

RESEARCH ARTICLE

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Assessment of Quality of Life in Patients with Colorectal Cancer in Kazakhstan

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Abstract

Background: The problem of quality of life (QOL) of patients with colorectal cancer (CRC) is particularly relevant due to the dynamics of CRC incidence growth. This study aims to assess QOL of patients with CRC in the Republic of Kazakhstan in order to give an idea about the impact of burden on QOL of patients. **Methods:** A total of 319 patients diagnosed with CRC participated in this one-stage cross-sectional study. The survey was conducted between November 2021 and June 2022 at cancer centers in Kazakhstan. Data were collected using the valid and reliable European Organization for Research and Treatment of Cancer Quality of Life Questionnaire (EORTC QLQ-C30, version 3.0). **Results:** The average age of respondents was 59, 23 (SD=10,604) years. The main age group 50-69 years old accounted for 62.1% of the total sample. Among all ill respondents, 153 (48%) were male and 166 (52%) were female. The mean global health status was 59.24 ± 22.62. Two of the five functional scales were below the ≥66.7% threshold, namely, emotional functioning 61.65 (28.04) and social functioning 61.96 (31.84); while scores for the other three were: physical functioning 69.38 (22.06), role functioning 69.69 (26.45), and cognitive functioning 74.60 (25.07). **Conclusions:** This study gives an indication of good life functioning among our participants on the functional and symptom scales. However, they reported inadequate global health status.

Keywords: Quality of life- colorectal cancer- EORTC QLQ-C30

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Introduction

Colorectal cancer (CRC) is one of the most common cancers, ranking third in morbidity and second in mortality worldwide. According to Global Cancer Statistics, there were more than 1.9 million new cases of CRC (including anal cancer) and 935,000 deaths in 2020, about one in 10 cancer cases and deaths (Sung et al., 2021).

The ongoing demographic changes will lead to an increase in the number of deaths from CRC per year in the vast majority of countries, and, according to the International Agency for Research on Cancer, about 1.4 million people are expected to die from this pathology in 2035. worldwide, including in Kazakhstan, this number will be about 2,950 people. Despite the fact that Kazakhstan has seen a decrease in mortality from CRC, our Republic belongs to a region with high mortality rates, the standardized mortality rate was 10.2 per 100,000 people, and the difference between men (13.9) and women (8.2) is statistically significant (Mauyenova et al., 2022).

The problem of quality of life in patients with CRC is increasingly being addressed by the scientific community. And this problem is especially relevant due to the dynamics of increasing CRC morbidity (Ferlay et al., 2021; Siegel et al., 2022).

While increased survival rates are certainly a great achievement, there are unintended negative consequences of treatment that can potentially reduce quality of life (Glaser et al., 2013; 'Quality of Life of Colorectal Cancer Survivors in England Report on a national survey of colorectal cancer survivors using Patient Reported Outcome Measures (PROMs)', 2015). Patients with CRC may suffer prolonged pain and decreased functional and social well-being regardless of the type of treatment, including surgery, radiation therapy, systemic chemotherapy, or targeted therapy (Ramsey et al., 2002).

In terms of QOL, those patients who had a stoma reported lower overall QOL, lower health-related QOL, and poorer social functioning than patients with CRC who did not have a stoma (Cotrim and Pereira, 2008).

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Quality of life consists of various aspects, including physical and mental aspects as well as social functions of patients. Thus, assessing QOL in cancer patients can provide a deeper understanding of the impact of cancer and its treatment on patients' lives (Schag et al., 1994; Rex et al., 2006; Caravati-Jouvencaux et al., 2011).

Several studies have prospectively evaluated the impact of CRC on patient QOL in both the short term (Wilson, Alexander and Kind, 2006; Smith-Gagen et al., 2010) and the long term. Despite improved survival, QOL is an important factor in the analysis of clinical outcomes (Ramsey et al., 2002).

Understanding QOL has led to many assessment tools with disease-specific applications, namely the QLQ C-30 questionnaire developed by the European Organization for Research and Treatment of Cancer (EORTC). The latter has been updated to the third version currently in use, which has been translated into more than 48 languages and has undergone transcultural validation (Aaronson et al., 1993; Petersen et al., 2006).

QOL is a topic that is increasingly being addressed by researchers. Due to the increasing incidence of CRC, this issue is particularly relevant. Despite the increasing number of publications on this topic every year, it still requires further research. There is no information about QOL of patients with CRC in Kazakhstan in the literature. Thus, this study aims to assess QOL of patients with CRC in the Republic of Kazakhstan using the EORTC assessment tool (QLQ C-30) to provide insight into the impact of burden on QOL of patients.

Materials and Methods

A total of 319 patients diagnosed with CRC participated in this one-stage cross-sectional study. The survey was conducted between November 2021 and June 2022 at cancer centers in Kazakhstan. Inclusion criteria were: voluntary consent to participate in the study, patients with diagnosed CRC who were registered in oncologic dispensaries at the age of 18 years and older. Exclusion criteria: refusal to participate in the study, other cancer diseases. All study participants provided written consent after providing detailed information about the purpose of the study and confidentiality of personal data. Participants' data were coded with a unique code. The correspondence between this code and the personal identification information was stored in a file that only the database custodian had access to. The others had access to the coded (secure) database. Prior to data collection, the study received approval from the Semey Medical University Ethics Committee (Protocol No. 2 of October 28, 2020).

The sociodemographic form and the European Organization for Research and Treatment of Cancer quality of life questionnaire (EORTC QLQ-C30, version 3.0) were used for analysis (Aaronson et al., 1993). Socio-demographic characteristics of respondents included age, sex, education and occupation, and stage of disease. Data were collected using the valid and reliable EORTC Quality of Life Questionnaire (QLQ)-C30, which is used worldwide to assess quality of life in all types of cancer. The EORTC QLQ-C30 includes 30 items

covering five functional scales (physical, role, social, emotional and cognitive functioning), nine symptom scales (fatigue, pain, nausea/vomiting, shortness of breath, sleep disturbances, loss of appetite, constipation, diarrhea and financial difficulties), and a global quality of life scale. All questions are answered on a 4-point Likert-type scale, with the exception of two general QOL questions using a 7-point scale. The questionnaire is designed for one week and uses a four-item response format ("not at all," "a little," "very little," and "very much").

The questionnaire scales are scored on a scale from 0 to 100 according to the standard EORTC scoring algorithm (Fayers et al., 2001). For the functional scales and the global quality of life scale, a higher score indicates better health. For the symptom scale, a higher score indicates a higher level of symptom burden. Higher scores on the functional scales indicate better functioning, while higher scores on the symptom scales indicate worse functioning. On the functional scales, subjects scoring <33.3% have problems; those scoring $\geq 66.7\%$ have good functioning. On the symptom/symptom scales, subjects scoring <33.3% have good functioning; those scoring $\geq 66.7\%$ have problems.

Statistical analysis

Descriptive statistics were used to analyze the data. The choice of statistical criteria for data analysis depended on the type of variables analyzed. Socio-demographic characteristics were presented in the form of frequencies and percentages. Pearson's chi-square was used for qualitative data. The QLQ-C30 questionnaire was presented as mean \pm standard deviation, 95% CI, percent score <33.3, and percent score ≥ 66.7 . Scores were calculated according to the EORTC QLQ-C30 assessment guidelines. Linear regression analysis was performed to elucidate factors predicting global, functional, and symptom scales. The analysis was performed at the 95% confidence interval using the Statistical Package for the Social Sciences (SPSS), version 20.0 (IBM Ireland Product Distribution Limited, Ireland) and a p value ≤ 0.05 was considered statistically significant.

Results

The study sample consisted of 319 patients with CRC who agreed to participate in the survey. The mean age was 59.23 (SD=10,604) years; max 86 years, min 28 years. The main age group 50-69 years old accounted for 62.1% of the total study sample. Among all patients, 153 (48%) were male and 166 (52%) were female; most of the patients had a high school education (40.1%). 57.7% of the patients had received treatment and 80.6% had undergone surgery for a malignant bowel neoplasm. Detailed demographic characteristics of the participants are presented in Table 1.

The mean global health status was 59.24 \pm 22.62 (Table 2). For the QLQ-C30 global health instrument, only two of the five functional scales were below the $\geq 66.7\%$ threshold, namely, emotional functioning 61.65 (28.04) and social functioning 61.96 (31.84); while scores for the other three were: physical functioning 69.38 (22.06), role functioning 69.69 (26.45) and cognitive functioning

Table 1. Participant Characteristics (n=319).

Characteristics	N (%)
Gender	
Male	153 (48)
Female	166 (52)
Age (years)	
28-49	67 (21)
50-69	198 (62.1)
> 70	54 (16.9)
Education level	
Higher	80 (25.1)
College	96 (30.1)
Secondary	128 (40.1)
Other	15 (4.7)
Treatment	
Yes	184 (57.7)
No	135 (42.3)
Operations	
Yes	257 (80.6)
No	62 (19.4)

74.60 (25.07).

Regarding the symptom scale items, four of the nine symptoms had good functioning, namely, nausea and vomiting 28.52 (30.76), shortness of breath 21.83 (29.08), constipation 30.30 (30.84), and diarrhea 30.40 (36.03); and the remaining four symptoms were slightly problematic: pain 35.37 (26.47), insomnia 42.21 (31.96), loss of appetite 42.31 (35.11), and fatigue 44.96 (27.99). (Table 2).

There was a statistically significant association between patient demographics such as gender and education level with global health scales ($p < 0.05$). Analysis showed that age was significantly related to physical and cognitive functioning ($p < 0.05$), and this relationship was particularly prominent with emotional and social functioning ($p < 0.001$). Gender was found to be related to three of the five functional scales, namely, role, cognitive, and social functioning. An indicator such as level of education was related only to physical and cognitive functioning ($p < 0.05$). (Table 3).

Our results also revealed significant differences ($p < 0.05$) in reported symptoms, i.e., nausea, vomiting, diarrhea and loss of appetite according to age ($p < 0.05$). There was an association of gender with symptoms such as diarrhea, nausea, and vomiting ($p < 0.05$). The predictor “financial difficulties” had a relationship with all three variables: gender, age, and level of education ($p < 0.05$). Education was significantly associated with financial difficulty ($p < 0.001$) (Table 3).

Discussion

In 2020, CRC was the third most common type of cancer worldwide (Ferlay et al., 2021), with a median 5-year relative survival estimated at about 67% (Cancer Statistics Review, 1975-2017 - SEER Statistics, no date). According to the American Cancer Society, 106,860 new cases of CRC will be diagnosed in America in 2022 alone (Siegel et al., 2022). Western countries have the highest incidence of CRC compared to countries in Asia and the Middle East (‘Age standardized (World) incidence rates, colorectal cancer, males, all ages’, no date; Al-Ahwal, Shafik and Al-Ahwal, 2013; Kuipers et al., 2015; Siegel

Table 2. Mean Score of All Items in QLQ-C30 Version 3.0 (n = 319)

Variables	N	No. of items	Mean (SD)	95% CI	N (%) scoring < 33.3	N (%) scoring ≥ 66.7
Global health status/QoL	319	2	59.24 (22.62)	56.75 - 61.73	17 (5.3)	148 (46.4)
Functional scales						
Physical functioning	319	5	69.38 (22.06)	66.95 - 71.81	15 (4.7)	196 (61.5)
Role functioning	319	2	69.69 (26.45)	66.78 - 72.61	11 (3.4)	221 (69.3)
Emotional functioning	319	4	61.65 (28.04)	58.56 - 64.73	39 (12.2)	169 (53)
Cognitive functioning	319	2	74.60 (25.07)	71.84 - 77.36	11 (3.4)	239 (74.9)
Social functioning	319	2	61.96 (31.84)	58.45 - 65.47	60 (18.8)	187 (58.6)
Symptom scales/items						
Fatigue	319	3	44.96 (27.99)	41.88 - 48.05	94 (29.4)	91 (28.5)
Nausea and vomiting	319	2	28.52 (30.76)	25.13 - 31.91	170 (53.3)	60 (18.8)
Pain	319	2	35.37 (26.47)	32.45 - 38.28	119 (37.3)	66 (20.7)
Dyspnea	319	1	21.83 (29.08)	18.63 - 25.04	181 (56.7)	57 (17.9)
Insomnia	319	1	42.21 (31.96)	38.69 - 45.73	78 (24.5)	126 (39.5)
Appetite loss	319	1	42.31 (35.11)	38.45 - 46.18	93 (29.2)	127 (39.8)
Constipation	319	1	30.30 (30.84)	26.90 - 33.70	128 (40.1)	75 (23.5)
Diarrhea	319	1	30.40 (36.03)	26.43 - 34.37	157 (49.2)	85 (26.7)
Financial difficulties	319	1	31.45 (30.99)	28.03 - 34.86	124 (38.9)	83 (26)

For functional scales, subjects scoring <33.3% have problems; those scoring ≥66.7% have good functioning. For symptom scales/symptoms, subjects scoring <33.3% have good functioning; those scoring ≥66.7% have problems. For functional scales, higher scores indicate better functioning. For symptom scales, higher scores indicate worse functioning.

et al., 2017).

Studies on Iranian and Chinese populations of patients with CRC have shown that CRC has had the most negative impact on “financial status, social function, pain, and physical function of patients” (Yang et al., 2014; Akhondi-Meybodi et al., 2016). In Kazakhstan, to our knowledge, this is the first study evaluating QOL in CRC after surgery. In our study, CRC affected emotional and social function the most, and the main symptoms that caused some problems were fatigue, loss of appetite, pain, and insomnia (Table 2).

Some studies provide evidence that prior to treatment, patients reported physical and cognitive functioning comparable to the general population, whereas general health, social, role, and emotional functioning were significantly lower, similar to our study (Table 2). In cancer patients, a common symptom is fatigue, and in patients receiving adjuvant therapy, it is universal. Fatigue has a strong impact on quality of life and a moderate impact on functional capacity in these patients. (Amarsheda and Bhise, 2021). Also, fatigue and insomnia were more common in patients with CRC than in healthy individuals (Couwenberg et al., 2018).

The literature considers two main factors: age and gender. As mentioned earlier, these patients have serious concerns about their financial situation. Age is an important factor when considering financial status and the type of treatment to be used (Marks et al., 2017; Acevedo-Ibarra et al., 2021). Just as in our study, variables such as age, education, and gender significantly affect financial limitations (Table 3).

It was observed that CRC survivors had decreased sexual function despite a good overall GHS/QOL score. The average sexual functioning score for Malaysian men and women was low (Magaji et al., 2019). The impact of CRC on QOL may also vary depending on the gender of the patient. Women were more likely to have lower QOL, yet still maintain higher scores on sexual functioning and higher taste scores than men (Acevedo-Ibarra et al., 2021).

Our study also found significant differences between gender and QOL, namely, global health status, role, cognitive, and social functioning (Table 3).

All over the world, for any type of cancer, age is considered to be the main factor influencing the patient’s QOL. However, in this study, age was found to be significantly associated only with limited social functioning. These results differed from those of other studies (Almutairi et al., 2016; Ahmed et al., 2018) that reported that the oldest age group (≥60 years) tended to have the lowest scores in functional domains, especially in scales of physical functioning. In our study, age did not affect global health status, but it significantly affected four of the five functional scales, namely emotional, social, physical, and cognitive functioning (Table 3). Another study found that marital status, education, and income were primary predictors of quality of life among patients with CRC, as each was significantly associated with at least two CRC symptoms (Qedair et al., 2022). We examined the predictor “education,” which was significantly associated with global health status, physical and cognitive functioning; and had a significant effect on

Table 3. Predictors of Quality of Life of Colorectal Cancer Patients (CR30).

	Global health status/QoL		Physical functioning		Role functioning		Emotional functioning		Cognitive functioning		Social functioning							
	B	95% CI	p-value	B	95% CI	p-value	B	95% CI	p-value	B	95% CI	p-value						
Gender	-3.085	-5.905 - -0.264	0.032	-2.585	-5.338 - -0.169	0.876	5.795	-0.134 - 11.723	0.055	0.695	-5.456 - -6.847	0.824	-7.028	-12.572 - -1.485	0.013	8.970	2.030 - 15.910	0.011
Age	-0.197	-0.436 - -0.043	0.107	-0.221	-0.455 - -0.013	0.037	0.044	-0.235 - -0.324	0.755	0.611	0.321 - -0.902	0.000	-0.385	-0.647 - -0.124	0.04	0.722	0.395 - 1.050	0.000
Education level	-3.333	-6.134 - -0.532	0.020	-2.913	-5.650 - -0.177	0.037	-2.623	-5.915 - -0.669	0.118	0.333	-3.169 - 3.835	0.852	-3.560	-6.666 - -0.453	0.025	-0.535	-4.512 - 3.441	0.791
	Fatigue			Nausea and vomiting			Pain			Dyspnea			Insomnia			Appetite loss		
Gender	-0.747	-4.275 - -2.780	0.677	-0.537	-0.838 - -0.216	0.001	-2.783	-8.621 - -3.055	0.349	0.520	-5.903 - -6.942	0.874	-0.516	-7.574 - -6.542	0.886	-1.990	-9.741 - -5.761	0.614
Age	-0.164	-0.463 - -0.136	0.283	-0.563	-0.881 - -0.246	0.001	-0.196	-0.473 - -0.082	0.166	0.267	-0.036 - -0.570	0.084	-0.007	-0.344 - -0.329	0.966	-0.420	-0.786 - -0.054	0.025
Education level	-1.012	-4.506 - -2.483	0.569	1.836	-1.971 - -5.642	0.343	1.671	-1.655 - -4.996	0.324	3.057	-0.574 - -6.688	0.099	-0.897	-4.927 - -3.133	0.662	1.847	-2.545 - -6.238	0.409
	Constipation			Diarrhea			Financial difficulties											
Gender	-0.799	-7.612 - -6.013	0.818	-7.716	-15.627 - -0.196	0.056	-8.220	-15.005 - -1.435	0.018									
Age	-0.059	-0.384 - -0.266	0.721	-0.598	-0.971 - -0.225	0.002	-0.329	-0.644 - -0.013	0.042									
Education level	0.772	-3.117 - -4.662	0.696	1.836	-2.638 - -6.310	0.420	8.325	4.539 - 12.111	0.000									

financial limitations (Table 3).

A number of studies on the quality of life of patients with CRC in a number of countries are presented below. A study conducted in Northern Germany of 1,294 CRC survivors, averaged 6 years after diagnosis, found that quality of life was quite high (mean overall HRQOL score of 87). Lower HRQOL was associated with increased all-cause mortality. The mean scores of the functional scales were between 80. The symptom scales had low mean values, except for insomnia and fatigue (Ratjen et al., 2018).

Another study was conducted in the United States assessing financial burden and quality of life among 14 CRC survivors diagnosed under age 50 and one caregiver. This analysis showed that employment (career trajectory, lost wages, health insurance/benefits, productivity) was the dominant topic of discussion of financial impact. The impact of illness and survivorship on lifestyle includes both emotional and physical side effects. The experience of diagnosis, lack of information about CRC treatment and side effects, financial stress, and relationship stress were major themes for overall impact on quality of life (Blum-Barnett et al., 2019).

Low HRQoL is a risk factor for poor survival in older patients with CRC. A study conducted in the administrative region of Burgundy, France among 401 patients with newly diagnosed CRC found that after three and six months of follow-up, patients with more severe appetite loss were more likely to die with risk ratios of 4.7 ($p = 0.013$) and 3.7 ($p = 0.002$), respectively. A role functioning parameter below the median predicted lower survival (hazard ratio = 3.1, $p = 0.015$) (Fournier et al., 2016).

Another study examining factors affecting QOL during chemotherapy was conducted in South Korea among 144 patients with CRC. The most frequent symptom was lack of appetite, accompanied by sleep disturbance and fatigue. The mean anxiety score was 5.40 with a prevalence of 23% and depression was 8.85 with a prevalence of 64.6%. The mean quality of life score was 81.93 out of 136. Depression was the strongest prognostic factor (Baek and Yi, 2015).

The Slovenian study found no statistical difference in reported global health indicators between patients with CRC and the general Slovenian population. And patients were more likely to report symptoms such as constipation, diarrhea, and financial difficulties. Only on some quality of life scales did they have significantly lower scores. Female patients with CRC were found to be more likely than male patients to report poorer cognitive and emotional functioning, as well as poorer physical and social functioning (Grosek et al., 2019). This phenomenon has also been reported by other European researchers (Hjermstad et al., 1998; Derogar, Van Der Schaaf and Lagergren, 2012; Juul et al., 2014).

A similar study to ours was conducted in East Azerbaijan among 303 patients with CRC. The analysis showed a lower health-related quality of life (HRQOL), especially in women. They suffered more than men from impaired physical and social functioning after cancer development, and reported more fatigue and pain

compared to men. The mean overall QOL score was 49.91 (Laghousi et al., 2019), lower than the mean QOL score of our patients. In our study, however, the average global health status was 59.24 (22.62), significantly lower than in other countries. However, the functional scales had fairly high scores of 60 to 75 (out of a total of 100 points). The symptom scale from 31 to 45 (out of 100 points), that is, there were relatively low scores, but some symptoms like fatigue, insomnia, and loss of appetite were more common.

Strengths and limitations

Our study had some limitations because it was cross-sectional, a causal relationship between the variables being compared could not be established. In addition, we had no information on comorbidities, although it is likely that certain comorbidities affect quality of life and survival. In cancer patients the stage of the disease is an important predictor of the quality of life. In our study the questionnaire contained a question about the stage of the disease; but since many respondents did not answer this question, we excluded it from the statistical analysis. Despite these limitations, this is the first study in Kazakhstan in which we have analyzed quality of life in patients with CRC. The strengths of our study relate to its multicenter nature, including several cancer centers in Kazakhstan, and to the use of a reliable tool that is used worldwide to assess quality of life in all types of cancer.

Conclusion: Thus, this study gives an indication of good life functioning among our participants on the functional and symptom scales. However, they reported insufficiently high global health status. Analysis of the results showed that, according to the subjective opinion of the patients, their global health status remained at an average level. Among the most unpleasant symptoms, fatigue, insomnia, and loss of appetite topped the list. The assessment of QOL directly depends on the treatment patients receive. Thus, the assessment of QOL in patients with CRC will improve the medical and rehabilitation care for this category of patients in the future.

Author Contribution Statement

Dina Toletayeva initiated the research and prepared the manuscript. The data were obtained with the help of Kuantkan Zhabagin, Almagul Zhabagina, Ainur Baissalbayeva. Gulnar Shalgumbayeva and Assel Baibussinova contributed to the data analysis. Tolegen Toletayev contributed to the critical evaluation and revision of the manuscript. Dina Toletayeva is the guarantor of the document.

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Scientific Approval

This research is carried out within the framework of the approved topic of the doctoral dissertation of a 3-year doctoral student of the specialty “Public Health” of the Semey Medical University, Kazakhstan.

Ethics approval

Prior to data collection, the study received approval from the Semey Medical University Ethics Committee (Protocol № 2, October 28, 2020).

Conflict of Interest

The authors declare no conflicts of interest.

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