



Quality of life of colorectal cancer patients: A cross-sectional study, Alexandria, Egypt.

Sara Refay¹, Fayek El khwsky², Gamal El-Housseni³, Assem Rostom⁴, Iman El Sayed^{2*}

1) Bachelor of Pharmaceutical Sciences, Alexandria University.

2) Department of Biomedical Informatics and Medical Statistics, Medical Research Institute, Alexandria University.

3) Department of Clinical Oncology, Faculty of Medicine, Alexandria University.

4) General Director of Alexandria Ayadi Al-Mostakbal Oncology Centre.

ABSTRACT:

Introduction: The growing burden of cancer explicates an increasing global trend of 1% every year. Low- and Middle-Income countries report more than two-thirds of cancer mortality all over the world. In Egypt, colorectal cancer (CRC) was diagnosed in 14.0% of all patients who underwent colonoscopies. Little data is known about quality of life in CRC patients though it can be preventable with good prognosis.

Objective: to assess colorectal cancer patients' quality of life (QoL) and recognize different factors affecting it.

Methods: We conducted a cross-sectional study among adult colorectal cancer patients as confirmed by the pathology report at least one year after their initial diagnosis. Patients were admitted to Alexandria University. We used the Arabic version of both general EORTC QLQ-C30 and colorectal cancer specific QLQ-C29 questionnaires.

Results: One hundred-thirty-two patients completed the questionnaire. Average global health score was 41.4(95% CI 37.8 to 44.98). Multivariate analysis revealed the average global health score increased by 14.69% in educated patients compared to non-educated patients 95% CI (8.2 to 21.2). However, it was reduced by 40.88% in patients who received multiple treatment modalities compared to those who received single treatment (95% CI -35.5 to -26.5).

Conclusion and recommendation: Average global health score was generally low. Patients with stoma suffered worse symptoms scales than those without stoma. Early detection programs to improve prognosis as well as better palliative care strategies are urgently needed especially among patients with low socio-demographic characteristics to further improve their QoL.

Keywords: Colorectal; cancer, quality of life, Risk factors

1. BACKGROUND:

Colorectal cancer is the third leading cause of cancer deaths worldwide with global recent positive trends in colorectal cancer incidence. Between 1990 and 2019, The global age-standardised incidence rate of colorectal cancer increased from 22.2 (95% UI 21.3–23.0) per 100 000 to 26.7 (24.6–

28.9) per 100 000. colorectal cancer incident cases more than doubled, from 842 098 (95% uncertainty interval [UI] 810 408–868 574) to 2.17 million (2.00–2.34), and deaths increased from 518 126 (493 682–537 877) to 1.09 million (1.02–1.15). (1)

Colorectal cancer survival is highly

dependent upon stage of disease staging at time of diagnosis, and typically ranges from a 90% 5-year survival rate for cancers detected at the localized stage; 70% for regional; to 10% for people diagnosed for distant metastatic cancer.(2)

Cancer and its treatment have a major impact on patients' lives which can lead to difficulties and affect quality of Life.(3)

Quality of Life (QoL) is a multidimensional construct encompassing perceptions of dimensions such as physical, emotional, social and cognitive functions, as well as the negative aspects of somatic discomfort and other symptoms produced by a disease or its treatment. (4, 5)

European organization for research and treatment of cancer (EORTC) recognizes that there is not only a need to examine the impact of cancer in terms of longer survival, but also in terms of understanding the general effect of cancer on a patient as a "whole person", as opposed to simply regarding the patient as a disease that needs to be cured. This type of research is called health related quality of life (HRQOL).(4)

Understanding the QoL experienced by colorectal cancer patients is essential for evaluating the full impact of the disease on individuals, their families, and their communities. Patient perspective is essential in establishing a proper understanding of the quality of life of colorectal cancer patients. Well-designed oncological studies are of

Quality of life of colorectal cancer patients: A cross-sectional study, Alexandria, Egypt.

Received: 1-12-2023 Accepted: 15-12-2023

Corresponding author: Iman El Sayed

importance for a profound understanding of the impact on treatment outcome in terms of QoL. Moreover, QoL studies could contribute to health state valuation either directly by using generic preference-based measures (e.g EQ-5D questionnaire) or indirectly by condition specific measures (EORTC QLQ CR29 questionnaire).(6)

Voluminous literature has been accumulated about QOL in patients with breast cancer , prostate cancer and lung. Previous studies assessed QoL of colorectal cancer patients in other countries.(7, 8) A study was conducted in Morocco and concluded that the functional dimension was the most affected health status. Financial difficulties and fatigue scores were the highest for symptoms. Emotional and social functions were significantly worse in rectal cancer. Rectal cancer preserved most symptoms. This study assessed the effect of age, sex as sociodemographic factors as well as staging, radiotherapy and intake of chemotherapy as clinical factors.(7) A 4-year prospective study of 329 rectal cancer patients' quality of life determined that QoL is affected by surgery type and presence of stoma.(8) Anterior resection and non-stoma patients had better quality of life scores than abdominoperineal extirpation and stoma patients.(8)

A study was conducted in Suez Canal University Hospital , Ismailia, Egypt among 43 colorectal carcinoma patients in the postoperative period before starting radio or chemotherapy. (9) Quality of life was assessed using an Arabic translated versions of European Organization for Research and Treatment of Cancer (EORTC QLQ C30) and colorectal cancer Module (EORTC QLQ CR29) showed that the most preserved functional scale was the social function. Among symptom scales, the worst symptom was the financial difficulties followed by insomnia and fatigue. Patients without stoma showed significantly better scores than patients with stoma as regards to global health status (p-value < 0.05). EORTC (QLQ-CR29) questionnaire revealed that, the most annoying symptom affecting the quality of life was bloated feeling and it was significantly more with non-stoma patients (p-value < 0.05).(9) However, this study was conducted about one decade ago and did not determine the independent risk factors of overall quality of life.

Little is known however about QOL in colorectal cancer particularly in our region. We decided to conduct this study in Alexandria, Egypt to assess the impact of CRC diagnosis and treatment on different domains of QOL

2. Aim of the Work:

The aim of this work is to assess colorectal cancer patients' quality of life and recognize the factors affecting it in Alexandria, Egypt.

Subjects and Methods:

Subjects:

Study design:A cross sectional study.

Study Setting:

The study was conducted on patients admitted to the oncology department of the main university hospital (MAUH), the Medical Research Institute (MRI) (governmental hospitals) and Alexandria Ayadi Al-Mostakbal Oncology Centre (A non-governmental oncology centre) dedicated to philanthropy, a centre that serves patients from both public and private sectors.

Study population:Patients diagnosed with colorectal cancer and pathologically confirmed.

Inclusion criteria: The study included fully conscious adult patients, at least one year after their initial diagnosis, willing to participate and fill in the questionnaire.

Exclusion criteria:

- Children Patients.
- If colorectal cancer is metastasizing not primary diagnosis.

Sampling method:

- The eligible patients were selected from medical records.
- The selected patients then interviewed to fill in the questionnaire.

Sample size:

Based on our objective to assess the factors predicting quality of life for colorectal cancer patients, we determined a minimum required sample of $50 + 8k$ where k is number of predictors, we assume that at least 10 predictors will contribute significantly to quality-of-life global score, so a minimum required sample of 130 patients was achieving 80% power at 0.05 level of significant to predict quality of life score. We calculated a minimum required sample of 121 colorectal cancer patient based on the primary objective of an accepted maximum tolerated error of ± 10 in the mean global score (69.23 to 89.23) among Egyptian colorectal cancer patients from the global score of Jordanian patients 79.23(23.1), (10) using one sample mean t-test at 90% power and .01 significance level and 0.3 effect size. Patients who did not fulfill the eligibility criteria or did not completely fill in the questionnaires were excluded. A total final sample of 132 patients was collected.

Ethical considerations:Approval was obtained from all settings prior to study initiation with assurance of confidentiality of patient's information.

Methods:

Data collection procedure included interviewing the patients.

Data collection form:

The data collection form was conducted using the following forms:

A- Socio-demographic characteristics:

1. Name
2. Phone number
3. Date of birth
4. Education level
5. Current Marital status
6. Occupation
7. Residence (Urban- Rural)
8. Body mass index (BMI)

B- European organization for research and treatment of cancer quality of life questionnaire. The Arabic version of C30 (EORTC QLQ-C30):

It is an instrument used to assess cancer patients' health-related quality of life. It is a multidimensional questionnaire consists of:

1. Five functional scales: Physical, role, emotional, cognitive and social functioning
2. One global quality of life scale
3. Three symptom scales: Fatigue, nausea- vomiting and Pain

4. Six single item scales: dyspnea, sleep disturbance, appetite loss, constipation, diarrhea and financial impact of the disease.

C- European organization for research and treatment of cancer quality of life questionnaire (Arabic version) EORTC QLQ-CR29. (Colorectal cancer - specific module).

CR29 is recommended as a reliable and valid tool to use with the QLQ-C30 to assess HRQL in clinical trials and other settings in patients with colorectal cancer research. **The questionnaire is validated with many validated translations including an Arabic version. (11) There is a specific Egyptian Arabic version conducted simultaneously in a multi-cultural setting. (11)**

The QLQ-CR29 consists of 29 items, including items in 4 scales (urinary frequency, blood/mucus in stools, stool frequency, body image) and 19 single items (urinary incontinence, dysuria, abdominal pain, buttock pain, bloating, dry mouth, hair loss, taste, anxiety, weight, flatulence, fecal incontinence, sore skin, embarrassment, stoma care problems, sexual interest for men, sexual interest for women, impotence, dyspareunia). There are 11 items allocated for specific sub-populations, including males, females, and stoma patients. Scores of the QLQ-CR29 can be linearly transformed to provide a score from 0 to 100. The scales are scored based on responsiveness, with higher scores representing higher levels of functioning on the functional scales, greater degrees of symptomatology on the symptom scales and improved QOL on the global QOL scale. The QLQ-CR29 allows for sexuality to be assessed in a 4-week timeframe and handled independently of the rest of the domains. Revised sexual functioning and GI symptom scales in the QLQ-CR29 are aimed to improve overall participation and compliance in patient populations. (12)

Analysis of results:

Quantitative data were summarized by mean, median, standard deviation and Interquartile range as appropriate, while categorical variables were summarized by frequency, percent as appropriate. Bivariate and multivariate analyses were conducted to assess the factors affecting QoL.

For bivariate analysis, Chi-square test (χ^2) studied significant association between two categorical variables. Fisher exact (FEp) and Montecarlo (MCp) significance were performed if more than 20% of total expected cell counts <5 . Parametric or non-parametric tests

detected significant difference of global as well as different domains' scores between categorical variables based on normal distribution of variables by Kolmogorov Smirnov test and sample size per group. Multivariate linear regression analysis studied independent risk factors of global and functional scales. Assumptions of linearity, normality, homoscedasticity, and independence of residuals were checked while conducting multiple linear regression.

All statistical tests were two-sided and judged at .05 significance level. (13)

RESULTS

The results of the present study are presented in the following sections:

Section I: Characteristics of the included participants:

Section II: Bivariate analysis to study socio demographic as well as clinic-pathological factors affecting quality of life:

Section III: Multivariate analysis to assess the independent contribution of different sociodemographic and clinicopathological characteristics of patients to global health status.

Section I: Characteristics of the included participants:

1) Distribution of the patients according to sociodemographic characteristics:

The characteristics of the 132 patients (54 males/40.9% and 78 females/59.1%) in the study are shown in Table 1. More than half of the patients (57.7%) were aged from 50-70 years old. Most of the patients (82.6%) were married. Around 53.8% of the patients lived in rural areas. Regarding the occupation status and education level of the patients; 94.7% were not occupied and 64.4% were educated. Near to the half of the patients (45.5%) were obese. (Table 1)

2) Distribution of the patients according to Clinical and Pathological characteristics:

The analysis of clinical and pathological indicators revealed that 62.2% of the patients had grade 2 tumor, and the stage of the disease was III in most of the patients (65.9%). Around 78.8% of the patients had no metastasis, (31.1%) had received right hemicolectomy surgery. About 59.8% were diagnosed last year. Most of the patients (88.6%) received single chemotherapy. (Table 2)

3) Descriptive statistics of EORTC QLQ-C30 Instrument Scales:

EORTC QLQ-C30 variables are demonstrated in Table 3. The mean QoL score was 41.4 ± 20.7 . The most common complaints were financial difficulties, insomnia, appetite loss, fatigue, and pain. The least reported symptoms were constipation, followed by diarrhea.

4) Descriptive statistics of EORTC QLQ-CR29 Instrument Scales:

EORTC QLQ-CR29 variables are demonstrated in Table 4. The mean Weight score was the lowest (19.4 ± 31.37). The most common complaints were embarrassment, flatulence, stoma care problems. The least reported symptoms were urinary incontinence, followed by dysuria, and blood and mucus in stool.

Section II: Bivariate analysis to study sociodemographic as well as clinic-pathological factors affecting quality of life:

Regarding colorectal cancer modules (QLQ-C30) and (QLQ-CR29) questionnaires, for the global score and functional scales, higher scores indicate a better response, while for the symptom's scales; higher scores mean a worse response.

No statistical significance existed between men and women in terms of global scores of EORTC QLQ-C30 and QLQ-CR29 ($p > .05$). We also found that there was no statistically significant difference in global health at different age groups. Patients with university and higher levels of education reported a significantly higher global QoL score than those with lower educational level ($p < .001$).

We detected that there was no statistically significant difference between occupied and not occupied patients in the

functional scales of global health. Also, insignificant difference existed according to the marital status in global QoL score ($p > .05$).

Patients with multiple treatments concluded a statistically significant difference in the median global QoL score from those receiving single treatment ($p = 0.001$).

We concluded that the global health low anterior resection type of surgery to other types of surgery. That outcome was statistically significant ($p = 0.001$).

We illustrated that functional scales of global health were better in transverse colon compared to sites of colostomy. That outcome was statistically significant ($p = 0.001$) (Table 5)

Section III: Multivariate analysis to assess the independent contribution of different sociodemographic and clinico-pathological characteristics of patients to global health status and its dimensions:

Global health score was higher by 14.69% in university educated patients compared to educated patients below university 95% CI (8.2-21.2). However, global health score was reduced by 40.88% in patients who received multiple treatment compared to patients received single treatment 95% CI (-35.5)-(-26.5)

Physical function score was higher by 24.9% in educated patients compared to not educated Patients 95% CI (16.47-33.3). However, physical function score was reduced by 25.99% in patients who received multiple treatment compared to patients received single treatment 95% CI (-42.6)-(-9.33).

Role function score was higher by 14.16% in educated patients compared to not educated patients 95% CI (3.7-24.9). However, role function score was reduced by 49.7% in patients who received multiple treatment compared to patients received single treatment 95% CI (-72.3)-(-27).

Emotional function score was higher by 14.35% in educated patients compared to not educated patients 95% CI (3.7-24.9). However, emotional function score was reduced by 58.79% in patients who received multiple treatment compared to patients received single treatment 95% CI (-80.8)-(-36.80).

Cognitive function scores was reduced by 13.17% in stoma patients compared to non-stoma patients 95% CI (-21.2)-(-5.1), and also reduced by 16.4% in metastatic patients compared to non- metastatic patients 95% CI (-26)-(-6.79). However, cognitive function scores was higher by 12.35% in patients aged between 50 and 70 years old compared to younger patients 95% CI (4.1)-(20.5). And also higher by 14.06% in patients aged above 70 years old compared to younger patients 95% CI (-1.5)-(-29.2).

Social function score was higher by 10% in patients aged between 50 and 70 years old compared to other patients 95% CI (-0.9)-(20.9). However, social function score was reduced by 20.4% in patients with stage 3 compared to other patients 95% CI (-33.3)-(-7.07), and also reduced by 12% in patients compared to other patients 95% CI (-23.36)-(-0.63), finally reduced by 78.37 % in patients with multiple treatment compared to patients with single treatment 95% CI (-103.3)-(-53).

Table (1): Distribution of the patients according to sociodemographic characteristics:

Patient Socio-demographic Characteristics	Total (n=132) N(%)	With Stoma (n=86) N(%)	Without Stoma (n=46) N(%)
Age			
<50	47(35.6%)	40(46.5%)	7(15.2%)
50-70	76(57.6%)	39(45.3%)	37(80.4%)
70+	9(6.9%)	7(8.1%)	2(4.3%)
Gender			
Male	54(40.9%)	35(40.7%)	19(41.3%)
Female	78(59.1%)	51(59.3%)	27(58.7%)
Marital Status			
Married	109(82.6%)	75(87.2%)	34(73.9%)
Single	7(5.3%)	7(8.1%)	-
Widow	16(12.1%)	4(4.7%)	12(26.1%)
Residence			
Urban	61(46.2%)	27(31.4%)	34(73.9%)
Rural	71(53.8%)	59(68.6%)	12(26.1%)
Education Level			
Educated (lower than University)	85(64.4%)	48(55.8%)	37(80.4%)
Educated (University and higher)	47(35.6%)	38(44.2%)	9(19.6%)
Occupation			
Occupied	7(5.3%)	2(2.3%)	5(10.9%)
Not Occupied	125(94.7%)	84(97.7%)	41(89.1%)
BMI			
Normal weight	41(31.1%)	39(45.3%)	2(4.3%)
Overweight	31(23.5%)	18(20.9%)	13(28.3%)
Obesity	60(45.5%)	29(33.7%)	31(67.4%)

BMI: Normal weight <25, Overweight: 25-30, >30 Obese

Table (2): Clinical and Pathological characteristics of colorectal cancer patients

Patient Clinical and Pathological Characteristics	Total (n=132) N(%)	With Stoma (n=86) N(%)	Without Stoma (n=46) N(%)
<i>Grad</i>			
Grad 1	34(25.8%)	34(39.5%)	-
Grad 2	86(65.2%)	45(52.3%)	41(89.1%)
Grad 3	12(9.1%)	7(8.1%)	5(10.9%)
<i>Stage</i>			
Stage 1	-	-	-
Stage 2	17(12.9%)	4(4.7%)	13(28.3%)
Stage 3	87(65.9%)	61(70.9%)	26(56.5%)
Stage 4	28(21.2%)	21(24.4%)	7(15.2%)
<i>Metastasis</i>			
Yes	23(17.4%)	16(18.6%)	7(15.2%)
No	104(78.8%)	65(75.6%)	39(84.8%)
<i>Time since Diagnosis</i>			
2017	79(59.8%)	45(52.3%)	34(73.9%)
2016	36(27.3%)	36(41.9%)	-
2012-2015	12(9.1%)	-	12(26.1%)
<i>Type of surgery</i>			
Sigmoidectomy	28(21.2%)	17(19.8%)	11(23.9%)
RT_Hemicolectomy	41(31.1%)	18(20.9%)	23(50.0%)
Low_ant_resection	14(10.6%)	7(8.1%)	7(15.2%)
Rectosigmoidectomy	5(3.8%)	5(5.8%)	-
It_Hemicolectomy	33(25.0%)	33(38.4%)	-
<i>Site of Colostomy</i>			
Sigmoid	23(17.4%)	17(19.8%)	6(13.0%)
Ascending Colon	9(6.8%)	9(10.5%)	-
Transverse Colon	4(3.0%)	4(4.7%)	-
Rectosigmoid	5(3.8%)	5(5.8%)	-
Rectum	15(11.4%)	15(17.4%)	-
Cacum	5(3.8%)	-	5(10.9%)
<i>Current Treatment</i>			
Single	117(88.6%)	73(84.9%)	44(95.7%)
Multiple	7(5.3%)	5(5.8%)	2(4.3%)

Table (3): Descriptive statistics of EORTC QLQ-C30 Instrument Scales:

QLQ-C30 version 3.0	Total (n=132) Mean ± SD	95% Confidence Interval for Mean
<i>Global health status/QoL</i>	41.4 ± 20.7	37.8-44.98
<i>Functional scales:</i>		
Physical functioning	40.8±25.9	36.3-45.26
Role functioning	43.8±32.3	38.2-49.37
Emotional functioning	52.58±32.38	47-58.16
Cognitive functioning	70.95±23.17	66.96-74.9
Social functioning	54.5±34.2	48.65-60.4
<i>Symptom scales / items:</i>		
Fatigue	54.5±29.96	49.38-59.7
Nausea and vomiting	43.56±32.47	37.96-49.15
Pain	56.18±28.49	51.28-61.09
Dyspnea	43.18±34.88	37.17-49.18
Insomnia	57.57±37.76	51.07-64.07
Appetite loss	57.8±32.65	52.2-63.45
Constipation	15.4±19.9	11.97-18.8
Diarrhea	29.79±37.1	23.4-36.19
Financial difficulties	58.58±28.86	53.6-63.55

Table (4): Mean and Standard Deviation of EORTC QLQ-CR29 Instrument Scales:

<i>QLQ-CR29</i>	<i>Total (n=132) Mean ± SD</i>	<i>95% Confidence Interval for Mean</i>
<i>Functional Scales:</i>		
<i>Body Image</i>	<i>20.7±31.1</i>	<i>15.3-26</i>
<i>Anxiety</i>	<i>21.46±32.2</i>	<i>15.9-27</i>
<i>Weight</i>	<i>19.4±31.37</i>	<i>14-24.8</i>
<i>Sexual interest (men)</i>	<i>71.7±26.26</i>	<i>63.9-79.5</i>
<i>Sexual interest (women)</i>	<i>81.4±16.69</i>	<i>77.1-85.69</i>
<i>Symptom scales:</i>		
<i>Urinary frequency</i>	<i>32.4±31.18</i>	<i>27-37.8</i>
<i>Blood and mucus in stool</i>	<i>9.2±13.55</i>	<i>6.8-11.5</i>
<i>Stool frequency</i>	<i>36.6±28.78</i>	<i>31.65-41.57</i>
<i>Urinary incontinence</i>	<i>5±19.95</i>	<i>1.6-8.48</i>
<i>Dysuria</i>	<i>6.5±21.57</i>	<i>2.85-10.28</i>
<i>Abdominal pain</i>	<i>42±37</i>	<i>35.79-48.5</i>
<i>Buttock pain</i>	<i>30.8±77.1</i>	<i>17.5-44</i>
<i>Bloating</i>	<i>39.6±35.46</i>	<i>33.5-45.75</i>
<i>Dry mouth</i>	<i>32.8±40.35</i>	<i>25.88-39.77</i>
<i>Hair loss</i>	<i>56.8±37</i>	<i>50.44-63.19</i>
<i>Taste</i>	<i>45.7±31.2</i>	<i>40.3-51</i>
<i>Flatulence</i>	<i>67.17±28.8</i>	<i>62.2-72.1</i>
<i>Faecal incontinence</i>	<i>35.35±26.9</i>	<i>30.7-39.9</i>
<i>Sore skin</i>	<i>59.3±32.25</i>	<i>53.79-64.89</i>
<i>Embarrassment</i>	<i>78.1±33.5</i>	<i>73-84.56</i>
<i>Stoma care problems</i>	<i>60.85±36.9</i>	<i>52.9-68.77</i>
<i>Impotence</i>	<i>34.16±30.65</i>	<i>24.36-43.96</i>
<i>Dyspareunia</i>	<i>48.29±26.4</i>	<i>40.7-55.88</i>

Table (5): Bivariate analysis-to study the association between sociodemographic as well as clinic pathological factors with global health status/QoL

	Frequency	Global health status/QoL	Sig.
Sex			
Male	54	42.9±22.3	
Female	78	40.38±19.6	.495
Age:			
<50 years	47	33.33 ±16.67	
50-70 years	76	38.67±17.89	0.536
+70 Years	9	39.02±11.65	
Educational level:			
Educated (lower than University)	47	32.6±20.5	.001*
Educated (University and higher)	85	46.27±19.3	
Residence:			
Rural	71	39.2±22	.187
Urban	61	43.98±18.76	
Occupation:			
Not occupied	125	34±15.25	0.673
Occupied	7	33.33±9.45	
Marital status:			
Single	36	33.33±12.57	
Married	79	43±85	0.340
Widow	12	32.12±16.61	
BMI:			
Normal Weight	41	43.9±19.98	
Overweight	31	46.2±19.58	.094
Obesity	60	37.2±21.3	
Grade:			
Grade 1	34	47±78.42	
Grade 2	86	33.33 ±16.67	.353
Grade 3	12	66.67±17.34	
Stage:			
Stage 2	17	50 ±41.67	
Stage 3	87	33.73 ±13.93	.089
Stage 4	28	38.29 ±15.56	
Metastasis:			
Yes	23	39.98 ±16.67	0.397
No	104	50.48 ±13.39)	
Presence of stoma bag:			
With Stoma	86	40.69±20.86	.589
Without Stoma	46	42.75±20.68	
Current treatment			
Single	117	50.28(33.33)	.001*
Multiple	7	30.34 (16.67)	
		<i>Md(IQR)</i>	
Type of Surgery:			
Right Hemicolectomy	41	33.3(50)	
Left Hemicolectomy	33	33.3(16.67)	
Sigmoidectomy	28	33.3(16.67)	.001*
low anterior resection	14	50(33.3)	
Rectosigmoidectomy	5	33.3(50)	
Site of Colostomy:			
Sigmoid	23	33.3(33.3)a	
Rectum	15	50(16.67)a	
Ascending Colon	9	20.45(23.32)b	.001*
Caecum	5	16.66(18.96) bc	
Rectosigmoid	5	66.66(16.64)a	
Transvers_Colon	5	75(26.66)a	

*Significant results $\leq .05$, Different superscripts denote significant pairwise comparison by adjusted significance using Bonferroni correction

Table (6): Multivariate analysis to assess the independent contribution of different sociodemographic and clinico-pathological characteristics of patients to global health status and its dimensions.

	R^2	Adjusted R^2	F	Overall Model Sig.	Predictors	Unstandardized Coefficients B	std.error	Standardized Coefficients Beta	t	Overall Model Sig.	95% Confidence Interval for Mean
Global health status/QoL	30.3 %	29.2%	26.3	0.0001	Education ^a	14.69	3.3	0.336	4.43	0.0001	(8.2-21.2)
					Treatment ^b	-40.88	6.91	-0.449	-5.9	0.0001	(-35.5)-(-26.5)
Physical function	30.5 %	28.1%	13	0.0001	Education ^a	24.9	4.346	0.487	5.741	0.003	(16.47-33.3)
					Treatment ^b	-25.99	8.539	-0.244	-3.044	0.0001	(-42.6)-(-9.33)
Role function	16.6 %	15.3%	12.08	0.0001	Education ^a	14.16	5.553	0.212	2.55	0.012	(3.7-24.9)
					Treatment ^b	-49.7	11.569	-0.357	-4.299	0.0001	(-72.3)-(-27)
Emotional function	21.5 %	20.2%	16.6	0.0001	Education ^a	14.35	5.4	0.214	2.65	0.009	(3.7-24.9)
					Treatment ^b	-58.79	11.27	-0.420	-5.2	0.0001	(-80.8)-(-36.80).
Cognitive function	18.9 %	16.4%	7.4	0.0001	Stoma ^c	-13.17	4.117	-0.272	-3.199	0.002	(-21.2)-(-5.1)
					Metastasis ^d	-16.4	4.948	-0.270	-3.324	0.001	(-26)-(-6.79)
					50-70 years ^e	12.351	4.206	0.264	2.937	0.004	(4.1)-(20.5)
					Above70 ^f	14.063	7.819	0.154	1.799	0.074	(-1.5)-(29.2)
Social function	26.4	23.9	10.65	0.0001	50-70 years ^e	10	5.641	0.143	1.775	0.079	(-0.9)-(20.9)
					stage3 ^g	-20.4	6.813	-0.278	-2.998	0.003	(-33.3)-(-7.07)
					Residence ^h	-12	5.844	-0.176	-2.059	0.042	(-23.36)-(-0.63)
					Treatment ^b	-78.37	12.849	-0.530	-6.100	0.000	(-103.3)-(-53)

- Dependent Variable: Global health status/QoLi:
Initially included Predictors: metastasis, Q48:Do you have a stoma bag (colostomy/ileostomy)?, Gender, treatment, Education, Residence, occupation, stage 3, stage 4, Site of Colostomy:
- Dependent Variable: Physical functioning:
Initially included Predictors: treatment, Education, metastasis, Q48: Do you have a stoma bag (colostomy/ileostomy)?, Residence, Gender, occupation
- Dependent Variable: Role functioning:
Initially included Predictors: treatment, Education, metastasis, Q48:Do you have a stoma bag (colostomy/ileostomy)?, occupation, stage4.
- Dependent Variable: Emotional functioning :
Initially included Predictors: (Constant), 50-70 years, metastasis, Education, treatment, Q48:Do you have a stoma bag (colostomy/ileostomy)?, occupation, stage3, stage4.
- Dependent Variable: Cognitive functioning:
Initially included Predictors: Gender, Q48:Do you have a stoma bag (colostomy/ileostomy)?, metastasis, More than seventy, 50-70 years, occupation.
- Dependent Variable: Social functioning:
Initially included Predictors: treatment, Education, 50-70 years, metastasis, Residence, Gender, occupation, stage3, stage4.

a ref: Education level below university
 b ref: Single treatment
 c ref: No stoma
 d ref: No metastasis
 e ref:<50
 f ref:<50
 g ref:stag 2
 h ref:Rural

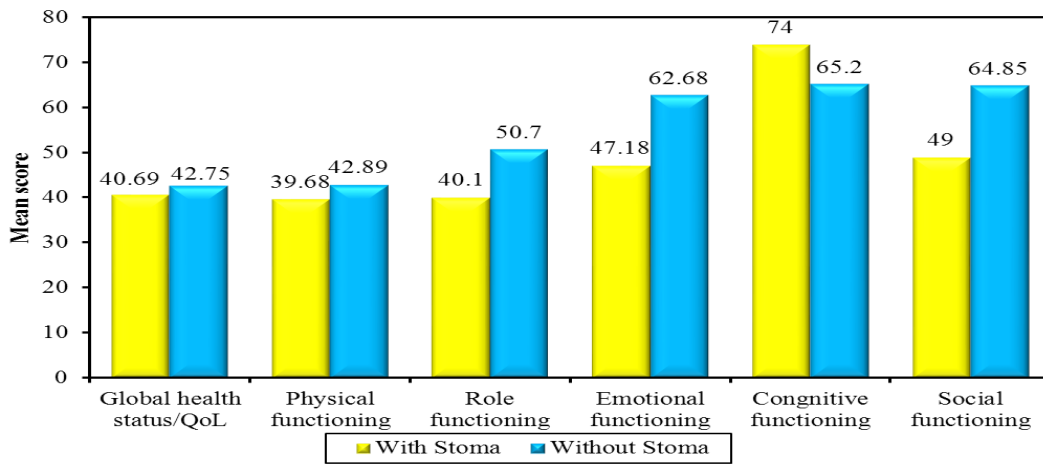


Fig. (1): Mean global score, and functions scores of EORTC QLQ-C30 according to stoma bag

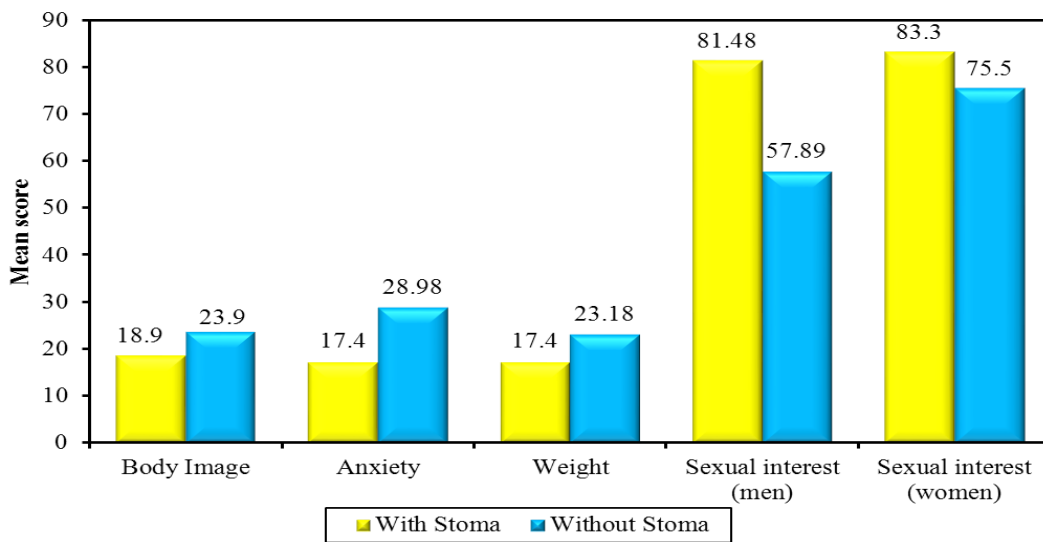


Fig (2): Mean functions scores of EORTC QLQ-CR29 according to stoma bag

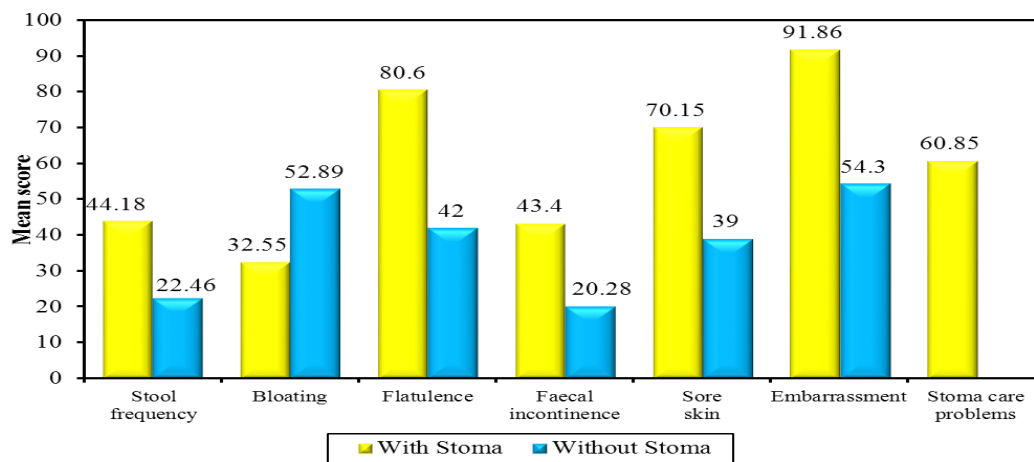


Fig (3): Mean Symptoms scores of EORTC QLQ-CR29 according to stoma bag

DISCUSSION

Survival expectations of patients with CRC increased and reached 93.2% at the 5th year after diagnosis.(13) Health-related QoL is now considered as an important endpoint for the oncology community.(14) QoL of colorectal cancer patients can also provide valuable information regarding the progress of disease and the side effects of cancer therapies. In addition, some studies established that a better QoL was associated with prolonged survival of patients with cancer. (15) Braun *et al.* found that a 10-point increase in baseline global QoL scores (using EORTC QLQ-C30) was associated with a 7% decreased risk of death.(16) This result was also proved for other types of cancer.(17) Therefore, improving the QoL may lead to an improvement of the prognosis and well-being of cancer patients.

The most important findings in our study were:

- In present study results of EORTC QLQ C30 showed impaired global health status of colorectal carcinoma patients with mean value 41.4 ± 20.7
- Regarding the functional scales of EORTC QLQ C30, the most affected functions were emotional, physical, social, and role functions while the most preserved function was cognitive function.
- As regarding the symptom /item scales of EORTC QLQ C30, financial difficulties were the worst affected symptom with mean value 58.58 ± 28.86 .
- Stoma and non-stoma patients have almost the same impaired global health status.
- There was no statistically significant difference between men and women in terms of global QoL.
- Younger patients with colorectal cancer express financial and cognitive problems compared with older patients.
- Patients with different marital status had the same poor global QoL.
- Some functional scales were worse in obese patients compared to normal weight patients. These outcomes were statistically significant in physical, social, role functions, and sexual interest in women.
- Obese patients had worse outcomes in some symptoms such as stoma care problems, flatulence with stoma bag, sore skin with stoma bag, embarrassment with stoma bag.
- Patients with different stages and grades were having poor overall global QoL with no statistically significant difference.
- Global health status, physical, role, and emotional functions scores were higher in educated patients compared to non-educated patients.

In present study concerning the sample's sociodemographic characteristics most of patient were from 50 to 70 (57%), with mean age 53.4 ± 12.5 . This result was similar to that obtained in studies from USA and Germany.(8, 16)

Our study results of EORTC QLQ C30 showed impaired global health status of colorectal carcinoma patients with mean value 41.4 ± 20.7 . Our results were lower compared to that reported in regional and international figures; the mean global score in a study from Germany 62.8 ± 22.4 SD. (18) The mean ages of participants in the previous two studies were 61.6 ± 8.2 SD, and 65.0 ± 9.9 SD respectively. The lower reported scores in our study might be because Egypt is

suffering from economic circumstances nowadays and because none of the participants participated in a psychosocial support group. Results from different studies provide strong evidence that psychosocial interventions are often efficacious in decreasing patients' distress and improving their quality of life.(19)

Regarding the functional scales of EORTC QLQ C30, the most affected functions were emotional, physical, social, and role functions while the most preserved function was cognitive function. This partially matches with another study's findings.(20) which reported significant impairment of physical functions as well as social and emotional functions.

As regarding the symptom /item scales, financial difficulties, insomnia, appetite loss, pain, and fatigue were the worst symptoms / items affecting the health-related quality of life among the studied patients. In accordance with our results, a study from Germany reported that fatigue and insomnia were the most severely affected symptoms followed by dyspnea, pain, diarrhea, constipation, and financial difficulties. (18)

When comparing the health-related quality of life as assessed by EORTC QLQ C30 in patients with and without stoma, we found that stoma and non-stoma patients have almost the same impaired global health status, stoma patients were found to have higher scores (worse) than non-stoma patients in financial difficulties, that's might be due to the economic circumstances nowadays.(41)

In our study, there was no statistically significant difference between men and women in terms of global health status QoL. One study suggested that gender has not been reported as a significant factor for QoL.(21)

Our results showed that younger and older patients had almost the same score of the global health score. This resembles a study with similar findings.(22)

Another finding in our study was that there was no significant difference between urban patients and rural patients, rural patient's financial problems were worse than urban patients that might be due to low incomes in these areas compared to urban areas.

Patients with different marital status had the same poor global QoL. Obesity was proved to be associated with poorer QoL in some studies. (22, 23)

Patients with different stages and grades were having poor global health status QoL with no statistically significant difference. A similar study reported that there is no significant relationship between tumor stage and QoL. Educational level was found to be significant determinant of health-related quality of life among colorectal carcinoma patients by many other studies.(24, 25)

We found that multiple treatment cause greater impact in global health status, physical and emotional, role and social functions than single treatment. Patients with left hemicolectomy and sigmoidectomy had the worst score in global health status with no significant difference.

Global health status, physical, role, and emotional functions scores were higher in educated patients compared to non-educated patients. Educational level was found to be significant determinant of health-related quality of life among colorectal carcinoma patients by many other studies.(25, 26)

Finally cancer remains one of the most important challenges for the population in the Middle East. Around 50% of cancer patients consult physicians for the first time at stage 3 or 4. Nothing is left except palliation. Palliative care (PC) is defined according to WHO as “an approach that improves the quality of life (QOL) of patients and their families facing the problem associated with life-threatening illness, through the prevention and relief of suffering by means of early identification, assessment, treatment of pain and other problems, physical, psychosocial, and spiritual.”

One of the strategic actions for cancer prevention and control in the Eastern Mediterranean region was to improve cancer management and support PC and pain relief through the following action plans:

- Strengthen cancer diagnosis and treatment programs through all levels of care.
- Promote and implement interventions in childhood cancers at different levels of the health system.
- Strengthen the development of human resources in cancer management.
- Develop or strengthen PC services, including promotion of community nursing and home care.
- Ensure accessibility and affordability of PC medicines.
- Support integration of cancer management and PC in primary health care. (25)

Potential limitations involved the relatively small sample size, cross sectional design, and the study was conducted as single center rather than multi-centered study.

RECOMMENDATIONS

1. Early detection and screening programs for early diagnosis should be taken into consideration.
 2. Health care professionals should provide the following for colorectal cancer patients:
 - Explained information about patients’ diagnosis and treatment.
 - Follow-up surveillance and care.
 - Strategies that can help patients to prepare themselves to handle the disease.
 - Refer patients to other health care professionals; e.g. stomal therapy nurse, and psychosocial services.
 - Improved diagnosis and treatment techniques.
 - Focus on patients’ needs
 - Improve patients’ follow up standards.
 3. Implementation of palliative care at different stages of cancer to improve QOL:
 - a. Just diagnosed and during treatment:
 - Relief from aggressive treatment of adverse effects related to cancer treatment.
 - Relief of pain, nausea and other physical symptoms.
 - Help with practical concerns including help with transportation, finding caregivers or insurance matters.
 - Assistance with legal matters relating to advance directives (written documents that detail patients’ wishes for health care in the event they are unable to express them).
 - Planning for rehabilitation services such as physical or occupational therapy.
 - b. After cancer treatment:
 - Emotional support.
 - Ongoing support for survivors and their families to enhance quality of life after cancer treatment.
 - A range of services that addresses the survivor’s individual physical, emotional and practical needs.
4. Effective 2ndry prevention programs to promote early treatment.
 5. Psychosocial interventions are efficacious in decreasing patients’ distress and improving their quality of life.
 6. Launch websites for providing financial assistance, counseling, support groups, community programs and education workshops for colorectal cancer patients.
 7. Launch financial assistance organizations to provide financial support for colorectal cancer patients and their families during and after treatment.
 8. Patients with colorectal cancer must learn to discuss their sexual problems with doctors and not to be afraid or impressed.
 9. Further studies are needed to take into consideration the outcomes of our study to improve colorectal cancer patients’ quality of life

6. References

1. Global, regional, and national burden of colorectal cancer and its risk factors, 1990-2019: a systematic analysis for the Global Burden of Disease Study 2019. *Lancet Gastroenterol Hepatol.* 2022;7(7):627-47.
2. Jemal A, Clegg LX, Ward E, Ries LA, Wu X, Jamison PM, et al. Annual report to the nation on the status of cancer, 1975-2001, with a special feature regarding survival. *Cancer.* 2004;101(1):3-27.
3. Lin C-Y, Hwang J-S, Wang W-C, Lai W-W, Su W-C, Wu T-Y, et al. Psychometric evaluation of the WHOQOL-BREF, Taiwan version, across five kinds of Taiwanese cancer survivors: Rasch analysis and confirmatory factor analysis. *Journal of the Formosan Medical Association.* 2019;118(1, Part 2):215-22.
4. EORTC Quality of Life. <https://qol.eortc.org/quality-of-life/>. Accessed: 11 December 2022.
5. Post MW. Definitions of quality of life: what has happened and how to move on. *Top Spinal Cord Inj Rehabil.* 2014;20(3):167-80.
6. Samohýl M, Hirošová K, rgalášová E, tančiak J, Vondrová D, J. J. Quality of life in patients with colorectal cancer in the Slovak Republic: A pilot study. *kontakt.* 2018;20(1): e37–e41.
7. Mrabti H, Amziren M, ElGhissassi I, Bensouda Y, Berrada N, Abahssain H, et al. Quality of life of early stage colorectal cancer patients in Morocco. *BMC Gastroenterology.* 2016;16(1):131.
8. Engel J, Kerr J, Schlesinger-Raab A, Eckel R, Sauer H, Hölzel D. Quality of life in rectal cancer patients: a four-year prospective study. *Ann Surg.* 2003;238(2):203-13.

9. Hokkam MD, Farrag MD, El Kammash MD. Assessment of quality of life of colorectal carcinoma patients after surgery. *World J Colorectal Surg*. 2013;3(1):4.
10. Abu-Helalah MA, Alshraideh HA, Al-Hanaqta MM, Arqoub KH. Quality of life and psychological well-being of colorectal cancer survivors in Jordan. *Asian Pac J Cancer Prev*. 2014;15(18):7653-64.
11. Johnson CM, Wei C, Ensor JE, Smolenski DJ, Amos CI, Levin B, et al. Meta-analyses of colorectal cancer risk factors. *Cancer Causes Control*. 2013;24(6):1207-22.
12. Stiggelbout AM, Kunneman M, Baas-Thijssen MC, Neijenhuis PA, Loo AK, Jägers S, et al. The EORTC QLQ-CR29 quality of life questionnaire for colorectal cancer: validation of the Dutch version. *Qual Life Res*. 2016;25(7):1853-8.
13. Baade PD, Youlden DR, Chambers SK. When do I know I am cured? Using conditional estimates to provide better information about cancer survival prospects. *Med J Aust*. 2011;194(2):73-7.
14. Outcomes of cancer treatment for technology assessment and cancer treatment guidelines. American Society of Clinical Oncology. *J Clin Oncol*. 1996;14(2):671-9.
15. Montazeri A. Quality of life data as prognostic indicators of survival in cancer patients: an overview of the literature from 1982 to 2008. *Health Qual Life Outcomes*. 2009;7:102.
16. Braun DP, Gupta D, Grutsch JF, Staren ED. Can changes in health related quality of life scores predict survival in stages III and IV colorectal cancer? *Health Qual Life Outcomes*. 2011;9:62.
17. Luoma ML, Hakamies-Blomqvist L, Sjöström J, Pluzanska A, Ottoson S, Mouridsen H, et al. Prognostic value of quality of life scores for time to progression (TTP) and overall survival time (OS) in advanced breast cancer. *Eur J Cancer*. 2003;39(10):1370-6.
18. Arndt V, Merx H, Stegmaier C, Ziegler H, Brenner H. Quality of life in patients with colorectal cancer 1 year after diagnosis compared with the general population: a population-based study. *J Clin Oncol*. 2004;22(23):4829-36.
19. Yun YH, Lee MK, Bae Y, Shon EJ, Shin BR, Ko H, et al. Efficacy of a training program for long-term disease-free cancer survivors as health partners: a randomized controlled trial in Korea. *Asian Pac J Cancer Prev*. 2013;14(12):7229-35.
20. Guren MG, Eriksen MT, Wiig JN, Carlsen E, Nesbakken A, Sigurdsson HK, et al. Quality of life and functional outcome following anterior or abdominoperineal resection for rectal cancer. *Eur J Surg Oncol*. 2005;31(7):735-42.
21. Krouse RS, Herrinton LJ, Grant M, Wendel CS, Green SB, Mohler MJ, et al. Health-related quality of life among long-term rectal cancer survivors with an ostomy: manifestations by sex. *J Clin Oncol*. 2009;27(28):4664-70.
22. Marventano S, Forjaz M, Grosso G, Mistretta A, Giorgianni G, Platania A, et al. Health related quality of life in colorectal cancer patients: state of the art. *BMC Surg*. 2013;13 Suppl 2(Suppl 2):S15.
23. Alacacioglu A, Binicier O, Gungor O, Oztop I, Dirioz M, Yilmaz U. Quality of life, anxiety, and depression in Turkish colorectal cancer patients. *Support Care Cancer*. 2010;18(4):417-21.
24. El Sayed I. Cancer in the Middle East. In: Boffetta P, Hainaut P, editors. *Encyclopedia of Cancer (Third Edition)*. Oxford: Academic Press; 2019. p. 225-42.
25. Shokar NK, Carlson CA, Weller SC. Factors associated with racial/ethnic differences in colorectal cancer screening. *J Am Board Fam Med*. 2008;21(5):414-26.
26. Nicolussi AC, Sawada NO. Quality of life of patients with colorectal cancer who were receiving complementary therapy. *Acta Paul Enferm* 2009; 22:155-6.