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Galaxy Publication

Health-Related Quality of Life among Colorectal Cancer Patients in Qatar: Findings from an Analytical Cross-Sectional Study

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ABSTRACT

Colorectal cancer (CRC) constitutes a critical public health issue, compromising patients' quality of life (QoL) and placing considerable strain on families and health services. To measure QoL and its associated factors among individuals with CRC in Qatar, and to determine the sociodemographic and clinical characteristics that shaped QoL during 2023. An analytical cross-sectional investigation was conducted between July and December 2023. Drawing from the National Center for Cancer Care and Research (NCCCR) registry, 456 CRC patients underwent screening, of whom 169 met the inclusion criteria and were enrolled. QoL was assessed using the EORTC QLQ-C30 and the CRC-specific QLQ-CR29 module. Participants were predominantly aged ≥ 45 years (80.5%), of non-Qatari nationality (79.9%), and married (88.8%). The most frequently observed comorbidities were hypertension (39.1%) and diabetes (31.4%). Adenocarcinoma represented the vast majority of histological findings (90.5%), with the bulk of diagnoses occurring at late stages (III–IV, 74.8%) and metastatic spread documented in 71.6%. The sigmoid colon emerged as the most commonly affected anatomical site (34.9%), while combined surgery and chemotherapy constituted the principal therapeutic approach (69.2%). The global QoL score was in the moderate-to-high range (70.4 ± 18.5), with fatigue (23.9 ± 26.8) and monetary hardship (28.9 ± 40.4) standing out as the most frequently reported issues. Functional QoL scores were elevated among those enjoying adequate income (+12.5 points, $P < 0.01$) and those with more time elapsed since diagnosis (+0.06 points/month, $P < 0.05$). In contrast, they were diminished among individuals with higher educational attainment (–5.0 points, $P = 0.05$) or a history of alcohol consumption (–11.2 points, $P = 0.05$). Although disease stages were typically advanced, CRC patients in Qatar recorded satisfactory QoL. Socioeconomic standing exerted a pronounced influence on outcomes, underscoring the need to integrate psychosocial and financial support services.

Keywords: Quality of life, Colorectal cancer, Predictors, Adults, Qatar

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Introduction

Globally, cancer persists as a top driver of disease and death, being implicated in close to 10 million deaths and an estimated 19.3 million incident cases in 2020 [1]. Of the various tumor types, colorectal cancer (CRC)—arising from the glandular epithelium of the colon or rectum—is among the most widespread. By incidence, CRC occupies third place worldwide, accounting for 1.93 million new diagnoses in 2020 (10.6% of cases in men, 9.6% in women across age groups), and it ranks second in cancer-attributable mortality, with roughly 916,000 deaths that same year [2].

The worldwide toll of CRC is climbing, with forecasts pointing to an alarming 60% surge by 2030, exceeding 2.2 million new cases and 1.1 million deaths [3]. Beyond its clinical complexity, CRC imposes a considerable public health burden by significantly affecting health-related quality of life (HR-QoL). While developments in screening, chemotherapy, and surgical care have boosted survival figures [4], these gains must also be balanced against patient-reported outcomes, most notably QoL, which encompasses physical, emotional, social, and role-functioning facets [5, 6].

Today, QoL is recognized as a cornerstone outcome in oncology care and research [5]. Research reveals that CRC patients commonly endure an array of disease- and therapy-linked sequelae—pain, tiredness, depressed mood, worry, disrupted sleep, and gut dysfunction—that collectively erode HR-QoL [7, 8]. Furthermore, QoL trajectories diverge markedly across contexts, shaped by cultural, socioeconomic, and health system disparities. For instance, work from specific settings indicates that CRC patients continue to report impaired QoL in physical, social, clinical, and financial spheres [7].

A host of sociodemographic and clinical attributes have been shown to influence HR-QoL among CRC patients. Characteristics such as age, biological sex, marital circumstances, level of schooling, economic security, housing situation, and tobacco use are regularly tied to QoL outcomes. On the clinical side, determinants including disease extent, interval since diagnosis, nature and length of treatment, inpatient stay duration, therapeutic response, metastatic involvement, and concurrent illnesses likewise exert a notable effect. By way of illustration, a Saudi Arabian study of 106 CRC patients demonstrated that job status and tumor site were robustly linked to deterioration across several QoL domains [9-13]. A recent systematic synthesis additionally stressed that cancer-associated symptoms reaching beyond the gastrointestinal tract—namely pain, exhaustion, depression, anxiety, breathlessness, and sleeplessness—substantially undercut HR-QoL and may shift according to stage and treatment type [8].

Within Qatar, CRC ranks as the most common malignancy among males (15.7% of incident cancers) and the second most common among females (7.5%), trailing only breast cancer. In 2017, 178 new CRC registrations were recorded: 115 (66.6%) in men and 63 (35.4%) in women. Most individuals survived, with just 2.9% recorded as deceased at the time of the report [14]. Incidence peaked in males aged 60–64 years and females aged 55–59 years; the youngest patient was a 20-year-old man. Histologically, adenocarcinoma not otherwise specified (NOS) was the most common (75.8%), followed by neuroendocrine carcinoma (7.9%) and malignant neoplasm (5.6%) [14]. Staging information was available for only 28% of the cohort, among whom 40% had stage IV, 27% had stage III, and 22% had stage II disease. Treatment particulars were available for 75.8%, with surgery (31.9%), chemotherapy (8.9%), radiotherapy (2.2%), and multimodal protocols [14] as the prevailing strategies. In response to the high incidence and lethality of CRC, Qatar has rolled out a national screening initiative through the Primary Health Care Corporation (PHCC) and launched wide-reaching community education drives to raise awareness of risk factors, preventive behaviors, and the value of early diagnosis [15].

Despite these steps, a significant knowledge gap remains regarding the broader impact of CRC on patient QoL in Qatar. Clinical endpoints like survival are relatively well characterized, yet far less is known about CRC's toll on the local population's physical, psychological, social, and functional well-being. Since QoL is an indispensable metric for capturing the full brunt of CRC on patients, relatives, and the health apparatus, closing this gap is vital. Accordingly, this study aims to assess QoL in Qatari CRC patients and identify sociodemographic and other variables that correlate with QoL.

Materials and Methods

Study design and setting

An analytical cross-sectional inquiry was conducted in Qatar from July through December 2023, enrolling CRC patients who attended the oncology clinic for routine surveillance. Records were extracted from the National Center for Cancer Care and Research (NCCCR) database at Hamad Medical Corporation (HMC). NCCCR functions as Qatar's lone dedicated cancer hospital, furnishing a full spectrum of oncology provisions—advanced systemic therapy, hematology care, stem cell transplantation, and palliation—while oncosurgical interventions are delivered through a partnership with Hamad General Hospital [16].

Study population and procedure

Having gained approval from Hamad Medical Corporation's Institutional Review Board (MRC-01–22-536), a compilation of individuals diagnosed with colorectal cancer (CRC) (n = 456) was extracted from the National Center for Cancer Care and Research (NCCCR) database and examined to single out those fitting the study's eligibility specifications. Suitable candidates were adults aged 18 or above, regardless of sex or national origin, who had a confirmed CRC diagnosis, were receiving therapeutic management at the NCCCR, and were proficient in Arabic or English. Subjects exhibiting cognitive or psychiatric disturbances that might impede meaningful exchange or bias HRQOL assessments were disqualified.

Oral informed consent was obtained, and enrollees were asked to participate in a telephone-based conversation lasting approximately 20–30 minutes. Clinical particulars, including the timing of diagnosis, the tumor's anatomical site, and whether metastasis had occurred, were abstracted from patient files by instructed study personnel. At the same time, self-assessed outcomes were collated using a prearranged, multi-module questionnaire. Participation was entirely voluntary, and respondents retained the freedom to discontinue involvement at any stage without repercussions.

Questionnaire development and validation process

This component was conceived and assembled by the researcher following a wide-ranging survey of the existing literature. It encompassed 15 items tailored to harvest details about sociodemographic backgrounds, health-related characteristics, and malignancy-related variables. Face validity was ensured through dialogue with faculty members in preventive medicine and seasoned oncology practitioners. To establish translation validity, the English original was translated into Arabic by two mother-tongue Arabic speakers and subsequently back-translated into English to confirm the fidelity of meaning. All contributors then granted unanimous endorsement of the definitive version. Following this, the instrument was pre-tested on a convenience sample of 10 patients to assess its ease of use, intelligibility, and relevance.

Data collection tools and variables

Dependent variables

The primary outcome measure was quality of life (QoL) among colorectal cancer (CRC) patients residing in Qatar, as determined using the well-validated EORTC QLQ-C30 and QLQ-CR29, both available in Arabic and English [17, 18]. The QLQ-C30 comprises 30 questions arranged into five functional subscales (physical, role, cognitive, emotional, social), three symptom subscales (fatigue, pain, nausea/vomiting), a single global health status/QoL scale, and six standalone items that capture dyspnea, sleeplessness, appetite reduction, constipation, diarrhea, and economic strain. Answers are recorded on a four-tier Likert format (1 = "not at all" extending to 4 = "very much"), save for the global health status component, which runs from 1 = "very poor" to 7 = "excellent"; raw results then undergo linear transformation to a 0–100 spectrum. Higher figures indicate improved functioning and QoL [19]. The QLQ-CR29 instrument contains 29 separate entries, built around four multi-question scales tackling urinary frequency, involuntary stool leakage, bowel motion consistency, and body image perception, supplemented by single questions that deal with additional post-therapeutic issues; the tool succeeds in discriminating between clinically disparate patient cohorts and yields steady scores upon repeated measurement in individuals whose condition is stable. Elevated scores across symptom dimensions point to a worsening symptom profile and poorer QoL [17].

Independent variables

Independent variables span sociodemographic, health-attendant, and tumor-defining facets. In terms of sociodemographic markers, these took in age bracket, biological sex, country of origin, spousal situation, schooling level, occupational standing, monthly earnings (categorized as insufficient, partly sufficient, or sufficient), and residential setting (living solo, alongside family members, under the care of a caregiver, or within a long-stay nursing institution). Health-attendant factors, meanwhile, incorporated the existence and nature of concurrent health conditions, namely high blood pressure, diabetes mellitus, disorders of the heart and vessels, long-term respiratory illness, cancer, longstanding renal or hepatic impairment, immunological disturbances, and mental health ailments such as anxious states or depressive episodes. Tumour-defining details encompassed the histopathological category (e.g., adenocarcinoma), extent of disease (stage I–IV), site of the primary growth (caecum, ascending colon, hepatic flexure, transverse colon, splenic flexure, descending colon, sigmoid colon, rectum, rectosigmoid, or anus), duration elapsed after initial confirmation of disease, metastatic involvement (yes/no), and therapeutic strategy pursued, including operative removal, cytotoxic drugs, radiation delivery, endocrine manipulation, marrow grafting, or multimodal combination plans.

Ethical statement

This inquiry received clearance from the Medical Research Centre Ethical Committee (MRC-IRB) under the assigned protocol identifier (MRC-01-22-536). A spoken agreement was collected from each respondent before the questioning session. The entire study was conducted in strict adherence to the ethical principles outlined in the “Declaration of Helsinki” and in accordance with Good Clinical Practice guidelines.

Data analysis

Data capture and statistical exploration were conducted using the Statistical Package for the Social Sciences (SPSS)™ Version 25, alongside R version 4.2.1 and RStudio 2023.09.0 Build 463. A descriptive breakdown of participant profiles was generated, with outputs reported as count and percentage distributions for nominal groupings. Assessment of whether the data conformed to a normal distribution was performed using the Kolmogorov-Smirnov test. The decision to present summaries as mean ± standard deviation (S.D) or as median ± Inter-Quartile Range (IQR) was governed by the p-value emerging from that normality check. Non-parametric bootstrapped regression modeling was applied to disentangle the contribution of sociodemographic and clinical predictors to patients’ quality of life indices, generating beta coefficients accompanied by their 95% Confidence Interval (CI) bounds. Statistical significance was assigned at a threshold of $P \leq 0.05$ (employing a two-tailed criterion).

Results and Discussion

Sample characteristics

Across the enrolment period, 456 people aged 18 years and older were initially identified, and their clinical documentation was scrutinized for potential suitability. On closer inspection, 143 of these were determined to harbor conditions other than colorectal cancer and were consequently excluded from further consideration. The residual group of 313 qualifying patients was then contacted by telephone, yielding a participation rate of 53.9% **(Figure 1).**

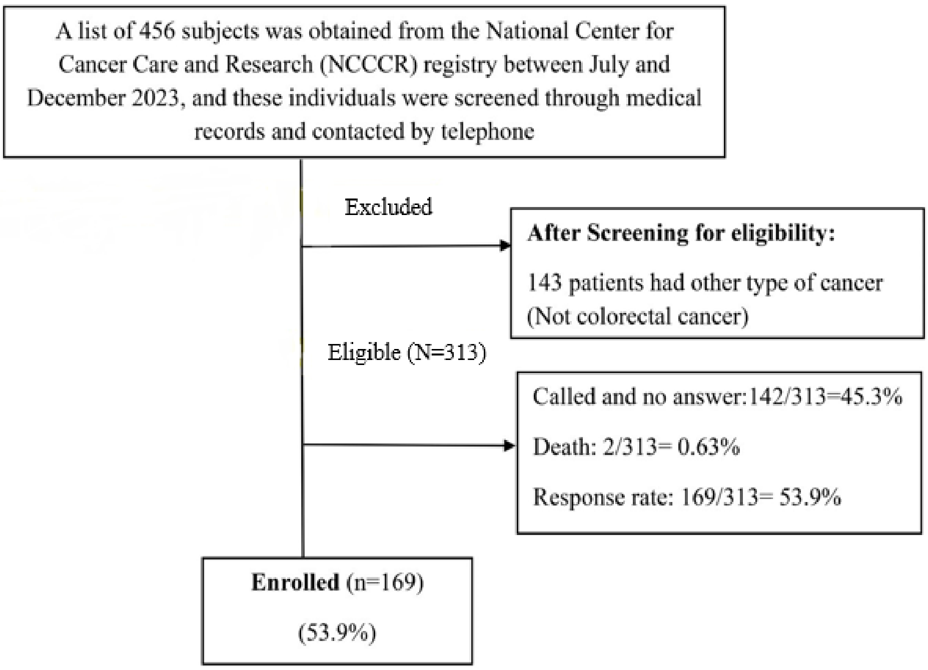

Figure 1. Flow chart of the study recruitment of the participants (n = 169).

Sociodemographic and background characteristics of the study populations

A comprehensive overview of the sociodemographic and personal background attributes characterizing the colorectal cancer (CRC) cohort in Qatar in 2023 is presented in **Table 1**. The preponderance of CRC patients had reached or surpassed 45 years of age (80.5%), originated from outside Qatar (79.9%), lived in a spousal relationship (88.8%), held advanced academic qualifications (66.4%), shared a household with kin (80.7%), and commanded a monthly financial resource they regarded as adequate for their requirements (48.1%). Concurrently, nearly half of all CRC patients (45%) harbored a prior history of additional persistent medical conditions, chief among which were hypertensive disease (39.1%) and type II diabetes (31.4%). It is also worth remarking that 11.2% of colorectal cancer patients identified themselves as habitual tobacco users, and 7.7% disclosed the use of alcohol.

Table 1. Sociodemographic and background characteristics of colorectal cancer participants in Qatar during 2023 (n = 169).

Variable	Percentage (%)	Frequency (n)
Age (years)		
25-34	2.4	4
35-44	17.2	29
45-54	30.2	51
55-64	27.2	46
65 and above	23.1	39
Gender		
Male	50.3	85
Female	49.7	84
Nationality		
Qatari 20.1		34
Non-Qatari	79.9	135
Marital status		
Married	88.8	150
Not married	11.2	19
Educational level (n = 152)		
Up to secondary school	33.6	51
University and higher education	66.4	101
Employment status (n = 163)		
Not employed	40.5	66
Employed	59.5	97
Monthly income (n = 131)		
Insufficient	29	38
Partially sufficient	22.9	30
Sufficient	48.1	63
Living condition (n = 161)		
Live alone	18.6	30
Live with family	80.7	130
Living with a caregiver	0.6	1
History of chronic disease		
Yes	45	76
No	55	93
Hypertension		
Yes	39.1	66
No	60.9	103
Diabetes		
Yes	31.4	53
No	68.6	116
Smoking status		
Non-smoker	88.8	150
Smoker	11.2	19
Alcoholic		
Yes	7.7	13
No	92.3	156

An outline of the clinical portrait of colorectal cancer (CRC) patients managed in Qatar across 2023 is presented in **Table 2.** By a wide margin, adenocarcinoma of glandular origin dominated the histological landscape, constituting 90.5% of all recorded malignancies. The vast majority of subjects (74.8%) presented to medical attention when the neoplasm had already progressed to regionally advanced, or systemically disseminated stages (3 and 4), and well over two-thirds (71.6%) manifested secondary deposits in distant organs at the time of evaluation.

Table 2. Cancer-related clinical characteristics among colorectal cancer patients in Qatar during 2023 (n = 169).

Variable	Percentage (%)	Frequency (n)
	Type of cancer	
Adenocarcinoma	90.5	153
Others	9.5	16
	Stage of cancer (n = 167)	
Stage 1	6.6	11
Stage 2	18.6	31
Stage 3	40.7	68
Stage 4	34.1	57
	Metastasis	
Yes **71.6**		121
No	28.8	48

Cancer-related clinical characteristics of the study populations

Figure 2 shows the distribution of primary tumor locations within the colorectal cancer (CRC) study sample. The sigmoid segment of the large bowel was the single most commonly implicated anatomical region, featuring in 34.9% of all instances, followed in descending order by the rectal vault (13.6%), the right hemi-colon at the level of the ascending segment (9.5%), and the sigmoidorectal junction (7.7%).

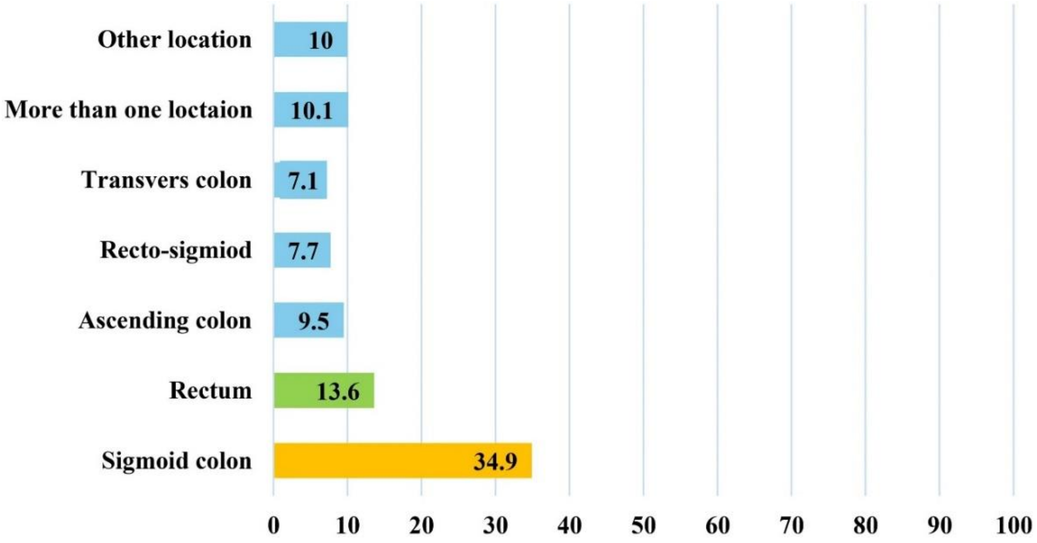

Figure 2. Frequency distribution of the tumor location among colorectal cancer patients in Qatar during 2023 (n = 169).

A dual-pronged management plan marrying operative tumor excision with systemic chemotherapeutic agents was the treatment pathway adopted for the greatest segment of colorectal cancer (CRC) patients (69.2%). Even so, a not-insignificant proportion of individuals were managed with a single modality: standalone surgical procedures were undertaken in 21.3% of cases, exclusive reliance on cytotoxic chemotherapy in 4.1%, and ionizing radiation as the sole intervention in 0.6%. This breakdown is illustrated in **Figure 3.**

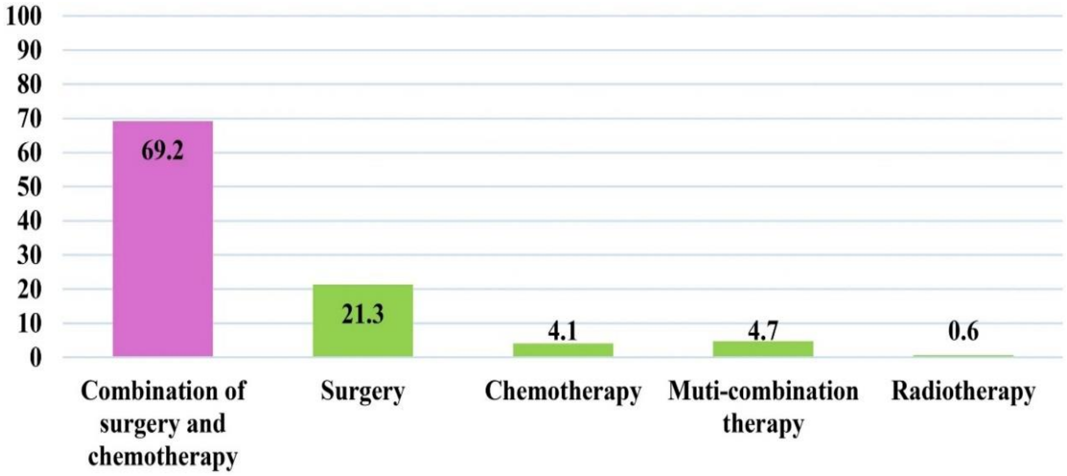

Figure 3. Frequency distribution of the types of treatment among colorectal cancer patients in Qatar during 2023 (n = 169).

Quality of life among colorectal cancer patients in Qatar

The distribution of quality-of-life (QoL) measurements from the EORTC QLQ-C30 and QLQ-CR29 instruments among colorectal cancer patients residing in Qatar is presented in **Table 3 and Figure 4.** The collective data indicate a relatively robust overall QoL, as evidenced by an average Global Health Status/QoL score of 70.4 (SD = 18.5) on the QLQ-C30. Functional status likewise tracked favorably, with mean values hitting 80.6 (SD = 20.5) and 64.2 (SD = 19.8) on the QLQ-C30 Functional and QLQ-CR29 Functional indices, respectively, a pattern suggestive of largely well-preserved capacity to carry out everyday roles and activities.

Table 3. Mean and standard deviation (SD) of quality-of-life measures for colorectal cancer patients (n = 169).

QLQ	IQR	Median	SD	Mean
QLQ-C30 – Global Scale	25.00	66.67	18.542	70.364
QLQ-C30 – Functional Scale	26.67	86.67	20.541	80.565
QLQ-C30 – Symptom Scale	21.21	12.12	18.526	16.406
QLQ-CR29 – Functional Scale	23.81	71.43	19.840	64.215
QLQ-CR29 – Symptom Scale	11.11	45.68	10.390	47.828

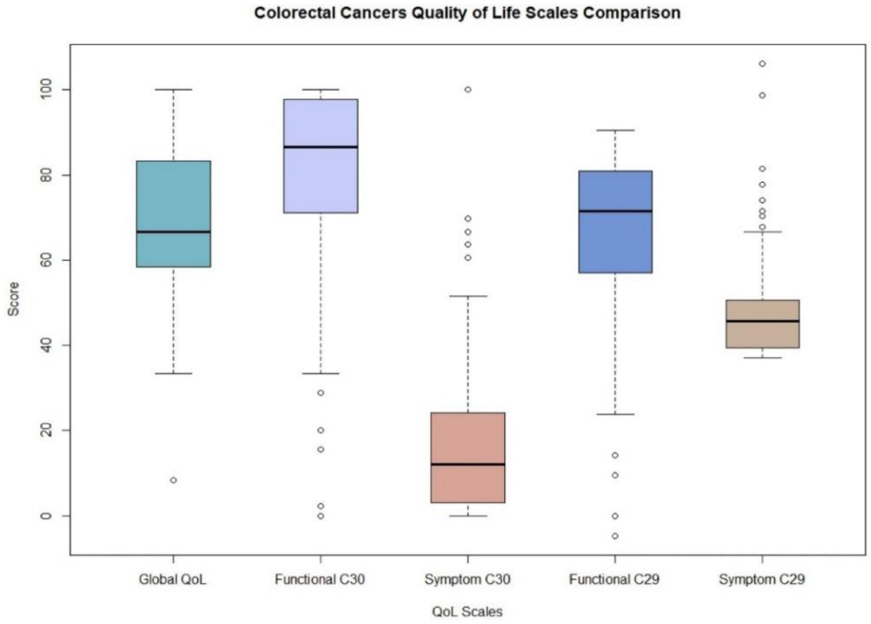

Figure 4. Colorectal cancer quality-of-life scales box plot (n = 169).

In contradistinction, the weight of symptoms borne by the sample appeared comparatively modest, a reading reinforced by mean tallies of 16.4 (SD = 18.5) on the QLQ-C30 Symptom composite and 47.8 (SD = 10.4) on the QLQ-CR29 Symptom composite. Collectively, these observations intimate that colorectal cancer patients enrolled in this investigation maintained a tolerably good quality of life while grappling with a fairly limited repertoire of troublesome symptoms.

Aggregated mean scores alongside corresponding standard deviations for the EORTC QLQ-C30 Global Health Status/Quality of Life (QoL) scale, segmented according to chronological age, biological sex, and tumor extent, are itemized in **Table 4.** In general, perceived global QoL remained reasonably stable across age groups, except for the 55–64-year-old subgroup, which posted the highest average estimate at 76.27 ± 15.3.

Table 4. QLQ-C30 global quality of life scale scores, averages, and standard deviations based on age, gender, and stage of cancer for colorectal cancer patients in Qatar (n = 169).

Variable	Standard deviation (SD)	Global quality of life scale mean (M)
	Age	
25-34	12.5	64.58
35-44	18.7	68.39
45-54	20.9	69.12
55-64	15.3	76.27
65 and above	18.3	67.09
	Gender	
Male	19.9	70.78
Female	17.2	69.94
	Stage of cancer	
Stage 1	17.9	75
Stage 2	20	67.7
Stage 3	17.9	70.8
Stage 4	18.7	70.2

A sex-based dissection revealed barely perceptible differences: male participants reported an average global QoL of 70.78 ± 19.9, and female participants reported 69.94 ± 17.2, suggesting a near-equivalent subjective health state between men and women.

With respect to tumor burden at diagnosis, individuals with stage I disease had the most favorable global QoL score (75.0 ± 17.9), in marked contrast to the stage II subset, which had the least favorable (67.7 ± 20.0). Those assigned to stages III and IV colorectal cancer reported closely aligned global QoL scores (70.8 ± 17.9 and 70.2 ± 18.7, respectively), suggesting that more extensive locoregional or metastatic spread did not, within this particular series, substantially impair participants' overall subjective well-being.

Table 5 presents the mean and standard deviation for each distinct quality-of-life (QoL) subscale of the EORTC QLQ-C30 and QLQ-CR29 questionnaires for the Qatari CRC patient group. The overarching impression is of a broadly satisfactory quality of life, anchored by a mean Global Health Status/QoL (QLQ-C30) score of 70.36 ± 18.5, indicating a high level of self-assessed wellness.

Table 5. The frequency distributions of the QLQ-C30 and QLQ-CR29 subscales' averages and standard deviations among colorectal cancer patients in Qatar in 2023 (n = 169).

Instrument	Domains	Items	Standard deviation (SD)	Mean (M)
QLQ-C30	Global domain	Overall quality of life	18.54	70.36
		Physical functioning	24.99	80.71
		Role functioning	28.49	81.95
		Emotional functioning	26.82	80.08
		Cognitive functioning	23	83.73
		Social functioning	30.93	76.63
	Symptom domain	Fatigue	26.78	23.93
		Nausea and vomiting	18.03	6.71
		Pain	27.72	15.98

	Dyspnea	26.81	13.41
	Insomnia	30.4	18.54
	Appetite loss	23.52	10.06
	Constipation	26.56	13.41
	Diarrhea	22.41	9.27
	Financial difficulties	40.43	28.99
Symptom domain	Urinary frequency	27.55	20.32
	Urinary incontinence	20.14	6.11
	Dysuria	23	7.69
	Abdominal pain	26.97	12.82
	Buttock pain	24.18	10.45
	Bloating	28.64	17.95
	Blood and mucus in stool	16.67	5.13
	Dry mouth	29.32	15.38
	Hair loss	24.45	10.45
	Taste alteration	24.39	9.27
	Flatulence	27.34	20.36
	Fecal incontinence	18.11	6.15
	Sore skin	23.78	10.91
	Stool frequency	23.09	15.08
Functional domain	Embarrassment	26.37	13.49
	Stoma care problems	29.18	20.83
	Impotence	32.3	19.11
	Dyspareunia	27.01	11.25
	Anxiety	37.27	71.79
	Weight concerns	31.5	82.25
	Body image	21.87	85.93
	Sexual interest (male)	39.99	58.94
	Sexual interest (female)	27.04	82.92

When reviewing the QLQ-C30 functional spheres, where higher values indicate more effective daily performance and, accordingly, improved QoL, the cognitive functioning domain had the highest mean (83.7 ± 23.0). In contrast, interpersonal social functioning received the lowest scoring among functional parameters (76.6 ± 30.9), even though it remained at a comparatively elevated threshold in real terms.

Conversely, in symptom-related domains, larger numerical values equate to an escalated symptomatic experience and thus a deterioration in QoL. Within the QLQ-C30 symptom battery, economic strain was identified as the single most oppressive concern (28.99 ± 40.4), closely followed by pervasive tiredness (23.9 ± 26.8). In contrast, digestive upset, in the form of nausea and vomiting, had the lowest frequency of complaint (6.7 ± 18.0).

The QLQ-CR29 subscales afford a more fine-grained dissection of disease-tailored functional and symptom-driven constituents of QoL. Among the functional dimensions, contentment with one's physical appearance occupied the prime spot (85.9 ± 21.9), with female libido (82.9 ± 27.0) and subjective weight appraisal (82.3 ± 31.5) rounding out the top ranks, collectively signaling an affirmative self-conception across these particular arenas. In stark contradistinction, the domain of male libido garnered the poorest functional rating (58.9 ± 39.99), indicating a comparatively profound impact on this sphere of intimate life for male respondents.

Turning to the QLQ-CR29 symptom dimensions, difficulties stemming from the presence of a surgically fashioned intestinal stoma were most often reported (20.83 ± 29.2), followed by excessive intestinal wind (20.4 ± 27.3) and abnormally frequent urination (20.3 ± 27.6).

To dissect the connections between the six quality-of-life composite scales and the independent factors under study, a parametric analytical route—specifically, multivariate multiple linear regression—was initially pondered. However, the foundational normality postulates that undergird parametric regression were demonstrably contravened; accordingly, fitting a parametric regression model to appraise the contribution of sociodemographic and clinical determinants to patients' quality of life is not statistically warranted [20]. As a surrogate strategy, five bootstrap-facilitated non-parametric regression specifications were formulated. The non-parametric regression framework obviates the normality imperative because it operates without any presuppositions about the shape of the parent population distribution [21].

Evidence bearing on the linkages between the Global Quality of Life (QoL) scale recorded among colorectal cancer patients in Qatar and the assortment of sociodemographic and clinical determinants examined in this research is presented in **Table 6**. On the Global QoL metric, higher values indicate a more favorable holistic self-assessment of life quality.

Table 6. Non-parametric bootstrapped regression results of global Quality of Life scale scores against the sociodemographic and clinical variables (n = 169).

Predictors	95% confidence interval	P-value	Standard error	Regression coefficient (β)
Age	-0.193 to 0.436	0.45	0.161	0.121
Gender				
Male (reference)	—	—	—	—
Female	-5.837 to 7.584	0.799	3.424	0.873
Nationality				
Non-Qatari (reference)	—	—	—	—
Qatari	-10.97 to 6.016	0.568	4.333	-2.477
Marital status				
Not married (reference)	—	—	—	—
Married	-11.789 to 7.333	0.648	4.878	-2.228
Education level				
Below secondary school (reference)	-12.996 to 0.001	0.05	3.316	-6.497
Secondary school or higher	—	—	—	—
Employment status				
Unemployed (reference)	—	—	—	—
Employed	-3.908 to 11.295	0.341	3.878	3.693
Monthly income				
Insufficient (reference)	—	—	—	—
Partially sufficient	-12.921 to 2.786	0.206	4.007	-5.068
Sufficient	-3.814 to 11.509	0.325	3.909	3.847
Comorbidities				
No (reference)	—	—	—	—
Yes	-9.693 to 3.106	0.313	3.265	-3.293
Smoking status				
Non-smoker (reference)	—	—	—	—
Smoker	-2.016 to 17.019	0.122	4.856	7.502
Alcohol consumption				
No (reference)	—	—	—	—
Yes	-15.95 to 6.571	0.414	5.745	-4.689
Cancer stage				
Stage I (reference)	—	—	—	—
Stage II	-20.365 to 7.019	0.339	6.986	-6.673
Stage III	-22.282 to 9.004	0.405	7.981	-6.639
Stage IV	-21.467 to 12.356	0.598	8.628	-4.555
Time to diagnosis	-0.072 to 0.063	0.889	0.034	-0.005
Metastasis				
No (reference)	—	—	—	—
Yes	-11.167 to 9.874	0.904	5.368	-0.647
Treatment type				
Mixed chemo & surgery (reference)	—	—	—	—
Other	-11.936 to 3.605	0.293	3.965	-4.166

Beta a: Bootstrapped Regression Coefficient.

Upon analysis, none of the variables examined demonstrated a statistically significant link with the Global QoL scale. Yet educational attainment came close to the significance boundary (P = 0.05). Concretely, participants whose education extended to secondary level or above returned an average Global QoL figure that lagged 6.5 points behind that of participants whose schooling was confined to elementary level or below (coefficient = –6.497), a pattern potentially signaling a trend wherein more highly schooled patients perceive their overall well-being somewhat less favorably—though such an interpretation demands prudence.

Table 7 maps the interplay between core sociodemographic and clinical predictors and the EORTC QLQ-C30 functional and symptom domain scores, which serve as indicators of quality of life in the colorectal cancer population. Within this measurement framework, higher functional scores indicate improved quality of life, whereas higher symptom scores indicate deteriorating quality of life.

Table 7. Non-parametric bootstrapped regression results of EORTC QLQ-C30 scale scores against the sociodemographic and clinical variables (n = 169).

Variables	Functional C30 scale β	95% CI	P-value	Std. Error	Symptom C30 scale β	95% CI	P-value	Std. Error
Age	-0.131	-0.404 to 0.142	0.346	0.139	-0.076	-0.293 to 0.142	0.496	0.111
Gender								
Male (reference)	—	—	—	—	—	—	—	—
Female	-3.046	-9.101 to 3.009	0.324	3.089	0.273	-4.599 to 5.144	0.913	2.485
Nationality								
Non-Qatari (reference)	—	—	—	—	—	—	—	—
Qatari	0.407	-6.933 to 7.748	0.913	3.745	-4.078	-9.919 to 1.762	0.171	2.98
Marital status								
Not married (reference)	—	—	—	—	—	—	—	—
Married	0.218	-8.239 to 8.675	0.96	4.315	-5.981	-12.963 to 1	0.093	3.562
Education								
Below secondary school (reference)	—	—	—	—	—	—	—	—
Secondary school or higher	-4.824	-10.67 to 1.025	0.106	2.984	4.511	0 to 9.022	0.05	2.301
Employment status								
Unemployed (reference)	—	—	—	—	—	—	—	—
Employed	0.857	-5.74 to 7.454	0.799	3.366	-1.696	-7.036 to 3.644	0.534	2.724
Monthly income								
Insufficient (reference)	—	—	—	—	—	—	—	—
Partially sufficient	6.024	-1.002 to 13.049	0.093	3.585	-1.229	-6.902 to 4.444	0.671	2.895
Sufficient	12.25	5.41 to 19.09	0.000*	3.49	-6.859	-12.378 to -1.341	0.015*	2.816
Comorbidities								
No (reference)	—	—	—	—	—	—	—	—
Yes	-2.917	-8.369 to 2.535	0.294	2.782	2.094	-2.316 to 6.504	0.352	2.25
Smoking								
Non-smoker (reference)	—	—	—	—	—	—	—	—
Smoker	1.123	-7.492 to 9.738	0.798	4.396	-2.902	-9.925 to 4.121	0.418	3.583

Alcohol consumption								
No (reference)	—	—	—	—	—	—	—	—
Yes	5.069	-5.162 to 15.3	0.332	5.22	-2.351	-10.46 to 5.758	0.57	4.137
Cancer stage								
Stage I (reference)	—	—	—	—	—	—	—	—
Stage II	-11.5	-23.86 to 0.852	0.068	6.305	6.384	-3.713 to 16.481	0.215	5.152
Stage III	-5.206	-19.29 to 8.882	0.469	7.188	5.117	-6.39 to 16.624	0.383	5.871
Stage IV	-5.243	-20.33 to 9.852	0.496	7.702	9.086	-3.212 to 21.383	0.148	6.274
Time to diagnosis	0.061	0.001 to 0.122	0.048*	0.031	-0.027	-0.076 to 0.023	0.289	0.025
Metastasis								
No (reference)	—	—	—	—	—	—	—	—
Yes	-3.558	-12.74 to 5.626	0.448	4.686	0.136	-7.371 to 7.642	0.972	3.83
Treatment type								
Mixed chemo & surgery (reference)	—	—	—	—	—	—	—	—
Other	-3.441	-10.37 to 3.493	0.331	3.538	1.662	-3.874 to 7.198	0.556	2.825

Beta a: Bootstrapped Regression Coefficient. P < 0.05.

Probing of the Functional C30 domain established that both monthly earnings and the duration elapsed from initial diagnosis were independently tied to superior functional performance in a statistically meaningful manner. Respondents who deemed their income sufficient outnumbered those who deemed it insufficient by 12.5 points, revealing a meaningfully better functional dimension of quality of life. There was no discernible statistical distinction between individuals with insufficient income and those whose income was judged partially adequate. In addition, for each supplementary month of post-diagnosis survival, functional domain scores increased by 0.06 points, indicating a slight but reliably positive association between extended survival time and preserved functional capability.

Turning to findings from the Symptom C30 domain, income was the sole factor with a statistically significant effect on symptom intensity. Those with sufficient monthly financial inflows registered scores roughly 9 points lower than those with inadequate resources, indicative of a lighter symptomatic load and a corresponding boost in quality of life. Educational standing, albeit not meeting the formal cutoff for significance, hovered at the threshold ($P = 0.05$). Patients schooled at the secondary tier or higher obtained scores 4.5 points greater on the symptom index in comparison with peers whose education ended at the primary level or earlier, hinting at a tendency for escalating symptom-related distress among the more academically qualified group.

Table 8 presents the associations between patient characteristics and the EORTC QLQ-CR29 functional and symptom scale scores, which reflect quality of life among individuals living with colorectal cancer. Within the functional component, higher values indicate better quality of life, whereas within the symptom component, higher values indicate poorer quality of life.

Table 8. Non-parametric bootstrapped regression results of EORTC QLQ-CR29 scale scores against the sociodemographic and clinical variables (n = 169).

Variables	Functional CR29 β	95% CI	p-value	Std. Error	Symptom CR29 β	95% CI	P-value	Std. Error
Age	0.418	0.187 to 0.648	0.000*	0.118	-0.003	-0.123 to 0.117	0.966	0.061
Gender								
Male (reference)	—	—	—	—	—	—	—	—
Female	1.572	-3.559 to 6.703	0.548	2.618	0.636	-2.055 to 3.327	0.643	1.373

Nationality								
Non-Qatari (reference)	—	—	—	—	—	—	—	—
Qatari	5.843	-0.309 to 11.996	0.063	3.139	-2.002	-5.189 to 1.186	0.218	1.626
Marital status								
Not married (reference)	—	—	—	—	—	—	—	—
Married	3.889	-3.352 to 11.131	0.292	3.695	-0.53	-4.377 to 3.316	0.787	1.963
Education level								
Below secondary school (reference)	—	—	—	—	—	—	—	—
Secondary school or higher	-4.951	-9.792 to -0.111	0.045*	2.47	1.739	-0.763 to 4.242	0.173	1.277
Employment status								
Unemployed (reference)	—	—	—	—	—	—	—	—
Employed	-3.143	-8.669 to 2.382	0.265	2.819	1.179	-1.707 to 4.065	0.423	1.472
Monthly income								
Insufficient (reference)	—	—	—	—	—	—	—	—
Partially sufficient	-1.462	-7.4 to 4.475	0.629	3.029	-0.033	-3.118 to 3.052	0.983	1.574
Sufficient	2.815	-3.091 to 8.72	0.35	3.013	-2.81	-5.861 to 0.24	0.071	1.556
Comorbidities								
No (reference)	—	—	—	—	—	—	—	—
Yes	-3.327	-7.917 to 1.263	0.155	2.342	2.067	-0.311 to 4.445	0.088	1.213
Smoking status								
Non-smoker (reference)	—	—	—	—	—	—	—	—
Smoker	3.007	-4.286 to 10.3	0.419	3.721	-0.099	-3.87 to 3.672	0.959	1.924
Alcohol consumption								
No (reference)	—	—	—	—	—	—	—	—
Yes	-11.23	-19.71 to -2.759	0.009*	4.326	-1.096	-5.364 to 3.173	0.615	2.178
Cancer stage								
Stage I (reference)	—	—	—	—	—	—	—	—
Stage II	0.953	-9.594 to 9.731	0.859	5.381	2.805	-2.501 to 8.111	0.3	2.707
Stage III	-2.175	-14.08 to 12.635	0.72	6.074	-0.708	-6.769 to 5.353	0.819	3.092
Stage IV	0.009	-12.61 to 0.089	0.999	6.442	-0.505	-7.008 to 5.998	0.879	3.318
Time to diagnosis	0.038	-0.013 to 0.122	0.142	0.026	-0.021	-0.047 to 0.005	0.114	0.013
Metastasis								
No (reference)	—	—	—	—	—	—	—	—
Yes	0.133	-7.8 to 8.065	0.974	4.047	2.183	-1.925 to 6.292	0.298	2.096
Treatment type								
Mixed chemo & surgery (reference)	—	—	—	—	—	—	—	—

Other	1.58	-4.165 to 7.326	0.59	2.931	-0.703	-3.738 to 2.333	0.65	1.549

P < 0.05.

Examination of the functional domain brought into relief robust associations with age at diagnostic confirmation, scholastic achievement, and the use of alcohol. To elaborate, for every single-year rise in age at the point of diagnosis, the functional domain score climbed by 0.42 points (denoting an amelioration in quality of life). Patients whose education reached the secondary level or beyond registered scores that were 5 points lower than those whose schooling ended at the elementary level or lower, suggesting a more constrained self-rated functional quality of life. Likewise, individuals who drank alcohol scored 11.2 points fewer than their non-drinking counterparts, pointing to an appreciably inferior functional profile among consumers of alcohol.

Conversely, scrutiny of the symptom domain uncovered no factors meeting the threshold for statistical significance. However, both monthly income and the co-occurrence of other long-term health conditions bordered on significance. Patients reporting sufficient funds tended to report lower symptom scores, reflecting better quality of life, whilst those with one or more comorbid ailments reported higher symptom scores, signaling greater symptom burden and, consequently, poorer quality of life.

This investigation sought to evaluate quality of life (QoL) and its associated determinants in a cohort of colorectal cancer (CRC) patients under care in Qatar in 2023, using both the EORTC QLQ-C30 and QLQ-CR29 measurement tools. The evidence we gathered indicated a broadly positive self-rated QoL among Qatari CRC patients, as reflected in a mean Global Health Status score of 70.4 (SD = 18.5). Such a result resonates with Swedish research by Sjövall *et al*. [22], who employed the same QLQ-C30 and CR29 instruments and reported broadly analogous QoL trends, despite 39% of their subjects falling below the threshold for clinically acceptable global QoL. By comparison, the Saudi Arabian study by Qedair *et al*. [23] reported a somewhat lower average global health score of 63.9 (SD = 24.8), which would place our study population in a relatively more favorable light in terms of QoL. Yet the results we obtained diverged considerably from those reported by Abu-Helalah *et al*. [24], whose respondents yielded a less favorable mean global health estimate of 56.9 ± 31.3, and from the Egyptian data published by Refay *et al*. [25] in 2024 covering 132 patients, where the average global health rating amounted to no more than 41.4 (95% CI: 37.8 to 44.98).

A 2024 study by Flórez *et al*. [26] conducted in Colombia used a cross-sectional design and found that individuals with stable economic means and dense social support structures tended to report superior global QoL. This finding harmonizes with the connection we observed between financial sufficiency and elevated QoL. The Tunisian study by Belaid *et al*. [27] similarly reported satisfactory QoL among CRC patients, particularly among those diagnosed at earlier stages and those surrounded by adequate psychosocial resources. This profile aligns well with the functional well-being documented in our own sample.

Those who took part in our study displayed a high degree of preserved functional capacity, reflected in mean scores of 80.6 on the Functional C30 domain and 64.2 on the Functional CR29 domain. Such outcomes sit comfortably beside those published by Flórez *et al*. [26], who described comparatively robust functional indices among Colombian CRC patients equipped with adequate healthcare access and familial reinforcement, and by Belaid *et al*. [27], who witnessed analogous functional patterns in Tunisian patients, with the most pronounced benefits seen among those receiving timely therapeutic measures and coordinated input from multiple disciplines. Echoing this theme, Drury *et al*. [28] noted that uninterrupted clinical follow-up and meaningful communication with treating teams were associated with superior physical and role functioning, suggesting that the well-structured care pathways available to our cohort may partly account for the strong functional performance observed.

Symptom-related distress among our cohort was modest, as indicated by a mean Symptom C30 score of 16.4 and a mean Symptom CR29 score of 47.8, both of which suggest a relatively contained set of somatic complaints. Of particular note, within the symptom-related domains of the QLQ-C30, economic hardship stood apart as the single most oppressive issue (mean = 28.99, SD = 40.4), trailed by ongoing fatigue (mean = 23.9, SD = 26.8), whereas digestive upset in the form of nausea with vomiting registered as the least troubling concern (mean = 6.7, SD = 18.0). This particular configuration aligns closely with descriptions by Turnbull *et al*. [29] and Abu-Helalah *et al*. [24], both of whom identified exhaustion alongside financial pressure as commonly encountered sources of distress in the CRC population. A similar symptom pattern has been documented by Jansen *et al*. [5] and in additional European samples, in which tiredness and monetary strain consistently ranked among the most distressing issues, sometimes surpassing both pain and gastrointestinal disturbance in terms of subjective impact. Turning to the QLQ-CR29 subscale, this tool yielded further nuanced insight into disease-attributable components of QoL. Among our respondents, the functional aspects of body image (85.9), sexual drive in female participants (82.9), and subjective weight appraisal (82.3) all attracted high mean values, collectively signifying a constructive sense of self. Standing in marked contrast, the domain capturing sexual interest among male participants posted the lowest functional rating (58.9), suggesting a distinct and clinically meaningful degree of sexual impairment concentrated in men. Both Kim *et al*. [30] and Marchewczyk *et al*. [31] have previously reported on sex-differentiated patterns of post-treatment sexual functioning, observing that the male sex tends to shoulder the heavier burden of dysfunction. Research by Belaid *et al*. [27] uncovered comparable sexual difficulties, most notably among male long-term survivors and those living with an intestinal stoma or who had undergone treatment for rectal neoplasms. It should be noted, however, that the Swedish dataset presented a reversed pattern, with women exhibiting diminished sexual interest relative to their male counterparts (3.5% vs 19.5%) [22]. Moreover, Portuguese findings assembled by Marchewczyk *et al*. [31] produced mean scores of 38.4 (95% CI, 32.7–44.2) in males and 16.6 (95% CI: 10.8–22.4) in females.

As regards the symptom dimensions captured by the CR29, challenges arising from stoma presence (20.83), excessive intestinal gas (20.4), and frequent urination (20.3) were the three most frequently endorsed items among our participants. These observations are congruent with the Swedish evidence base supplied by Sjövall *et al*. [22] as well as with the meta-analytic overview conducted by Flyum *et al*. [8], which identified stoma-linked issues, abdominal symptomatology, and urinary disturbances as enduring and commonly reported difficulties confronting CRC patients navigating the palliative phase of their illness [22].

Regarding factors predicting QoL, our data identified sufficient financial resources as a strong and consistent determinant of both improved functional status and reduced symptom expression. This finding concurs with the work of Färkkilä *et al*. [9] and Newcomer and Fenstermacher [32], both of whom highlighted the role of socioeconomic security in preserving emotional well-being and broader QoL [32]. Flórez *et al*. [26] additionally observed that financial strain represented a potent contributor to QoL decrements, particularly among those lacking stable employment or adequate insurance coverage. The period of time that had unfolded since the initial diagnosis showed a positive relationship with functional domain scores, a dynamic that hints at progressive psychological accommodation over the survivorship trajectory and that echoes observations made by Newcomer and Fenstermacher [32] and Abu-Helalah *et al*. [24]. Further, a more advanced age at the point of diagnostic confirmation was tied to more favorable QoL within our sample, a tendency earlier remarked upon by Jansen *et al*. [5] and Drury *et al*. [28], who advanced the view that older persons may draw upon deeper reserves of resilience and may exhibit a dampened sensitivity to somatic symptoms.

A somewhat counterintuitive result was that more extensive formal schooling was associated with modestly lower QoL scores. While this stands at odds with the positive correlation reported in Belaid *et al*. [27], it finds support in the arguments put forth by Al-Dahshan *et al*. [33], who proposed that individuals with higher education may possess elevated expectations regarding their health and may simultaneously maintain a more intense vigilance toward bodily changes. These factors jointly predispose to less generous self-appraisals of QoL [27, 33]. One might also attribute this finding to the likelihood that more educated patients often possess superior health literacy and nurture loftier hopes for treatment efficacy and the trajectory of recovery, thereby adopting a more demanding lens through which they judge their own wellness. In addition, the heavier psychological burden and heightened awareness of somatic perturbations that often accompany higher educational attainment could further contribute to slightly depressed QoL ratings. The intake of alcoholic beverages likewise emerged as tied to poorer functional scores within our dataset, a trend consonant with the conclusions of Fedirko *et al*. [34], whose work established that alcohol consumption among CRC patients was correlated with a worsening of symptoms and a less encouraging survival outlook. As a final point, while the majority of the determinants explored exerted measurable influences on the functional and symptom-oriented scales, none reached statistical significance for the global QoL score, though the education variable came close. This may well be attributable to the intrinsically multidimensional and deeply subjective constitution of global QoL perception, a notion previously accentuated in the studies of Jansen *et al*. [5] and Flyum *et al*. [8].

An intriguing feature of our data was that patients burdened with advanced colorectal cancer (Stage III–IV) provided overall quality of life (QoL) ratings that were essentially indistinguishable from those supplied by individuals whose disease had been caught at an early stage. The international body of published evidence touching upon this relationship is far from unified. By way of illustration, research originating in the United States by Feizpour *et al*. [35] demonstrated that Stage IV patients experienced a measurable decline in symptom-anchored QoL, suggesting that the physiological burden of widely disseminated disease may selectively erode certain dimensions of QoL. Conversely, a cohort study from Sweden by Sjövall *et al*. [22] documented clinically significant impairments in global QoL among a sizeable proportion of patients with early-stage (I–III) disease, evaluated 1 year after surgical intervention, underscoring that an early-stage classification does not automatically insulate against QoL deterioration.

It is important to recognize that these apparent contradictions may find a meaningful explanation in the prognostic information carried by tumor characteristics that extend well beyond the limits of conventional TNM staging. As contemporary discourse in the field has underscored, pathological features including tumor grade, the extent of budding, the presence of lymphovascular and perineural infiltration, alongside molecular signatures such as microsatellite instability status and pivotal oncogenic driver mutations, continue to hold clinically consequential prognostic weight in colorectal cancer, even against the backdrop of an increasingly personalized therapeutic landscape [36]. Such tumor-specific attributes govern the inherent aggressiveness of the malignancy, influence the selection and sequencing of treatment modalities, and shape the long-term disease trajectory, and may therefore contribute substantially to the heterogeneous QoL experiences observed across patients who otherwise share a matching clinical stage. In light of this complexity, it is plausible that broadly equivalent global QoL scores might emerge irrespective of stage-based distinctions, reflecting the intricate, multidirectional interplay among tumor biology, the cumulative sequelae of therapeutic interventions, and the adaptive capacities of the individual patient [36].

Study strengths and challenges

Strengths

The investigation benefited from the deployment of validated, widely recognized measurement instruments, namely the European Organization for Research and Treatment of Cancer Core Questionnaire (EORTC QLQ-C30) and its colorectal cancer-specific extension (QLQ-CR29). Furthermore, data collection was carried out by rigorously trained field staff. This factor enhanced both the precision and reliability of the collected information, thereby strengthening the overall reliability of the results.

Challenges

In keeping with the inherent limitations of any cross-sectional research design, the possibility of memory-related inaccuracies and selection bias cannot be ruled out. The reliance on telephone-based interviews carries its own set of vulnerabilities, given that individuals who are unreachable by phone or who decline to take part may differ in meaningful ways—both in their personal attributes and in their symptom experiences—from those who agree to participate.

Conclusion

Within this cohort of colorectal cancer patients residing in Qatar, the majority fell into the older adult category, held non-Qatari nationality, and had their disease first identified at locally advanced or metastatic stages, with adenocarcinoma representing the dominant histological variant and the sigmoid colon emerging as the single most commonly affected anatomical subsite. Despite the preponderance of late-stage diagnoses, participants reported a comparatively high overall quality of life, encouraging functional status indicators, and a relatively modest symptomatic burden. Functional QoL proved to be superior among those enjoying adequate financial resources and those for whom a longer stretch of time had passed since the initial diagnosis. In contrast, it was comparatively diminished among individuals with higher educational attainment or a history of alcohol intake. The coexistence of additional chronic illnesses was associated with a greater symptom burden.

These observations bring into sharp relief the critical importance of weaving psychosocial and economic assistance, guidance on healthy lifestyle practices, and systematic quality-of-life surveillance into routine oncological care, to flag vulnerable patients early and maximize their outcomes. Research efforts from now on would do well to examine the effect of purposefully designed supportive interventions on the long-term trajectory of QoL.

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The remaining author(s) declared that this work was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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Ethics Statement: This study was approved by the Medical Research Centre Ethical Committee (MRC-IRB) under protocol number (MRC-01-22-536). Verbal consent was obtained from each participant before the interview. The study was conducted in full conformance with the principles of the "Declaration of Helsinki" and Good Clinical Practice. The studies were conducted in accordance with the local legislation and institutional requirements. Participants provided verbal consent to participate in this study.

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