitourinary cancer	9 (13)	28 (23.7)	37 (20)
	Head and neck cancer	22 (32)	4 (3.4)	26 (14)
	Lung cancer	9 (13)	1 (0.8)	10 (5)
Treatment modality availed	Chemotherapy only	24 (34.8)	30 (25.4)	54 (29)
	Surgery + Chemotherapy	13 (18.8)	29 (24.6)	42 (22.4)
	Surgery + Chemotherapy + Radiotherapy	5 (7.3)	32 (27.2)	37 (19.8)
	Chemotherapy + Radiotherapy	15 (21.7)	9 (7.6)	24 (12.8)
	Surgery only	6 (8.7)	13 (11)	19 (10.2)
	Surgery + Radiotherapy	4 (5.8)	3 (2.5)	7 (3.7)
	Radiotherapy only	2 (2.9)	2 (1.7)	4 (2.1)
Comorbidity profile (N=100) Male-40 Female-60 (Multiple responses)	CVD/Hypertension	23 (57.5)	41 (68.3)	64 (64)
	Diabetes	25 (62.5)	25 (41.7)	50 (50)
	Thyroid disease	2 (5)	14 (23.3)	16 (16)
	Dyslipidaemia	2 (5)	5 (8.3)	7 (7)
	Chronic Respiratory disease	2 (5)	2 (3.3)	4 (4)
	Others*	2 (5)	0	2 (2)

*Others include Stroke and Sickling disease

later stages of cancer, without health insurance schemes, and in those with financial hardships.

Physical functioning was found to be significantly associated with age (p-0.005), marital status (p-0.03), education (p-0.002), and type of family (p-0.03). On Dunn's post hoc analysis, physical functioning was found lower in those above 60 years, those with lower levels of education (i.e., below high school), those widowed/divorced/separated, and those belonging to three-generation families.

Role functioning was significantly associated with the type of family (p-0.02). Those belonging to three-generation families had a lower median score for role functioning (Supplementary file 1).

Table 3. Health-Related Quality of Life Scores of Cancer-Affected Individuals in Eastern India

Components of scoring	Mean score ± SD	Median	IQR
Global health status	58.1 ± 17.2	58.3	50-66.7
Functional scales			
Physical functioning	81.7 ± 23.7	93.3	73.3-100
Role functioning	89.2 ± 21.3	100	83.3-100
Emotional functioning	84.4 ± 19	91.7	75-100
Cognitive functioning	95.1 ± 13.4	100	100
Social functioning	57 ± 19.8	66.7	50-66.7
Symptom scales/items			
Fatigue	32.2 ± 22.1	33.3	22-44
Nausea, vomiting	6.9 ± 19.8	0	0
Pain	24.1 ± 25.5	16.7	0-33.3
Dyspnoea	6.1 ± 20.4	0	0
Insomnia	14.8 ± 24.9	0	0-33.3
Appetite loss	18.2 ± 25.2	0	0-33.3
Constipation	7.5 ± 18.7	0	0
Diarrhea	1.8 ± 9	0	0
Financial impact			
Financial difficulties	54.4 ± 22.9	66.7	33.3-66.7

The highest score was 100, except in diarrhea, where the highest score was 66.7. The lowest score was 0, except in Global health status-8.3, cognitive functioning-16.7

Discussion

HRQOL in cancer focuses on evaluating how cancer and its treatment impact a person's physical, psychological, social, and functional well-being. This study aimed to evaluate the HRQOL of cancer patients so that any change or tweak in healthcare decisions can be suggested to the physicians or the healthcare system, aligning with the patient's values and goals.

European Organization for Research and Treatment of Cancer Quality of Life Questionnaire (EORTC QLQ C30) and Functional Assessment of Cancer Therapy - General (FACT-G) questionnaires are the two most widely used cancer-specific quality-of-life assessment tools. We used EORTC QLQ C30 as a study tool as it provides a detailed and comprehensive assessment of patients' overall quality of life and has superior item efficiency than FACT G [12].

In the present study, the mean age of cancer patients was 55.5 (±11.6) years. Female preponderance was seen with a female-to-male ratio of 1.7:1. One of the reasons for this might be that males work outside and might not be present during our visits. HBCR of AIIMS Bhubaneswar also had a higher proportion of females than males, in the ratio of 1.2:1. A study by Chatterjee et

Table 4. Comparison of Health-Related Quality of Life Scores among Different Types of Cancers

Components of scoring	Mean score ± SD / Median (IQR)				
	Gastrointestinal Cancer	Breast Cancer	Genitourinary Cancer	Head & Neck Cancer	Lung Cancer
Global health status	54.2 ± 16.3	60.7 ± 16.5	59.5 ± 15.6	59 ± 20.3	59.2 ± 22
Physical functioning	83.3 (65-100)	100 (86.7-100)	80 (70-100)	93.3 (91.7-100)	83.3 (65-88.3)
Role functioning	100 (83.3-100)	100 (100-100)	100 (83.3-100)	100 (66.7-100)	100 (75-100)
Emotional functioning	83.3 (75-100)	91.7 (83.3-100)	91.7 (75-100)	95.8 (83.3-100)	79.2 (50-100)
Cognitive functioning	100 (100-100)	100 (100-100)	100 (100-100)	100 (100-100)	100 (70.8-100)
Social functioning	50 (33.3-66.7)	66.7 (50-66.7)	66.7 (50-66.7)	50 (33.3-66.7)	50 (33.3-70.8)
Fatigue	33.3 (30.5-47.2)	22.2 (11-33.3)	33.3 (22.2-44.4)	33.3 (19.4-44.4)	27.8 (0-47.2)
Nausea, vomiting	0 (0)	0 (0)	0 (0)	0 (0)	0 (0-8.3)
Pain	33.3 (0-33.3)	16.7 (0-33.3)	0 (0-33.3)	16.7 (0-50)	33.3 (0-75)
Dyspnoea	0 (0)	0 (0)	0 (0)	0 (0)	0 (0-41.7)
Insomnia	0 (0-33.3)	0 (0)	0 (0-33.3)	0 (0-33.3)	0 (0-33.3)
Appetite loss	16.7 (0-33.3)	0 (0-33.3)	0 (0-33.3)	0 (0-33.3)	33.3 (0-41.7)
Constipation	0 (0-33.3)	0 (0)	0 (0)	0 (0)	0 (0-8.3)
Diarrhea	0 (0)	0 (0)	-	-	-
Financial difficulties	66.7 (33.3-66.7)	66.7 (33.3-66.7)	66.7 (33.3-66.7)	33.3 (33.3-66.7)	66.7 (33.3-75)

GHS is expressed as Mean ± SD, whereas all other scores are expressed as Median

al. analyzing the pattern of cancer in Odisha also had a higher proportion of females than males, which supports our findings [13]. GLOBOCAN 2020 data of India also depicts more new cancer cases in females, and the age-standardized incidence rate was higher in females [14]. Most of the study participants were Hindus (97.8%), followed by Christians (1.1%) and Muslims (1.1%). This corresponds with the population characteristics of Odisha as per the 2011 census, where Hindus comprise 93.6% of the population, and Christians and Muslims comprise approximately 2% each [15].

In our study, the health-related quality of life assessed by EORTC QLQ C30 found the global health status score to be 58.1 ± 17.2. The study done by Upadhyay et al. in Delhi had a higher score (65.8) than our study [11]. This difference might be due to the study settings. The study by Upadhyay et al. was done in a hospital setting, whereas ours was in a community setting, in the study participants' homes. In our study, the participants might be more relaxed and in their comfort zone while answering our questions; hence we assume that their responses were more truthful and accurate as compared to when they were at the hospital, where their responses would be influenced by various factors like presence of healthcare providers, other patients and the feel-good effect of the treatment received in the hospital. The study done in Northwest Ethiopia by Abegaz et al. assessing the HRQOL of cancer patients found a lower mean score for the global health status (52.7 ± 20.1) [16]. This Ethiopian study included hematological cancers and the more metastasized cancers. Hematological cancers can have very different progression and disease trajectories than solid tumors. Moreover, metastasized cancer patients are more likely to have a lower quality of life. In our study, the participants had a higher cognitive functioning score among the functional scales, similar to the study by Kumar et al. and Soumya et al. [17,18]. The mean physical functioning score of study participants in the present study was 82.15 ± 23.84 and scored second highest, which implies that symptom management by physicians was reasonably good. This was similar to the study done by Soumya et al. [18]. This high score in physical functioning in different studies, including ours, hints at the fact that treating physicians were more concerned about alleviating the symptoms of the patients rather than achieving the holistic well-being of the cancer patients. The score for social functioning was the lowest in our study, similar to the study done by Abegaz et al. in Ethiopia, where social functioning scored second lowest functioning scores [16].

In our study, fatigue was found to have a higher score among the symptom scales, which implies severe symptomatology, followed by pain, appetite loss, and insomnia. The fatigue can be due to extensive cancer therapies like chemotherapy or radiotherapy. Fatigue is often not taken seriously by the physician, and more focus is given to alleviating cancer-related pain than fatigue. This was consistent with the findings of the study by Kumar et al. [17], where higher symptomatology was for fatigue followed by appetite loss, pain, and insomnia. However, in the study by Upadhyay et al. and Sowmya et al. [11,18], a higher score for symptomatology was found for pain, followed by fatigue. In the present study, females were found to have higher functional scores than males. This depicts females as having higher resilience than males.

Among the cancers, the global health status mean score was higher for breast cancer (60.7 ± 16.5), and the lowest score was seen in gastrointestinal cancers (54.2 ± 16.3). This aligned with the study by Kumar et al., where breast cancer had the highest score (63.78 ± 18.75), and

Table 5. Association of Global Health Status with Sociodemographic Factors among Cancer Patients

Independent Variables	N	Mean value (SD)	Statistics	P value
Age (in years)			F – 0.2	0.81
<40	15	58.89 (17.09)		
40-60	111	58.63 (17.00)		
>60	61	56.97 (17.75)		
Gender			t – 0.2	0.83
Male	69	58.45 (17.76)		
Female	118	57.90 (16.90)		
Caste			F-5.2	0.006*
General	138	58.45 (17.17)		
OBC/SEBC	34	62.25 (14.25)		
SC/ST	15	45.56 (18.59)		
Marital status			F-2.06	0.13
Married	174	58.43 (16.69)		
Unmarried	3	69.44 (25.46)		
Widowed/divorced/separated	10	49.17 (21.68)		
Education of study subjects			F- 7.06	0.001*
Up to middle school	45	50.00 (19.14)		
High school and intermediate	86	60.95 (15.19)		
Graduate and honors	56	60.27 (16.67)		
Occupation of study subjects			F-1.7	0.62
Unskilled	11	52.78 (17.68)		
Skilled	76	58.76 (17.35)		
Homemaker	100	58.08 (17.10)		
Type of family			F- 2.1	0.12
Nuclear	100	58.17 (15.62)		
Joint	73	59.70 (17.35)		
Three generation	14	49.40 (24.56)		
Ownership of House			t- 0.3	0.78
Own house	132	58.33 (16.70)		
Rented house	55	57.58 (18.44)		
Income			F-1.2	0.3
<30,000	72	55.67 (18.91)		
30,000-60,000	87	59.48 (16.08)		
>60,000	28	60.12 (15.61)		
SES			F-5.5	0.005*
Lower and upper lower	37	50.45 (20.59)		
Lower middle	87	58.62 (16.15)		
Upper and upper middle	63	61.90 (15.09)		

ANOVA test is done to find the association for sociodemographic variables with GHS except for gender and ownership of house where an independent t-test is applied.

the lowest score was for gastrointestinal cancers (48.08 ± 19.33) [17]. The lowest score in gastrointestinal cancers might be due to more bothersome associated symptoms like pain, loss of appetite, nausea, and vomiting.

It has been observed in the present study that the proportion of study participants approaching the public and private facility at the diagnostic stage was almost equal in number. However, when it came to the treatment phase, most participants approached public facilities. This may be due to the higher out-of-pocket expenditure in private settings. The 71st round of surveys conducted by the National Sample Survey Organization (NSSO) on health-related social consumption found that the mean out-of-pocket expenditure in private facilities is nearly three times that of public facilities [19]. Health insurance was available for only 44% of study participants. This corresponds with Odisha's NFHS 5 data, which says only 44.7% of households have any member covered by the

health insurance scheme [20].

Cancer is an illness that incurs much out-of-pocket expenditure and reduced work capacity due to the physical and emotional distress associated with the disease and its treatment. In our study, the financial difficulties scored 54.4 ± 22.9. The study by Abegaz et al. found a higher financial difficulty score (69.6 ± 31.2) among their study participants [16]. This is higher than our findings, as the study was done in Ethiopia, which has an economically lower GDP per capita [21].

Studying the factors associated with the quality of life in cancer is crucial for optimizing patient care, decision-making, and developing effective supportive care interventions to enhance the well-being of cancer patients. In our study, cancer patients' global health status score was significantly associated with education, caste, and socioeconomic status. The financial difficulty had a significant association with global health, physical, emotional, and social functioning. A systematic review assessing the quality of life in breast cancer patients by Haidari et al. [22] found that the most commonly reported factors associated with quality of life were education, employment, income, and financial difficulty. In the study by Jacob et al. [23], financial stability was significantly associated with lower functional and emotional well-being. Consistent with our study, Gangane et al., assessing the quality-of-life determinants in breast cancer patients, found that lower education was negatively associated with QOL [24]. Similar findings were also observed in other studies [25, 26, 27, 28]. This may be because educated individuals understand health-related information better, engage in healthier behaviors and make informed lifestyle and healthcare choices. In the present study, married women had a significantly higher QOL score than unmarried/divorced/widowed women. The reason may be that married women get emotional and financial support from their partners. This was consistent with the study by Gangane et al. [24]. However, the study done in Iran by Kiadaliri et al. [29] found that being married had adversely affected the quality of life. This may be because the studies were done in different settings that significantly differ in cultural norms. Gender segregation and male dominance which are more prevalent in Iran-like countries, may be the plausible reason. In our study, patients with stage 4 cancer had lower QOL than the patients in other stages. Similar findings were observed in the study by Akel R et al. [30]. However, Chean et al. found no significant association between QOL and the cancer stage. In the present study, the type of family was significantly associated with physical and role functioning. Compared with a three-generation family, the nuclear family is significantly associated with better physical and role functioning, contrary to the conventional idea of better care in a joint/three-generation family compared to a nuclear family. But this finding could be because, in nuclear families, there might be more flexibility in coordinating activities due to fewer family members, which would help them in better role functioning. The study by Dixit J et al. [31], have identified that the HRQOL decreases with advancing of stages. Our study had also shown a significant association between Global Health status and stage of cancer among cancer patients.

There is a scarcity of studies that comprehensively assess all cancer patients' health-related quality of life (HRQOL), and no such study has been conducted in Odisha. This is one of the first studies done in community settings to capture the HRQOL. As we collected the data at their homes, we assumed that the participants had a relaxed and comfortable environment where they would have answered more truthfully without concealing any facts. This gave an upper edge to our study compared to hospital studies.

As Convenient sampling was done to select study participants, the study findings are not generalizable. There was no reference cutoff for EORTC QLQ scores. Since it included various types of cancer, it was not distributed evenly, and treatment modalities and disease duration differed for each patient. There may be intragroup variations as the study included patients at different stages of cancer. Another limitation of the study was we could not assess the quality of life on multiple occasions or no follow-up of the patients had been done.

In our study, we have found that the quality of life of cancer patients was satisfactory in cognitive, role, emotional, and physical functioning, whereas it was less satisfactory in social functioning. Sociodemographic factors like caste, education, and socioeconomic status were significantly associated with the global health status of cancer patients. Age, marital status, education, and type of family were significantly associated with the cancer patient's physical functioning. Financial difficulty among the study participants was significantly associated with overall health status and physical, emotional, and social functioning. The findings of our study imply that in clinical practice, the interventions should be need-based and patient-centered, which may provide complete care for cancer patients. So, improving social functioning among cancer-affected individuals can contribute to their overall well-being and quality of life.

Author Contribution Statement

SS, PPG, and SHS contributed to the development of the concept, literature search, and design of the study. SS, PPG, SHS, and SPP participated in data acquisition and data analysis of the study. SS prepared the manuscript. SS, PPG, SHS, and SPP participated in manuscript editing. PPG and SHS in manuscript reviewing.

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Ethical Approval

The ethical approval was taken from the ethical committee of All India Institute of Medical Sciences, Bhubaneswar, Odisha, India.

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