scientific reports

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Clinical and socioeconomic determinants of health-related quality of life among cancer patients in Southwestern Iran: a cross-sectional study

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Cancer significantly affects multiple dimensions of patients' well-being, making health-related quality of life (HRQoL) a key outcome in oncology. However, evidence on the clinical and socioeconomic determinants of HRQoL among cancer patients in Iran, particularly in southwestern regions, remains limited. This study aimed to assess HRQoL and to identify its clinical and socioeconomic determinants among cancer patients in southwestern Iran. This cross-sectional descriptive–analytical study was conducted in 2024 among cancer patients attending Shahid Jalil Hospital, Yasuj. A total of 166 eligible patients were recruited through consecutive sampling. HRQoL was assessed using the validated Persian version of the EORTC QLQ-C30. Sociodemographic, clinical, and treatment-related variables were collected through structured interviews and medical records. Data analysis was performed using SPSS 27. Median (IQR) values were reported for HRQoL domains. The Gamma regression model with log link was applied to identify predictors of overall HRQoL. Associations were expressed as Mean Ratios (MRs) with 95% confidence intervals. Participants had a mean age of 58.09 ± 16.08 years; 54.2% were male, and 58.5% had stage IV cancer. The lowest HRQoL scores were observed in cognitive functioning (median: 32.33), physical functioning (38), and role functioning (49), while social functioning showed higher scores (65.67). In multivariable analysis, stage IV cancer (MR = 0.33; 95% CI: 0.14–0.80) and metastatic disease (MR = 0.36; 95% CI: 0.17–0.77) were strongly associated with reduced HRQoL. Conversely, basic health insurance significantly improved HRQoL (MR = 2.15; 95% CI: 1.06–4.36). Other demographic variables were not significant predictors. Disease severity and insurance coverage are major determinants of HRQoL among cancer patients in southwestern Iran. Enhancing early detection, strengthening financial protection, and integrating supportive and palliative care services may improve patient outcomes. Longitudinal studies are recommended to better elucidate HRQoL trajectories.

Keywords Cancer, Health-Related Quality of Life, Socioeconomic Factors, Clinical Determinants, Cross-Sectional Study, Iran

Cancer represents one of the most formidable public health challenges of the twenty-first century. According to the Global Cancer Observatory (GLOBOCAN 2022), an estimated 20 million new cancer cases and approximately 9.7 million cancer-related deaths occurred worldwide in 2022, with projections indicating that the global burden will rise to 35 million new cases annually by 2050[1,2]. In Iran, cancer is the second leading cause of mortality after cardiovascular disease. GLOBOCAN 2022 data document 137,198 new cancer cases and 87,247 cancer deaths in a single year, with stomach, breast, and colorectal cancers representing the most frequently diagnosed malignancies[3]. Against this backdrop of escalating incidence and mortality, there is growing recognition that

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survival alone is insufficient as a measure of treatment success, and that the impact of cancer on patients' overall well-being must also be systematically assessed.

Health-related quality of life (HRQoL) has emerged as an essential dimension of modern oncology care, capturing the multifaceted impact of malignant disease on patients' lived experiences[4,5]. As defined by the World Health Organization (WHO), quality of life reflects an individual's perception of their position in life within the context of their culture, value systems, expectations, and goals[6]. In oncology, HRQoL encompasses physical functioning (pain, fatigue, treatment side effects), emotional functioning (anxiety, depression, psychological distress), cognitive functioning, and social participation—collectively determining patients' adaptive capacity and treatment adherence[7,8]. Globally, studies using the EORTC QLQ-C30 consistently demonstrate substantially impaired HRQoL across these domains in cancer patients, with mean global health status scores frequently falling below 60 out of 100 in patients with advanced disease[9,10]. In Iran, evidence from studies using the validated Persian version of the EORTC QLQ-C30 similarly indicates moderate-to-poor HRQoL; a study among Iranian hospital cancer patients reported a mean global health status score of 55.49 ± 21.27, with particularly impaired emotional functioning[11]. Beyond its intrinsic value, impaired HRQoL is independently associated with unfavorable clinical outcomes, including reduced treatment compliance, higher healthcare utilization, and in some cases, decreased overall survival[9–13].

A range of sociodemographic, clinical, psychological, and socioeconomic factors contribute to variations in HRQoL among cancer patients. Age, sex, and educational attainment are consistently identified as important determinants: older adults may face greater comorbidities and physical limitations, while higher educational level is associated with better health literacy and coping strategies[14,15]. Cancer type and stage strongly influence outcomes, as patients with advanced or aggressive malignancies generally report poorer HRQoL than those with more favorable prognoses[16,17]. Treatment-related toxicities from chemotherapy, radiotherapy, and surgery—including fatigue, cognitive impairment, pain, gastrointestinal disturbances, and sleep disorders—can further compromise physical, emotional, and social functioning[18,19]. Depression and anxiety, among the most prevalent psychiatric comorbidities in oncology, amplify perceived symptom burden and impair coping[20,21]. Conversely, strong social support from family members, friends, and community networks mitigates psychological strain and enhances HRQoL by providing emotional stability and practical assistance[22].

Beyond clinical and psychosocial determinants, financial toxicity—defined as the economic burden arising from treatment costs, income loss, and reduced work capacity—has emerged as a critical predictor of HRQoL, particularly in low- and middle-income settings[23,24]. In Iran, this issue carries particular salience. Despite government efforts to limit patient cost-sharing to a maximum of 6% of total costs in the public sector through the Health Transformation Plan implemented in 2014, and despite expanding universal health insurance coverage, significant gaps remain—particularly for specific oncology medications and specialized outpatient services[25]. A landmark study among cancer patients at Namazi Hospital, Shiraz, reported that 67.9% of households with cancer patients faced catastrophic health expenditures (CHE), a proportion substantially exceeding the general population rate[26]. A national systematic review and meta-analysis further estimated the average CHE rate among Iranian cancer patients at 25.3% (95% CI: 11.7–46.5%), confirming the wide-ranging and severe nature of this burden across different settings and patient populations[27]. These structural vulnerabilities in healthcare financing render financial toxicity an especially pressing and clinically relevant determinant of HRQoL among Iranian cancer patients.

Despite the growing body of evidence, important gaps remain. Much of the existing literature has examined limited sets of predictors without integrating the complex interplay among sociodemographic, clinical, psychological, and socioeconomic factors[28]. Moreover, the majority of HRQoL studies have been conducted in Western populations, raising concerns about the generalizability of findings to Middle Eastern and Iranian contexts, where cultural beliefs, family structures, spirituality, and social norms distinctly shape perceptions of illness and well-being[29,30]. Comprehensive, multidimensional investigations of HRQoL determinants among Iranian cancer patients remain scarce. Given the escalating burden of cancer in Iran and the growing emphasis on patient-centered care, identifying the factors that influence HRQoL is a public health priority. This study aims to address current knowledge gaps by examining clinical, socioeconomic, psychological, and social determinants of HRQoL among cancer patients in southwestern Iran, thereby providing region-specific insights to support the development of targeted strategies to improve patient outcomes.

Methods

Study design and participants

This study was a cross-sectional descriptive–analytical investigation conducted between December 2024 and November 2025 among cancer patients attending Shahid Jalil Hospital in Yasuj, southwestern Iran. Shahid Jalil Hospital was chosen because it is the largest and only referral hospital for cancer care in Kohgiluyeh and Boyer-Ahmad province. The reporting of this study follows the STROBE Statement for observational research.

Inclusion criteria

- Histologically confirmed diagnosis of cancer documented in medical records.
- Cancer stages I to IV.
- At least one month elapsed since diagnosis.
- Ability to understand and respond to interview questions.
- Willingness to participate and provision of written informed consent.

Exclusion criteria

- Use of psychotropic medications during the past month.
- Exposure to major stressful life events within the previous 30 days.
- Cognitive or physical inability to complete the interview.
- Withdrawal from participation at any stage.

Sampling and sample size calculation

Participants were selected using consecutive sampling, meaning that all eligible patients who attended Shahid Jalil Hospital during the study period were invited to participate. The required sample size was calculated for a cross-sectional study using the formula:

$$n = \frac{Z^2 \times \mathrm{p}(1-\mathrm{P})}{d^2}$$

where Z is the standard normal value for a 95% confidence level (1.96), p is the estimated proportion of patients with poor HRQoL (assumed 50% to maximize sample size), and d is the desired precision (0.08). Based on this calculation, the required sample size was 160 patients[31]. Ultimately, 166 eligible patients were recruited.

The study protocol was approved by the Ethics Committee of Yasuj University of Medical Sciences (IR.YUMS.REC.1403.087). Written informed consent was obtained from all participants prior to data collection. Confidentiality and anonymity were strictly maintained.

Data collection

Data were collected using a Demographic and Clinical Information Form and the Persian version of the EORTC QLQ-C30 (v3.0). Key sociodemographic and clinical variables included age, sex, marital status, education, occupation, economic status, cancer type, cancer stage, disease duration, treatment type, insurance status, and metastasis. Economic status was self-reported by participants as poor, average, good, or excellent based on perceived household income and living conditions. Cancer type and stage were recorded from medical records based on histologically confirmed diagnosis and standard TNM classification. All variables were clearly defined to ensure transparency and reproducibility.

The QLQ-C30 comprises 30 items assessing HRQoL across five functional scales (physical, role, emotional, cognitive, social), nine symptom scales (fatigue, pain, nausea/vomiting, dyspnea, diarrhea, constipation, insomnia, appetite loss, financial difficulties), and one global health status/QoL scale. Scores are linearly transformed (0–100); higher functional scores indicate better functioning, while higher symptom scores indicate greater severity.

The Persian version of the QLQ-C30 has demonstrated good validity and reliability in Iran[32]. In this study, the demographic form was evaluated for content and face validity, and internal consistency and test–retest reliability of the QLQ-C30 were reassessed in 30 patients (Cronbach's alpha: 0.80–1.00; ICC: 0.80–1.00)[33].

All data were collected through face-to-face interviews conducted by a trained researcher in a private setting to minimize information bias. Completed questionnaires were reviewed for accuracy and completeness. Questionnaires with missing or incomplete responses were excluded from the final analysis; therefore, all analyses were performed using complete-case data.

Statistical analysis

Data analyses were performed using SPSS version 27. Continuous variables were presented as median(IQR), and categorical variables as frequencies and percentages.

Normality of continuous variables was assessed using the Kolmogorov Smirnov test and visual inspection of histograms and Q–Q plots.

For non normally distributed variables:

- Mann-Whitney test was used for two group comparisons.
- Multivariable Gamma regression models with a log link were used to identify predictors of HRQoL scales. The Gamma regression model was chosen because HRQoL scores are continuous, positively skewed, and bounded at zero, which violates the assumptions of linear regression. This model assumes that the dependent variable follows a Gamma distribution and that the variance is proportional to the square of the mean. The log link function ensures that predicted values remain positive, making it suitable for modeling skewed HRQoL data while accounting for multiple predictors simultaneously. Sociodemographic, clinical, and treatment-related variables were included simultaneously in the models to control for potential confounding effects. Regression results were reported as standardized beta coefficients (β), 95% confidence intervals, and p-values. A significance level of $p < 0.05$ was used.

Result

A total of 166 patients participated in this study. Figure 1 illustrates the study flowchart, including the number of patients assessed for eligibility, excluded, and finally included in the analysis. Initially, 205 patients were assessed for eligibility. Among them, 39 were excluded due to not meeting inclusion criteria or declining participation. Ultimately, 166 eligible patients were included in the analysis.

Table 1 presents the demographic and clinical characteristics of the participants. The age of participants ranged from 14 to 92 years, with a mean of 58.09 ± 16.08 years. The mean duration of disease was 17.33 ± 21.58 months. Most participants were married (89.2%) and 51.8% were illiterate. A total of 86 participants reported

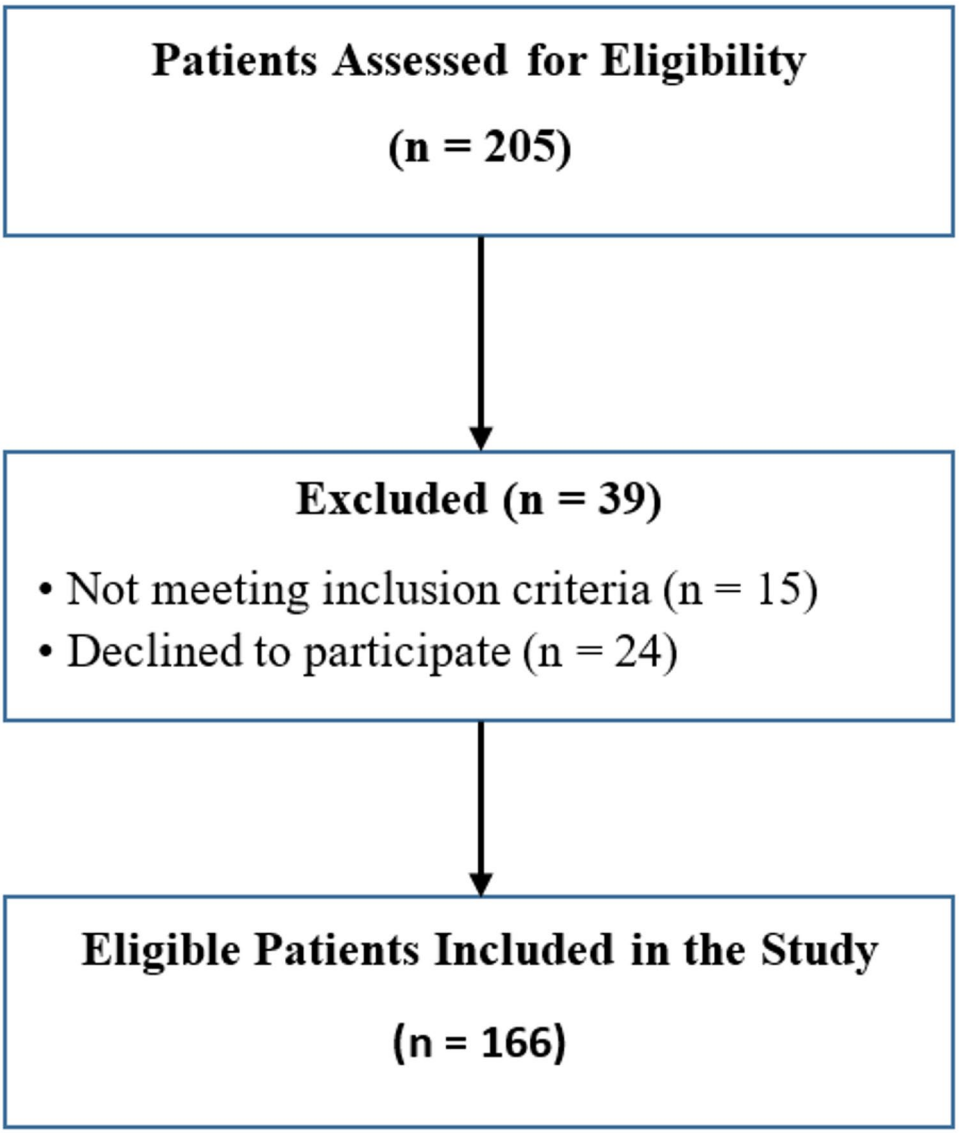


Fig. 1. Flowchart of patient selection process.

poor economic status. Regarding residence, 46.4% lived in urban areas and 53.6% in rural areas. The most common cancer types were gastrointestinal cancers (41.6%). Stage IV disease was diagnosed in 58.4% of the patients, and the most frequent treatment modality was chemotherapy (50.6%).

Table 2 presents the median and IQR scores of the HRQoL dimensions. Among the functional scales, social functioning had the highest median score (65.67) compared to cognitive functioning (32.33), physical functioning[38], role functioning (49) and emotional functioning (49).

In Table 3 HRQoL scores were compared across different cancer types. Based on the reported median (IQR) values, patients with respiratory system cancers showed the highest scores in physical functioning (59 [42.33–72.33]) and role functioning (65.67 [32.33–90.66]). The lowest cognitive functioning score was observed among patients with genitourinary system cancers (15.67 [8.33–32.33]). Patients with breast cancer demonstrated the highest emotional functioning score (57.33 [40.67–74]). In the domain of social functioning, the highest values were recorded among patients with respiratory system cancers and those categorized under "other" cancers.

As shown in Table 4, the multivariable Gamma regression model with a log link examined the association between sociodemographic and clinical factors and the overall HRQoL score. Cancer-related clinical factors showed significant associations with overall HRQoL. Compared with patients in cancer stage I, those in stage IV had substantially lower quality of life (Mean Ratio [MR] = 0.33; 95% CI: 0.14–0.80; $p = 0.014$). Similarly, patients with metastatic disease reported markedly reduced HRQoL (MR = 0.36; 95% CI: 0.17–0.77; $p = 0.009$).

In contrast, having basic health insurance was associated with a higher quality of life, with insured patients reporting more than twice the mean quality of life score compared to those without basic health insurance (MR = 2.15; 95% CI: 1.06–4.36; $p = 0.034$). Other sociodemographic and clinical variables including age, sex, education level, occupation, marital status, economic status, place of residence, cancer type, treatment type,

Variable		*n* (%)	Mean ± SD
Age (years)	–	–	58.09 ± 16.08
Disease Duration (months)	–	–	17.33 ± 21.58
Gender	Male	90 (54.2)	–
	Female	76 (45.8)	–
Marital Status	Single	18 (10.8)	–
	Married	148 (89.2)	–
Education Level	Illiterate	86 (51.8)	–
	Below Diploma	33 (19.9)	–
	Diploma	22 (13.3)	–
	University	25 (15.1)	–
Occupation	Employee	36 (21.7)	–
	Unemployed	24 (14.5)	–
	Housewife	62 (37.3)	–
	Self-employed	44 (26.5)	–
Economic Status	Poor	86 (51.8)	–
	Average	62 (37.3)	–
	Good	18(10.8)	–
Residence	Urban	77 (46.4)	–
	Rural	89 (53.6)	–
Cancer Type	Gastrointestinal cancers	69 (41.6)	–
	breast cancer	27(16.3)	–
	Respiratory system cancers	17 (10.2)	–
	Genitourinary system cancers	17 (10.2)	–
	Other		
	36 (21.7)	–	
Cancer Stage	I	4 (2.4)	–
	II	23 (13.9)	–
	III	42 (25.3)	–
	IV	97 (58.5)	–
Treatment Type	Chemotherapy	84 (50.6)	–
	Surgery + Chemotherapy	64 (38.6)	–
	Other	18 (10.8)	–
Health Insurance	Yes	165 (99.4)	–
	No	1 (0.6)	–
Supplementary Insurance	Yes	61 (36.7)	–
	No	105 (63.3)	–
Metastasis	Yes	96 (57.8)	–
	No	71 (42.2)	–

Table 1. Demographic and clinical characteristics of participants ($n = 166$).

HRQoL Domain	Median	IQR
Physical Functioning	39	25.67-59
Role Functioning	49	15.67–65.67
Cognitive Functioning	32.33	15.67-49
Emotional Functioning	49	24-65.67
Social Functioning	65.67	32.33–65.67

Table 2. Median(IQR) Scores of Health-Related Quality of Life Dimensions (EORTC QLQ-C30, $n = 166$).

HRQoL Domain	Gastrointestinal cancers Median (IQR)	Breast cancer Median(IQR)	Respiratory system cancers Median(IQR)	Genitourinary system cancers Median(IQR)	Other Median(IQR)
Physical Functioning	39 (22.34-59)	32.33 (19–39)	59(42.33–72.33)	39(25.66-59)	45.67(25.67-64)
Role Functioning	32.33 (24-65.67)	32.33 (1–49)	65.67(32.33–90.66)	49(15.67–65.67)	49(32.33–65.67)
Cognitive Functioning	32.33 (1–49)	32.33 (15.67-49)	32.33(15.67–57.33)	15.67(8.33–32.33)	32.33(15.67-49)
Emotional Functioning	40.67 (24-65.67)	57.33 (40.67-74)	40.67(28.16–57.33)	24(15.67–53.16)	49(15.67–71.91)
Social Functioning	49(32.33–65.67_	49 (15.67–65.67)	65.67(32.33-99)	49(24-65.67)	65.67(36.49–82.33)

Table 3. Comparison of HRQoL Scores among Different Types of Cancers ($n = 166$).

	Predictor	B	Std. Error	exp(B)	95% CI exp(B)	*p*–value
	(Intercept)	4.695	0.5237	109.3	39.2–304.2	0.000
Sex	Male (ref)	–	–	–	–	–
	Female	−0.054	0.1304	0.95	0.73–1.22	0.678
Education	Illiterate (ref)	–	–	–	–	–
	Below Diploma	0.024	0.0810	1.02	0.87–1.20	0.768
	Diploma	0.180	0.1090	1.20	0.97–1.48	0.099
	University	0.251	0.1182	1.29	1.02–1.62	0.034
Occupation	Employee (ref)	–	–	–	–	–
	Unemployed	−0.084	0.1141	0.92	0.73–1.15	0.464
	Housewife	0.115	0.1473	1.12	0.84–1.49	0.434
	Self–employed	−0.003	0.0961	1.00	0.83–1.20	0.977
Marital Status	Single (ref)	–	–	–	–	–
	Married	−0.051	0.1086	0.95	0.77–1.18	0.640
Economic Status	Poor (ref)	–	–	–	–	–
	Average	0.016	0.0704	1.02	0.89–1.17	0.817
	Good	0.013	0.1054	1.01	0.82–1.25	0.902
Place of Residence	Urban (ref)	–	–	–	–	–
	Rural	0.011	0.0645	1.01	0.89–1.15	0.864
Cancer Type	Gastrointestinal cancers (ref)	–	–	–	–	–
	breast cancer	−0.098	0.1067	0.91	0.74–1.12	0.360
	Respiratory system cancers	−0.028	0.1053	0.97	0.79–1.20	0.793
	Genitourinary system cancers	0.013	0.1020	1.01	0.83–1.24	0.898
	Other	0.004	0.0955	1.00	0.83–1.21	0.970
Cancer Stage	I (ref)	–	–	–	–	–
	II	0.170	0.2188	1.19	0.77–1.82	0.438
	III	0.128	0.2110	1.14	0.75–1.72	0.544
	IV	**−1.105**	**0.4488**	**0.33**	**0.14–0.80**	**0.014**
Treatment Type	Chemotherapy	–	–	–	–	–
	Surgery + Chemotherapy	0.044	0.0682	1.04	0.91–1.19	0.518
	Other	0.180	0.1141	1.20	0.96–1.50	0.115
Health Insurance (Basic)	Yes	–	–	–	–	–
	No	**0.765**	**0.3608**	**2.15**	**1.06–4.36**	**0.034**
Supplementary Insurance	Yes	–	–	–	–	–
	No	−0.061	0.0678	0.94	0.82–1.07	0.367
Metastasis	Yes	–	–	–	–	–
	No	**−1.008**	**0.3831**	**0.36**	**0.17–0.77**	**0.009**
	Age (years)	0.003	0.0026	1.00	0.99–1.01	0.223
	Disease Duration (months)	0.000	0.0016	1.00	0.99–1.00	0.772

Table 4. Association of Health-Related Quality of Life with sociodemographic and clinical characteristic of patients. HRQoL = Health-Related Quality of Life, exp(B) = Mean Ratio (MR), CI = Confidence Interval, Ref = reference category.

supplementary insurance and disease duration were not significantly associated with quality of life in the adjusted model (all $p > 0.05$).

Discussion

This cross sectional study provides a comprehensive assessment of health related quality of life (HRQoL) among patients with diverse types of cancer attending hospital in southwestern Iran. Using the validated Persian version of the EORTC QLQ-C30, we identified substantial impairments across multiple functional domains, with cognitive, physical and role functioning showing the lowest median scores. Social functioning demonstrated comparatively better performance, potentially reflecting strong family and community support systems in this region. The findings contribute to the growing evidence on HRQoL disparities among cancer patients in low and middle income countries, where access to supportive care and financial resources remains limited.

The domain-level HRQoL profile identified in this study is broadly consistent with recent findings from Iran. A meta-analysis by Isfahani et al. (2022), synthesizing 30 studies conducted in Iran through December 2020, reported a mean HRQoL score of approximately 52 out of 100 among Iranian cancer patients, confirming systemic and persistent functional impairment across the oncology population in this setting[34]. In a study by Mirzaei et al. (2021) among Iranian breast cancer patients undergoing chemotherapy and radiotherapy, the mean total HRQoL score was 57.1, with insurance coverage identified as a significant predictor a finding that aligns closely with our observation regarding the protective effect of health insurance[35]. Similarly, Shafaie et al. (2019), in their cross-sectional study of breast cancer patients in Tabriz, reported that cognitive functioning yielded the highest scores and emotional functioning the lowest among EORTC QLQ-C30 subscales, while identifying time of diagnosis and marital satisfaction as key determinants of overall HRQoL a finding that highlights the role of psychosocial factors, even when sociodemographic predictors lack independent significance in adjusted models[33]. The study by Fard and Janbabaei (2014), conducted in patients with metastatic gastrointestinal cancer in Iran, reported markedly lower HRQoL compared with European reference data, and explicitly attributed this gap to financial barriers to treatment and limited oncological support services a structural explanation that remains relevant to our study population in southwestern Iran, where a majority of patients reported poor or average economic status[36]. In a more recent Iranian study, Dahouri et al. (2024) examined HRQoL predictors in colorectal cancer patients across five hospitals in northwestern Iran and identified colostomy, unemployment, and comorbidity as the strongest adverse predictors, while urban residence was associated with higher HRQoL—findings that echo the socioeconomic and structural determinants emerging from our data[37]. Additionally, Naeimabadi et al. (2024), in a systematic review of HRQoL studies in Iranian patients with colorectal cancer published in Annals of Medicine and Surgery, confirmed that clinical severity, treatment type, and psychosocial factors were the most consistently identified determinants of HRQoL impairment in this population[38].

The comparatively better social functioning scores in our sample—relative to all other functional domains—may reflect the strong familial and communal support networks that are culturally embedded in southwestern Iran. This interpretation is consistent with the study by Aminisani et al. (2017), conducted among colorectal cancer survivors in the north of Iran, in which social support and family cohesion were found to be inversely associated with depression and positively correlated with EORTC QLQ-C30 social functioning scores[39]. The relative preservation of social functioning in collectivist cultural contexts has also been observed internationally: a systematic review by Pichler et al. (2021) found that cancer patients in countries with high levels of family-based caregiving reported significantly less deterioration in social functioning compared with patients in more individualistic healthcare settings, even when physical and cognitive deficits were comparable[40].

Internationally, the functional impairment pattern observed here is consistent with findings from several recent large-scale studies. Giesinger et al. (2020), using updated normative data from a pooled European sample, demonstrated that role and cognitive functioning decline most steeply with advancing disease stage among EORTC QLQ-C30 domains, establishing reference values that underscore the magnitude of impairment observed in our sample[41]. Warth et al. (2021), in a multinational European study of mixed-cancer outpatients, similarly reported that physical and cognitive functioning were the domains most sensitive to cancer stage progression, with patients at stage IV showing scores two to three standard deviations below population norms—a pattern strikingly consistent with our findings[42]. In Asia, Fan et al. (2022) demonstrated that gastrointestinal malignancies were associated with the highest symptom burden and the lowest physical functioning scores across cancer sites, consistent with our observation that gastrointestinal cancers—the predominant cancer type in our sample (41.6%)—were associated with among the lowest functional scores[43].

The most clinically consequential findings were the markedly reduced HRQoL among patients with stage IV cancer (MR = 0.33) and those with metastatic disease (MR = 0.36). These effect sizes indicate that advanced disease reduces mean HRQoL to approximately one-third of the stage I reference group—a difference that substantially exceeds the minimum clinically important difference of 10 points conventionally applied to the EORTC QLQ-C30 summary score[44]. The mechanisms through which advanced disease and metastasis compound HRQoL impairment are multifactorial and include progressive symptom accumulation, intensification of systemic treatment, functional dependency, and heightened psychological distress. Evidence from a large pooled analysis of EORTC clinical trials by Quinten et al. (2025) confirmed that physical functioning, pain, and appetite loss from the EORTC QLQ-C30—all of which worsen significantly at stage IV—are independently prognostic for survival across 17 cancer types, reinforcing the bidirectional relationship between HRQoL and disease severity[45]. The high prevalence of stage IV presentation in our sample (58.4%) likely reflects systemic challenges in cancer detection in southwestern Iran, where rural residence (53.6%), high rates of illiteracy (51.8%), and limited access to screening services converge to delay diagnosis. This structural context underscores the critical importance of community-level cancer awareness campaigns and expansion of primary care-based referral pathways in this region.

The positive association between basic health insurance and HRQoL (MR = 2.15) is clinically plausible and directionally consistent with broader evidence on financial toxicity in cancer care, though it must be interpreted with caution given that only one participant in our sample was uninsured. Financial barriers to treatment access in Iran remain substantial despite near-universal basic insurance coverage; a systematic review by Kianersi et al. (2020) found that cancer patients face among the highest rates of catastrophic health expenditure of any disease group in Iran, driven by high out-of-pocket costs for pharmaceuticals, imaging, and non-covered supportive medications[27]. Insurance coverage likely facilitates access to continuous treatment cycles, diagnostic follow-up, and symptom-management medications, each of which contributes to better functional capacity and reduced symptom burden. The absence of a significant effect of supplementary insurance in our model may reflect the heterogeneous scope of supplementary schemes in this region or low uptake of available benefits, a pattern documented in the Iranian context and warranting further investigation.

Sociodemographic variables—including age, sex, education, economic status, marital status, occupation, and residential location—were not independently associated with HRQoL in the adjusted model. This finding contrasts with some international literature reporting socioeconomic gradients in cancer HRQoL, but aligns with the pattern observed by Fard and Janbabaei (2014) in Iranian metastatic gastrointestinal cancer patients, where clinical severity dominated the prediction of HRQoL and demographic predictors were attenuated[36]. Several explanations are plausible. First, the near-uniform presence of advanced disease (84% at stage III or IV) may have statistically suppressed the contributions of sociodemographic variables through a clinical dominance effect, whereby the overwhelming influence of stage IV and metastasis reduces residual variance available for demographic predictors to explain. Second, the socioeconomic homogeneity of the sample—over half classified as poor, over half illiterate—limits the range of variation needed to detect socioeconomic gradients in HRQoL. Third, strong familial caregiving networks, which are culturally normative in this region, may partially compensate for the disadvantages of low education and poor economic status in preserving social and emotional functioning.

The findings of this study carry important implications for clinical practice and health policy. At the clinical level, the integration of routine HRQoL assessment using the EORTC QLQ-C30 into oncology workflows is warranted, as patient-reported outcomes provide prognostically relevant information above and beyond objective clinical parameters[45]. The markedly impaired cognitive and physical functioning observed here argues for systematic screening of treatment-related cognitive impairment and functional decline, with timely referral to rehabilitation and neuropsychological support services. Early and systematic integration of palliative care into oncology pathways—rather than reserving it for end-of-life situations—is particularly urgent given the high prevalence of advanced disease. Evidence consistently demonstrates that early palliative care integration improves HRQoL, reduces symptom burden, and may extend survival in patients with advanced malignancies[46]. From a policy perspective, the high proportion of stage IV presentations reflects a systemic failure of early detection, and investment in community-level cancer screening, rural health literacy campaigns, and strengthening of primary care referral networks is urgently needed. Regarding financial protection, the positive insurance-HRQoL association reinforces the case for deepening coverage—particularly for pharmaceutical support, diagnostic imaging, and supportive care medications—beyond the current basic insurance framework.

Strengths and limitations

A key strength of this study is the use of the well established EORTC QLQ-C30 and a comprehensive assessment of clinical and sociodemographic determinants using a robust statistical model appropriate for skewed HRQoL data. Inclusion of multiple cancer types also enhances generalizability.

However, several limitations should be acknowledged. First, the cross-sectional design precludes causal inference. Second, the use of consecutive (non-probability) sampling may introduce selection bias and limit the generalizability of the findings beyond the study population. Moreover, data were collected from a single referral hospital, which may not fully represent cancer patients in other regions of Iran. Self-reported measures are subject to recall and reporting bias. Finally, unmeasured factors such as psychological comorbidities, quality of social support, and treatment adherence may have influenced the observed associations.

Conclusion

This study demonstrates that HRQoL among cancer patients in southwestern Iran is most powerfully determined by disease severity—specifically advanced cancer stage and metastatic spread—and by access to basic health insurance. Cognitive, physical, and role functioning were most severely impaired, while social functioning was relatively preserved, likely reflecting the protective role of familial and community support systems in this cultural context. Sociodemographic variables did not independently predict HRQoL in the adjusted model, possibly due to statistical dominance of clinical predictors and socioeconomic homogeneity of the sample. These findings call for strengthening early cancer detection infrastructure, deepening financial protection for cancer patients, and systematically integrating palliative and supportive care into standard oncology practice. Future longitudinal, interventional, and multi-center research is essential to further elucidate HRQoL determinants and to evaluate targeted strategies aimed at improving well-being across the cancer care continuum.

Data availability

The datasets generated and/or analyzed during the current study are available from the corresponding author on reasonable request.

Received: 18 December 2025; Accepted: 29 April 2026
Published online: 06 May 2026

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Acknowledgements
We sincerely thank all the patients who participated in this study for their time and cooperation. Their contribution was invaluable to our research.

Author contributions
The authors confirm contribution to the paper as follow: study conception and design: MMJ, MR, MM, MS, SA; data collection: MMJ, MR, MM; analysis and interpretation of results: MMJ, SA, MS; Draft manuscript preparation and edit: MMJ, MR, MM, SA; All authors reviewed the results and approved the final version of the manuscript.

Funding
Not applicable.

Declarations

Competing interests
The authors declare no competing interests.

Ethics approval and consent to participate
This study was approved by the Ethics Committee of Yasuj University of Medical Sciences (approval number: IR.YUMS.REC.1403.087), and written informed consent was obtained from all participants. The study was conducted in accordance with the ethical standards of the Declaration of Helsinki and its subsequent revisions. No participants under the age of 16 were included in this study.

Consent for publication
Not applicable.

Additional information
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