

BMJ Open is committed to open peer review. As part of this commitment we make the peer review history of every article we publish publicly available.

When an article is published we post the peer reviewers' comments and the authors' responses online. We also post the versions of the paper that were used during peer review. These are the versions that the peer review comments apply to.

The versions of the paper that follow are the versions that were submitted during the peer review process. They are not the versions of record or the final published versions. They should not be cited or distributed as the published version of this manuscript.

BMJ Open is an open access journal and the full, final, typeset and author-corrected version of record of the manuscript is available on our site with no access controls, subscription charges or pay-per-view fees (<u>http://bmjopen.bmj.com</u>).

If you have any questions on BMJ Open's open peer review process please email <u>info.bmjopen@bmj.com</u>

**BMJ** Open

# **BMJ Open**

# Predictive Factors Associated with Health-Related Quality of Life in Patients with Colorectal Cancer in Iran: A Cross-Sectional Study

Journal:	BMJ Open
Manuscript ID	bmjopen-2024-086544
Article Type:	Original research
Date Submitted by the Author:	17-Mar-2024
Complete List of Authors:	dahouri, amirmohammad; Tabriz University of Medical Sciences, Community health nursing Sahebihagh, Mohammad Hasan; Tabriz University of Medical Sciences, Department of Community Health Nursing Gilani, Neda; Tabriz University of Medical Sciences
Keywords:	Risk Factors, ONCOLOGY, Aging, Chronic Disease, Gastrointestinal tumours < GASTROENTEROLOGY, Public health < INFECTIOUS DISEASES
	·





I, the Submitting Author has the right to grant and does grant on behalf of all authors of the Work (as defined in the below author licence), an exclusive licence and/or a non-exclusive licence for contributions from authors who are: i) UK Crown employees; ii) where BMJ has agreed a CC-BY licence shall apply, and/or iii) in accordance with the terms applicable for US Federal Government officers or employees acting as part of their official duties; on a worldwide, perpetual, irrevocable, royalty-free basis to BMJ Publishing Group Ltd ("BMJ") its licensees and where the relevant Journal is co-owned by BMJ to the co-owners of the Journal, to publish the Work in this journal and any other BMJ products and to exploit all rights, as set out in our <u>licence</u>.

The Submitting Author accepts and understands that any supply made under these terms is made by BMJ to the Submitting Author unless you are acting as an employee on behalf of your employer or a postgraduate student of an affiliated institution which is paying any applicable article publishing charge ("APC") for Open Access articles. Where the Submitting Author wishes to make the Work available on an Open Access basis (and intends to pay the relevant APC), the terms of reuse of such Open Access shall be governed by a Creative Commons licence – details of these licences and which <u>Creative Commons</u> licence will apply to this Work are set out in our licence referred to above.

Other than as permitted in any relevant BMJ Author's Self Archiving Policies, I confirm this Work has not been accepted for publication elsewhere, is not being considered for publication elsewhere and does not duplicate material already published. I confirm all authors consent to publication of this Work and authorise the granting of this licence.

terez oni

Enseignement Superieur (ABES) Protected by copyright, including for uses related to text and data mining, AI training, and similar technologies



BMJ Open	/bmjopen.	
"Predictive Factors Associated with Health-Related Quality of Life in Patients with Colorectal Cancer in Iran: A	2024-08 Sectional	l Study"
Amirmohammad Dahouri <sup>1</sup> , Mohammad Hassan Sahebihagh <sup>1</sup> , Neda Gilani <sup>2</sup> <sup>1</sup> Departement of community health nursing, Faculty of nursing and midwifery, Tabriz University of Medical Science <sup>2</sup> Department of Statistics and Epidemiology, Faculty of Health, Tabriz University of Medical Sciences, Tabriz, Iran Article type: Original	Cline Apabriz, Irar Babriz, Irar Babriz, Irar Cline Babriz, Irar	١
Corresponding Author Mohammad Hassan Sahebihagh, <u>sahebihagh@yahoo.com</u> , Phone: +989143135837, Fax: 34796969 No. words:3574, No. Tables: 3	sptember 2 Enseign	
<ul> <li>Declarations</li> <li>Ethics approval and consent to participate</li> <li>Ethical approval for the study was granted by Tabriz University of Medical Sciences with ID: IR.TBZMED.REC.1401</li> </ul>	2024. Down ement Still	
Informed consent was obtained from all participants. There was no under 16 participants in this research. All methods were carried out in accordance with relevant guidelines and regulations.	nloaded fr perieur (A	
<ul> <li>Consent for publication</li> <li>Not applicable</li> <li>Competing interests</li> </ul>	om http:// BES) . BESA	
Authors declare no competing interest.  • Funding Tabriz University of Medical Sciences	bmjopen.k	
• Authors' contributions AMD, MHS designed the study. AMD collected the data. NG, AMD analyzed the data. MHS supervised the study. A writing. MHS, NG involved in critical revisions for important intellectual content. All authors approved the manus	MD MD ip ip ip f	in manuscript
<ul> <li>Acknowledgements</li> <li>This study was conducted as part of the Master Thesis of the first author (Amirmohammad Dahouri) at the Tabriz</li> <li>Data availability statement</li> </ul>	ت Unisersity of N	Medical Sciences.
questionnaires by patients themselves the questioner questionnaires by patients themselves the questioner questionnaires were filled and provided the necessary guidance in filling the questionnaires by the patients. and all All the data are available at Tabriz University of Medical Sciences Pazhoohan official website.	theydata were	included in SPSS.
	gence Bił	
	iliographiq	
For peer review only - http://bmjopen.bmj.com/site/about/guidelines.xhtml	lue de l	

BMJ Open Predictive Factors Associated with Health-Related Quality of Life in Patients with Colorectal Cancer in Iran: A Cross & ectional Study

#### Abstract

Background: The incidence of colorectal cancer in Iran has shown a significant increase over the past 25 years, poging ubstantial impacts on both public health and economies. Despite advancements in treatment, there is a growing number of individuals with and economies, potentially affecting their quality of life. Hence, it becomes imperative to identify the factors contributing to the decline in HCCDE

ncluding

0n

nj.com/ on June 11, 2025 at Agence Bibliographique de l

id similar technologies

Method: This study adopts a Cross-Sectional approach, enrolling 256 colorectal cancer patients selected via 🕈 🗟 evenient method based on specified inclusion criteria from April 1, 2022, to May 1, 2022. Data collection tools encompass a participant chare criteria from April 1, 2022, to May 1, 2022. and reliable shortened version of the HRQoL questionnaire, which has undergone prior validation and reliability and statistical analysis employs IBM SPSS Statistics Version 24, utilizing descriptive statistics such as frequency, percentage, mean, and and deviation. Predictive factors are explored through a step-by-step linear regression model. Ided a É

**Results:** The study reveals a concerning disturbance in HRQoL among these patients, with a total score of 47.223analyses pinpoint seven key predictive factors among the participants' characteristics: the presence of other and a solution of the seven key predictive factors among the participants' characteristics: the presence of other and the seven key predictive factors among the participants' characteristics: the presence of other and the seven key predictive factors among the participants' characteristics: the presence of other and the seven key predictive factors among the participants' characteristics: the presence of other and the seven key predictive factors among the participants' characteristics: the presence of other and the seven key predictive factors among the participants' characteristics: the presence of other and the seven key predictive factors among the participants' characteristics: the presence of other and the seven key predictive factors among the participants' characteristics: the presence of other and the seven key predictive factors among the participants' characteristics: the presence of other and the seven key predictive factors among the participants' characteristics: the presence of other and the seven key predictive factors among the participants' characteristics: the presence of other and the seven key predictive factors among the participants' characteristics: the presence of other and the seven key predictive factors among the participants' characteristics: the presence of other among the seven key presence of other among the seve utilization of combined treatments, the presence of a colostomy, female gender, housing type, place of residence and unemployment.

**Conclusion:** The findings of this study emphasize the necessity for healthcare providers and health planners to give special consideration to the characteristics of the participants in this patient group. Furthermore, it underscores the importance of future research endeavors aimed at developing interventions that mitigate the adverse effects of disease symptoms on HRQoL among these vulnerable patients.

Keywords: Health-related quality of life, Demographic Factors, Risk Factors, Colorectal Cancer, Oncology

**BMJ** Open

/bmjopen-2024-086544 cted by copyright, incl

graphique de l

#### 1. Introduction

 Colorectal cancer (CRC) is one of the most common cancers globally, and its incidence is projected to increase of 3.2 million new cases with 1.6 million deaths by 2040(1). Developed countries account for more than half (55%) of these cases(2). In Taray, there has been a notable increase in the incidence rate of CRC over the past 25 years(3). Reports indicate that CRC ranks as the fourth most common cancer in Iran, the third most common in Iranian women, and the fifth most common in Iranian men(4). Tragically, CRC claims there is of approximately 30,000 individuals in Iran annually(5, 6). The rise in CRC can be attributed to factors such as increased life experimes of approximately 30,000 advancements in diagnostic and therapeutic methods(7). As the life expectancy of CRC patients has improved there is growing recognition of the importance of addressing their quality of life (QOL) concerns(8). Numerous studies have emphasized the reade durate and evaluation of cancer outcomes in terms of patient survival and QOL during and after treatment(9-11). Assessing the health for durating durating the import of the disease on survivors(10).

HRQoL is a multidimensional concept that encompasses physical, mental, emotional, and social functioning Several factors have been identified as influencing HRQoL in CRC patients, including sociodemographic characteristics, treatment-related factors such as smoking, physical activity, diet, and alcohol consumption(13). HRQoL is significantly associated with non-communicable chronic diseases such as cancer, impacting both physical and mental health outcomes(14). Therefore, evaluating HQQoL can provide valuable information about the physical and mental well-being of cancer patients, their social relationships, and their five all perception of health and well-being(15).

Numerous studies have investigated the factors influencing HRQoL in CRC patients. One of them has showed that specific patient subgroups may be at a higher risk of diminished HRQoL(16). Some others have showed that age,(16-18) gender,(16, 16, 16, 17) income,(19) and education(16, 18) may effect discernment of health. Additionally, cancer-related factors, such as time since diagnosis, cancer recurrence, multiple primary cancers, and recent initiation of cancer treatment, have been associated with HRQoL between genders have yielded variable results, with most studies reporting poorer to group a mong women, although some studies have found no differences in patients living with ostomies. Variations across sociodemographic groups have also been documented(20-24). Furthermore, body mass index and physical activity have been recognized as essentiae factors in HRQoL, with obesity being linked to lower HRQoL(18, 25).

Healthcare providers involved in the care and management of CRC patients should consider HRQoL and its influencing factors (26, 27). Timely identification of patients at risk of impaired HRQoL enables early interventions to enhance their well-being (28). Moreover, the influence of ethnicity, culture, and socioeconomic status can introduce fundamental variations in the factors influencing HRQoL (16, 18, 19, 22). Despite the high prevalence and increasing trend of CRC in Iran, along with the importance of HRQoL, there is a scarcity of organized studies in this

4

5 6

7

8 9 10

11

12 13

14

15

16

17

18

19 20

21

22

23

24

25 26

27

28

29 30

31

32

33

34

35 36

37

38

39

40

41

42 43 44

45 46 47 BMJ Open BMJ Open copyright copyright area. Therefore, this cross-sectional study aims to determine the predictive power of patient characteristics on BRQoL in colorectal cancer Atients in Iran. Methods 1 Ethical consideration In this study, adherence to ethical principles was ensured, and all necessary approvals and permissions war gettained. The research plan patients in Iran.

#### 2. Methods

#### 2.1 Ethical consideration

received approval from the Research Council and the Research Vice-Chancellor of the Faculty of Nursing and Mode are at "Blinded" University. Additionally, permission to conduct the research was obtained from the esteemed Research Vice-Chancellor or Bidded" University of Medical Sciences. The regional ethics committee provided approval with the reference number IR.TBZMED.REC.14g13046. Prior to conducting the study, permission was obtained from the research environment where the investigation took place. The research objectives were clearly explained to the potential participants, and their voluntary participation was sought. In order to safeguard entiality, assurances were given to the participants that their personal information would be treated with utmost confidentiality. Instead be using their actual names, a coding system was employed to anonymize the participants' identities in the questionnaire. The study strict was regarding the use of other research and sources. Proper citation and referencing were employed, acknowled acknowl respecting intellectual property rights. Furthermore, upon request, the research findings were shared transparency and accountability. By adhering to these ethical considerations, the study aimed to protect the rights and well-being of the participants, maintain the confidentiality of their information, and ensure the integrity and reliability of the research findings.

ning

### 2.2 Study design

A cross-sectional study was conducted between April 1, 2022 to May 1, 2022. The target population of this research was patients with colon and rectal cancer; the presence or absence of a colostomy, as well as whether the bag was permanent of temporary, was not taken into account during sampling. All the samples were referred to centers providing outpatient chemotherapy service af or chemotherapy. The method of sampling was available in the form of sampling. The researcher referred to the five hospitals, including Shehid Madani, Shahid Ghazi, Alinasab, Shahriar, and Valiasr in "Blinded". Then asked qualified and interested people to participate in the  $\exists$  tu  $\vec{a}$  to complete the research questionnaire. The method of conducting the present research was that the researcher went to the research exprision of conducting the present research was that the researcher went to the research exprision. permission from the hospital managers, provided questionnaires to the patients when did not disturb the trait the process of the patients. The inclusion criteria include definitive diagnosis of colon and rectal cancer by an oncologist; Being able to communicate; Willingness to participate in the study; Referral for outpatient chemotherapy; Having the patient know about his or her illnes and the type of treatment received. The exclusion criteria include suffering from other chronic diseases such as diabetes, kidney diseases, ang any organ defects that can affect health-related quality of life according to the participants' statements; the presence of cognitive disorates in the person (such as Alzheimer's) according to the statements of the participant or their companions; known mental disorders according to the statement of the ographique de person themselves or their companions or recorded in the file; and unwillingness to participate in the study.

#### 2.3 Sample size calculation

BMJ Open **3 Sample size calculation** In our study, we carefully considered the number of independent factors, which amounted to 22. Adhering 50 "Green's rule of thumb," which suggests that the sample size should be a minimum of 50 plus 8 times the number of predictors, we caculated that a total sample size of 226 would be appropriate (29). This calculation took into account a significance level ( $\alpha$ ) of 0.05 and a des  $\beta = 3$  bower of 0.8. To ensure the detection of a medium effect size (0.14 for small effects, 0.39 for medium effects, and 0.59 for large effects), ad the second a conservative 10% allowance for potential participant dropout, resulting in a minimum sample size of 251 (226 \* 0.9). To det complexity we 24. Downloaded from I ment Superieur (ABES d to text and data min employed Statistics Kingdom as a reliable tool (30).

#### 2.4 Data collection

In this study, two questionnaires were used as follows:

#### 2.4.1 Participants' characteristics

In this study, the characteristics of the patients were assessed through a researcher-designed questionn are interested to capture various demographic and clinical variables, including age, sex, marital status, educational back authout do income adequacy, insurance coverage, place of residence, housing type, type of treatment received, duration of the most recant the most recant the start provide the start type of the start provided the start type of the start provided the history of cancer in both distant and close relatives, presence of cancer metastasis, number of completed cheriotic erapy sessions, concurrent presence of other diseases, duration of surgery (if applicable), weekly exercise frequency, height, weight, and body mass index (BMI). The questionnaire was administered to collect comprehensive data on the participants' characteristics, enabling atharough analysis of the study population. imilar m/ on

min

đ

graphique de l

# 2.4.2 Health-related quality of life questionnaire with 36 questions (SF-36):

The health-related quality of life questionnaire, initially developed by Weber in 1992(31). serves as a fundation of the serves as a the impact of health on individuals' overall quality of life. Comprising 36 questions and encompassing Bight distinct components, this guestionnaire utilizes the Likert scale to measure health-related quality of life. The Likert scale employs a fine-paint rating system, where a score of 1 denotes "completely false," 2 signifies "somewhat false," 3 represents "I don't know," 4 indicates "mostly true," and 5 corresponds to "completely correct". The questionnaire generates scores ranging from zero to 100, without a predetermined dutoff point. Scores in each dimension are interpreted relative to the minimum and maximum values reported for that specific dimension. A higher score indicates a lower level of disability within the corresponding area, while a lower score suggests a higher degree of disability. The fore, the proximity of the score to 100 signifies reduced disability, whereas a closer proximity to 0 indicates increased disability within the 🛱 me area. Researchers may Page 7 of 18

 BMJ Open BMJ Open by copyright open-2024-000 and the second secon to various studies, consistently demonstrating good validity(32-34). Additionally, it exhibits strong reliabilely,  $\hat{\mathbf{x}}$  evidenced by a reported Cronbach's alpha coefficient of 0.92 in a study (33). Importantly, the questionnaire has been appropriately tra lated and standardized for use in Iranian society, ensuring its applicability within this context (35, 36).

### 2.5 Data analysis

 

 Iranian society, ensuring its applicability within this context (35, 36).

 5 Data analysis

 The data analysis was performed using IBM SPSS Statistics version 24. To examine the characteristics of the samples, frequency and the samples of t percentage distributions were employed. Additionally, for variables exhibiting normal distributions, descrip 🖗 Statistics such as mean and standard deviation were utilized. The normality of variable distributions was evaluated using the Kolmogorog Smirnov test, accompanied by Skewness and Kurtosis indices. A significance level of 0.05 was adopted for all tests conducted within this study b investigate the predictive influence of the variables, a step-by-step linear regression model was employed. All variables, including those the multiple categories (which were transformed into dummy variables), were entered into the regression analysis. The variables demore the most substantial predictive effects were selected for inclusion in the subsequent statistical analysis. It is worth noting that the subsequent statistical analysis. mining, quality of life score served as the dependent variable.

### 2.6 Patients and public involvement

Patients and members of the public did not participate in the formulation of the research design, the study, or the ning, and similar communication of the research outcomes. pen.bmj.com/

≥

# 3. Results

Table1. Distribution of frequency and percentage of individual characteristics of samplez Ī

Variable	Classes	Ngvalid Percent)
	30 to 40	୍ଟିଟ୍ର <b>୪</b> ୯୮ (26.2)
<b>A a a</b>	40 to 50	ي پي پي پي پي پي پي پي پي پي پي پي پي پي
Age	50 to 60	ູ <sup>2</sup> ອົ5 (37.1)
	More than 60	<b>4</b> 8 (18.8)
Sev	Male	Ë29 (50.4)
Sex	Female	27 (49.6)
	Single	డ్డ22 (8.6)
For pee	er review only - http://bmjopen.bmj.com/site/about/guideling	es.xhtml de

	BMJ Open	omjop ted by
		en-2024- r copyrig
Marital Status	Married	ਸ਼ੂ ਲੈੱ ਤਾਂ ਲੈੱਸ (80.5)
	Divorced and widowed	<u>ੇ</u> ਡੈ8 (10.9)
	Under Diploma	ສິ ຊື້0 (19.5)
Education	Diploma	స్థ్రి (28.5)
Education	Bachelor	ຼຼ ແລະ ເຊິ່ງ (31.6)
	Post Graduate	<u> </u>
lob	Employed	<u>ຕໍ່ອັ</u> 🛱 66 (64.8)
300	Unemployed	<u>e s ko (35.2)</u>
	Income Equals Expenditure	o ž ja 8 (53.9)
Income Adequacy	Income More Than Expenditure	<u> </u>
	Income Less Than Expenditure	an er g 6 (29.7)
	Yes	<u>ର</u> ଁ ଅଥିଃ (89.1)
	No	a ≥ ₹8 (10.9)
Location	City	<u><u> </u></u>
Location	Village	र्ख <sup>.</sup> 🔁 6 (6.3)
	Personal	<u>≥</u> 228 (89.1)
	Rent	
Type of Treatment	Only Chemotherapy	ຼຼຸ ເວັ້ 🖁 1 (31.6)
	Chemotherapy-Radiotherapy-surgery	ຼືອ 🧕 🦉 8 (38.3)
	Chemotherapy-surgery	<u>ຼິ</u>
Time of Last Chemotherapy	<5	<u>n</u> <b>2</b> 32 (90.6)
The of East offollouidrapy	≥5-10	<sup>™</sup>
(week)	Mean (SD)	ర్జో శ్రా్ 10 (4.04)
<b>Comily ( Linton (</b>	Positive	응 <b>12</b> 1 (47.3)
Family History	Negative	<u>Ģ</u> i <b>33</b> 5 (52.7)
Mataataala	Yes	
Melaslasis	No	<b>j</b> 07 (41.8)
	<10	<b>13</b> 7 (53.5)
Number of Chemotherapy	≥10-20	84 (32.8)
Courses (Number)	≥20-30	<u></u>
	Mean (SD)	<u>କ୍</u> ଷି34 (6.98)
		phiq
Earboark	wiew only - http://bmiopen.hmi.com/site/about/guidelines	

	BMJ Open	/bmjopen-2024 cted by copyri
Another Disease Resides Capeer	Yes	<u>,</u>
Another Disease Desides Calicer	No	<u>୍ର</u> ଟ୍ରିରେ (58.6)
	1-10≥	
Time of Last Surgery (Month)	11-20 And more	ຊຶ່3 (12.9)
	Mean (SD)	ຼຼຸ ແຜຼ້11 (5.52)
	≤10	<sup>8</sup> 229 (89.5)
Exercise (Hour / Week)	10-20 And more	e g 27 (10.5)
	Mean (SD)	ີ້ຂີ້ ອຶ່ງສີ່ວິຊ42 (3.84)
Sexually Active Before the	Active	ថ្មី ដី <u>ដ</u> ូ51 (98)
Sexually Active Defore the	Not Active	ex So (2)
Disease		nloa ancie
	45-65	<u>ລິຊ</u> <u>ຮ</u> ີ3 (24.6)
	≥65-85	a a a a a a a a a a a a a a a a a a a
vveight (kg)	≥85-105	희.(S) 57 (26.2)
	Mean (SD)	ب <sup>6</sup> 7 <b>4</b> 71 (14.42)
	70-130	<u>≥</u> §3 (1.2)
Height (cm)	≥ <b>130-192</b>	an z53 (98.8)
<b>č</b> ( <i>)</i>	Mean (SD)	.34 (13.48)
	<18.5	ង្ 🔄 2 (4.7)
	≥18.5-25	<u><u><u></u><u></u><u></u><u></u><u></u><u></u><u></u><u></u><u></u><u></u><u></u><u></u><u></u><u></u><u></u></u><u></u><u></u><u></u><u></u></u>
Body Mass Index (kg/m <sup>2</sup> )	≥25-30	
, a a a ( ),	≥30	<sup>™</sup> ž4 (21.1)
	Mean (SD)	출 2 <b>ছ</b> .88 (4.74)
	With	ੇ 127 (49.6)
Having Colostomy	Without	<u>ଜ</u> ୍ଜ ଅଥି (50.4)
		<u> </u>

Table 1 depicts the characteristics of the study participants. In accordance with the inclusion and exclusion criteria, a total of 256 patients consented to participate in the study and diligently completed the questionnaires. Among these participants, 199 were male (49.6%), with 49.6% of males possessing a colostomy bag and 51.2% without. Similarly, 127 female patients were included (50.4%), with 50.4% of females exhibiting a colostomy bag and 48.8% without. The majority of the participants (206 individuals) were married. Regarding the distribution of age, the highest frequency (67 individuals) was observed within the 30-40 years age range, while the lowes regarding the distribution of

raphique de l

BMJ Open pertained to the age range exceeding 60 years. One hundred ninety-six participants acknowledged having childen. Concerning educational attainment, the majority (81 individuals) possessed a bachelor's degree, followed by 50 individuals with a dolora Among the sample, 166 participants were employed. Furthermore, 138 individuals indicated that their income matched their expenses, and insurance coverage was reported by 228 participants. In terms of the duration since their disease diagnosis, the highest proportion (126%) reported a duration of ten months. Two hundred forty participants resided in urban areas, and within this group, 228 lived in their own zes ences. With respect to the type of treatment received, 81 patients underwent chemotherapy exclusively, 98 patients received a comparison of chemotherapy, radiotherapy, and surgery, and 77 patients underwent chemotherapy in conjunction with surgery. Of the 232 are the completed the guestionnaire, two weeks had transpired since their most recent chemotherapy session. One hundred twenty additional a positive family history of cancer, while in 149 cases, the tumor had metastasized to different regions of the bod for concerning the number of chemotherapy courses, 137 patients received 1-10 courses. Additionally, 106 patients exhibited at least one work of a condition alongside cancer. The majority of participants (223 individuals) disclosed that 1-10 months had elapsed since their not the surgery. Among the sample, 229 individuals engaged in sports activities for less than 10 hours per week. Two hundred fifty-one pair icipants asserted that they were sexually active prior to their disease diagnosis and commencement of treatment. In terms of weight deriver to their disease diagnosis and commencement of treatment. between 45-65 kg, 126 patients fell within the 65-85 kg range, and 67 patients registered a weight of 85-105 😹 🛱 the majority of participants (253 individuals) exhibited heights ranging from 130-192 cm. Regarding body mass index (BMI), the majority 123 individuals) fell within the 18.5-25 range. Notably, the participant characteristic questionnaire did not include any information regarding cancer stage.

Items			95% CI	
	Mean	SD	Min-Max	
Physical Functioning	44.96	30.97	0-100	
Role Limitations due to Physical	62.40	10 61	0 100	
Health	02.40	40.04	0-100	
Role Limitations due to Emotional	62.06	41.04	0 100	
Problems	02.00	41.04	0-100	

#### For peer review only - http://bmjopen.bmj.com/site/about/guidelines.xhtml

Page 11 of 18

Table 2 presents the comprehensive assessment of health-related quality of life (HRQoL) scores and their respective dimensions. The average score obtained (Mean=47.42, SD=16.76, Min=6, Max=75) highlights the range of values observed within the entire group, as indicated in Table 2. Notably, according to the analysis guidelines for the questionnaire, a score of 50 can be considered as a crucial fire hold for evaluating HRQoL. Comparatively, when considering scores obtained from a similar study conducted in Iran (Mean=70.92, SD=1556, Min=67.97, Max=73.86), it becomes apparent that our patients exhibit significant disturbances in their HRQoL. This finding adds an intriguing aspect to the investigation, emphasizing the need for further exploration and potential interventions to address the compromised well-being the se individuals.

Table.3 Results from stepwise multiple regression for total score of HRQoL				
FACTORS	β (95% Cl)	Beta*	P Value	
Another Disease Besides Cancer (yes)	12.91 (8.40, 17.42)	0.38	<sup>°</sup> <b>0</b> .001>	
Type of Treatment (Chemotherapy-surgery)	9.10 (4.12, 14.09)	0.25	<mark>ه</mark> .001>	
Having Colostomy (With)	10.27 (5.70 <i>,</i> 14.84)	0.30	<u>ື</u> .001>	
For peer review only - http://bmjopen.bmj.com/site/about/guidelines.xhtml				

	BMJ Open		mjopen-2024-0 ed by copyrigh
Sex (Male)	-4.52 (-8.95, -0.08)	-0.13	rt, inc. <b>10.046</b>
Housing Type (Personal)	11.25 (4.77, 17.73)	0.22	uding <b>90.001</b>
Location (Village)	17.74 (6.51, 28.96)	0.20	
Job (Employed)	-7.47 (-12.31, -2.63)	-0.21	
R Square: 0.458 (Adjusted R Square: 0.428) * Standardized beta coefficient			r 2024. E gnement lated to
			tế v v

Table 3 summarizes the results of a stepwise regression analysis conducted on 22 factors to determine their in the total health-related quality of life score. Among these variables, seven were found to have a significant effect on the outcome measure. The "Location" variable exhibited the most substantial influence, with a standardized beta value and a 95% confidence interval ranging fro 局 5.81 to 28.96 (P=0.002). These findings highlight the importance of considering the "Location" variable in understanding and improving overall hat a considering the location of life. The significance of these results brings excitement and underscores their potential implications for future research and interventions targeting the Ģ٠ :tp://bm enhancement of health-related guality of life in the studied population. Al trai

# 4. Discussion

HRQoL has emerged as a crucial outcome measure for patients afflicted with CRC(37). HRQoL goes beyond the wall-being of cancer patients, as it also influences treatment response and survival rates. Several studies have extensively examined factors that in bace HRQoL assessment in CRC, highlighting the substantial influence of symptoms, surgical procedures, and comorbidity burden on overall well being (8). The aim of this study was to assess the influential factors associating HRQoL in individuals with colorectal cancer and provide acomprehensive analysis of its dimensions. The study findings revealed consistently low scores in various domains of HRQoL among individuals with colorectal cancer. This suggests that the challenges posed by cancer and its treatment have a detrimental impact on the HRQoL experienced by cancer and its treatment have a detrimental impact on the HRQoL experienced by cancer and its treatment have a detrimental impact on the HRQoL experienced by cancer and its treatment have a detrimental impact on the HRQoL experienced by cancer and its treatment have a detrimental impact on the HRQoL experienced by cancer and its treatment have a detrimental impact on the HRQoL experienced by cancer and its treatment have a detrimental impact on the HRQoL experienced by cancer and its treatment have a detrimental impact on the HRQoL experienced by cancer and its treatment have a detrimental impact on the HRQoL experienced by the impact on the impact on the HRQoL experienced by the impact on the impact on the HRQoL experienced by the impact on the i cancer. These findings are consistent with previous studies reporting unfavorable HRQoL outcomes among CROpatients (38-40). Furthermore, systematic reviews conducted across diverse literature sources have consistently demonstrated a significant decle inquality of life among these patients (41, 42).

In this study, a comprehensive assessment and comparison of the eight dimensions of HRQoL were conducted. The results indicated that the dimension with the lowest score was general health, followed by physical performance and pain. Conversely, emgetional health obtained the highest score, followed by role limitations due to physical health status and role limitations due to emotional problems. These findings align with a related study by Domati et al., which examined HRQoL scores in men and women with colorectal cancer compare to healthy individuals (43). However, disparities between our study and the previous one may be attributed to factors such as participant characeristics, sample size, as well

ğ ₽

ohique

de

Page 13 of 18

5

6

7

8 9

10 11

12

13

14

15

16 17

18

19

20

21 22

23

24

25

26

27 28

29

30

31

32

33

34 35

36

37

38 39

40

41

42 43 44

45 46 47 BMJ Open as cultural, economic, and social variations. Additionally, our study established a correlation between low physical functioning and disability, leading to a loss of independence (44). Previous studies have also highlighted the importance of understanding how obtomies impact HRQoL, as it can inform and prepare patients prior to surgery (45). Therefore, comprehensive knowledge and enhanced plesical functioning are crucial in improving the physical dimensions of HRQoL and overall well-being. These findings emphasize the need for on blog sts, psychiatrists, oncology nurses, and health planners to prioritize the quality of life among individuals associated by CRC. By addressin 🖞 th dimensions and promoting patient adaptation, efforts can be made to enhance the overall quality of life, particularly in the afore and dimensions.

Moreover, in accordance with the findings of the present study, it was ascertained that certain participant charado stics exerted considerable predictive power over the overall health-related quality of life (HRQoL) score. Specifically, the following factors den a significant influence: 1) Another disease besides cancer: Individuals afflicted with diseases other than cancer exhibited higher HRQoL scores compared to those devoid of such conditions. 2) Type of treatment: Pertaining to the administered treatment, individuals who under defected treatment, as well as chemotherapy-radiotherapy-surgery, demonstrated superior HRQoL scores in contrast to those who exclusively 👼 🖉 ed chemotherapy-surgery. 3) Having colostomy: Participants without a colostomy bag reported higher HRQoL scores relative to their count abarts with a colostomy bag. 4) Sex: Females displayed lower HRQoL scores when juxtaposed with males. 5) Housing type: Tenants exhibited eleva to individuals who resided in their own homes. 6) Location: Urban residents demonstrated higher HRQoL scores zers us their rural counterparts. 7) Job: Individuals lacking employment exhibited diminished HRQoL scores in contrast to those with gainful engineering not be with gainful engineering to the second score and te comparisons yielded statistically significant results. Noteworthy investigations conducted by Naomi et al. (46) delinerated potential factors that impact HRQoL, encompassing age, gender, marital status, employment status, number of family members, winner elapsed since colostomy placement, and disease diagnosis. Likewise, Kristensen et al. (47) conducted a multifactorial analysis, revealing a ignificant association between stoma dysfunction, measured by the Confidence Interval (CI) score, young age, single or widowed status, unemployment, and the financial burden emanating from the stoma, with diminished HRQoL. Moreover, Dahouri et al. (48). undertook a comparative study assessing HRQoL among colorectal cancer patients, with and without a colostomy bag, and evinced a notable difference in HRQoL scores between the two groups. The dissimilarities in factors influencing health-related quality of life observed between the present study and othe Hinv stigations can plausibly be attributed to the variances in cultural contexts across distinct societies. This observation holds true at the individual eval as well, given that cultural considerations and interpersonal disparities give rise to divergent responses to problems. Individuals are not uniformly impacted by common predicaments, and their coping mechanisms and adaptive strategies are subject to variation. Additionally, disparides in the socioeconomic status of communities may serve as another pivotal determinant influencing the findings. In our study, conducted in Iran, education, factors such as housing type, geographical location, and the type of treatment received, which bear a direct correlation to patiBints' income, have emerged as influential factors impacting health-related quality of life. Consequently, based on the findings of the present study and prior scholarly research, it is conceivable to infer that factors such as the presence of a colostomy, unemployment, female gender, and comorbalities accompanying cancer constitute pivotal determinants influencing HRQoL. Furthermore, it is imperative for health policymakers at the macromevel to duly consider these factors and provide micro-level healthcare services. When faced with individuals associated by colorectal cancer, computing a comprehensive

aphique de l

wnloa

BMJ Open BMJ Open by copyright open-2024 assessment and recognizing the aforementioned factors as risk factors for declining HRQoL can effectively facilitate the dentification of individuals nclud at risk. Timely interventions hold the potential to enhance HRQoL and furnish avenues for its amelioration. 4

Furthermore, it is imperative to acknowledge the implications of the present study's findings for future interventions at mitigating the negative impact of disease symptoms on the HRQoL of CRC patients. Prospective longitudinal research enders should comprehensively evaluate the influence of various factors, including lifestyle choices, health behaviors, psychological determinan and other relevant variables, on HRQoL outcomes. As the population of cancer survivors continues to grow, addressing the multidimensional 35 acts of HRQoL through longterm nursing care provisions becomes increasingly crucial. This study highlights the robust correlation between so a characteristic factors and the overall HRQoL score among CRC patients. The identification of these socio-demographic factors underscores the 🛱 🗟 mificance in the treatment and care of CRC patients, necessitating healthcare professionals to consider them in their clinical practice to enh and englished outcomes.

#### 5. Conclusion

5 6

7

8

9

10 11

12

13

14

15

16 17

18

19

20

21 22

23 24

25

26

27

28

29 30

31

32

33

34

35

36

37

38

39

40

45 46 47

In conclusion, this study contributes to our understanding of the factors influencing HRQoL in CRC patiens at emphasizes the need to integrate these factors into treatment and care practices to improve patients' well-being and HRQoL outcomes. Healthcare professionals should prioritize the quality of life of CRC patients and tailor interventions accordingly. By addressing the infleed in this study, healthcare providers can significantly enhance HRQoL outcomes in CRC patients. Future research shound focus on developing targeted interventions and conducting longitudinal studies to further explore the multidimensional aspects of HRQoL in the patient population.

Strengths and limitations: It is crucial to acknowledge both the strengths and limitations of this study. The atilization of a well-established instrument to assess HRQoL is a notable strength. Nevertheless, it is essential to consider the influence of cultural 🛱 ctors on the results. as cultural context can shape HRQoL experiences. Future studies should explore this aspect in various cultural contexts to en and the generalizability of the findings. Additionally, addressing the study's time limitations and sample size in future research would further in prover its applicability. Although efforts were made to ensure data anonymity and confidentiality, the reliance on self-reported questionnaires anappin introduce intentional and unintentional biases. Furthermore, the cross-sectional nature of the study and the 100% response rate among participants may introduce selection bias. These limitations should be carefully considered when interpreting the results. nologies.

# References

11, 2025 Morgan E, Arnold M, Gini A, Lorenzoni V, Cabasag C, Laversanne M, et al. Global burden of colorectal cancer 🙀 2020 and 2040: incidence 1. and mortality estimates from GLOBOCAN. Gut. 2023;72(2):338-44.

Hasanpour-Heidari S, Fazel A, Semnani S, Khandoozi S-R, Amiriani T, Sedaghat S, et al. Temporal and geograp B cal variations in colorectal 2. cancer incidence in Northern Iran 2004–2013. Cancer Epidemiology. 2019;59:143-7.

Ostadghaderi M, Hanafi Bojd A, Nematollahi S, Holakoui-Naeini K. Spatial Analysis of Factors Affecting Colore al Cancer Using the Model 3. of Geographical Weight Regression in Iran. Iranian Journal of Epidemiology. 2021;17(1):1-12. ographique de

Page 15 of 18	BMJ Open	/bmjop
1		ven-2(
2		024- Vrio
3	A Abbastabar H. Roustazadeh A. Alizadeh A. Hamidifard P. Valinour M. Valinour AA. Relationshins of colore	Tal Concer with dietary factors
4	and public health indicators: an ecological study. Asian Pacific Journal of Cancer Prevention. 2015:16(9):3991-5	n 4
5	5 Khademi IKH Tehnizi MAH Shafizad S. The Effect Of Self-Care Education Program On Self-Efficacy And O	E F Belite Of Life Of Patients With
6	Colorectal Cancer Undergoing Chemotherapy Preventive Medicine 2021;8(2):0-	
7	6 Collatuzzo G. Sevvedsalehi MS. Rezaeianzadeh A. Marzhan M. Rashidian H. Hadii M. et al. Consumption o	Yowhurt and Other Dairy
8	Products and Risk of Colorectal Cancer in Iran: The IROPICAN Study, Nutrients, 2022;14(12):2506	s ma
10	7. Mohammadi E. Aminorroaya A. Fattahi N. Azadnajafabad S. Rezaej N. Farzi Y. et al. Epidemiologic pattern	og ⊐ ∃ ∽oficancers in Iran: current
11	knowledge and future perspective. Journal of Diabetes & Metabolic Disorders. 2021;20(1):825-9	reign
12	8. Marventano S. Foriaz MJ. Grosso G. Mistretta A. Giorgianni G. Platania A. et al. Health related guality of li	e anx colorectal cancer patients:
13	state of the art. BMC surgery. 2013:13(2):1-7.	to the second seco
14	9. Moinpour CM, Sawyers Triplett J, McKnight B, Lovato LC, Upchurch C, Leichman CG, et al. Challenges pos	non-random missing
15	guality of life data in an advanced-stage colorectal cancer clinical trial. Psycho-Oncology: Journal of the Psycholog	c a social and Behavioral
10 17	Dimensions of Cancer. 2000;9(4):340-54.	nieu Julieu
18	10. Mozafar Saadati H, Khodamoradi F, Salehiniya H. Associated factors of survival rate and screening for colo	arectal cancer in Iran: a
19	systematic review. Journal of Gastrointestinal cancer. 2020;51:401-11.	
20	11. Weis J, Gschwendtner K, Güthlin C, Holmberg C, Horneber M. Utilisation of complementary medicine in c	ane patients and survivors:
21	Expected benefits and its association to psychosocial factors. European Journal of Cancer Care. 2022;31(6):e1369	Ð, <del>ti</del>
22	12. Ratliff CR, Haugen V. Selecting a tool for assessing health-related quality of life in ostomates. Journal of W	ostomy & Continence
23	Nursing. 2013;40(5):462-7.	ain Jor
24 25	13. Tiselius C, Rosenblad A, Strand E, Smedh K. Risk factors for poor health-related quality of life in patients v	th golon cancer include stoma
26	and smoking habits. Health and Quality of Life Outcomes. 2021;19(1):1-11.	an m
27	14. Xiao M, Zhang F, Xiao N, Bu X, Tang X, Long Q. Health-related quality of life of hypertension patients: A po	Bulation-based cross-sectional
28	study in Chongqing, China. International journal of environmental research and public health. 2019;16(13):2348.	
29	15. Rodriguez JL, Hawkins NA, Berkowitz Z, Li C. Factors associated with health-related quality of life among o	elorgectal cancer survivors.
30	American journal of preventive medicine. 2015;49(6):S518-S27.	Le Jur
37	16. Weaver KE, Forsythe LP, Reeve BB, Alfano CM, Rodriguez JL, Sabatino SA, et al. Mental and Physical Healt	B-Related Quality of Life
33	among US Cancer Survivors: Population Estimates from the 2010 National Health Interview SurveyHealth-Related	Quality of Life among US
34	Cancer Survivors. Cancer Epidemiology, Biomarkers & Prevention. 2012;21(11):2108-17.	
35	17. Irentham-Dietz A, Remington P, Moinpour C, Hampton JM, Sapp A, Newcomb P. Health-related quality o	f life in female long-term
36	colorectal cancer survivors. The oncologist. 2003;8(4):342-9.	<b>A</b>
37	18. Jansen L, Koch L, Brenner H, Arndt V. Quality of life among long-term (≥ 5 years) colorectal cancer survive	ors-systematic review.
38	European Journal of cancer. 2010;46(16):2879-88.	
40	19. Ramsey SD, Berry K, Woinpour C, Gledzinska A, Andersen MK. Quality of life in long term Survivors of Cold	
41	Journal of Basil Generology. 2002;37(3):1228-34.	iog
42		rap
43		hiq
44	For neer review only - http://bmionen.hmi.com/site/about/quidalinas.yhtml	e c
45	For peer review only - http://binjopen.binj.com/site/about/guidelines.xhtml	Хe

\_

BMJ Open	/bmjop	
	y cop	
	024-C	
20. Mahjoubi B, Mirzaei R, Azizi R, Jafarinia M, Zahedi-Shoolami L. A cross-sectional survey of quality of life	life in color tron	n
<ul> <li>Verweij N, Bonhof C, Schiphorst A, Maas H, Mols F, Pronk A, et al. Quality of life in elderly patients wit</li> </ul>	vith a study from the	
population-based PROFILES registry. Colorectal Disease. 2018;20(4):092-0102.	te the relationshin hetween soci	0-
demographic factors and quality of life in patients with a permanent colostomy. Ostomy Wound Management	nt. 2019	<u>)</u> -
23. Krouse RS, Herrinton LJ, Grant M, Wendel CS, Green SB, Mohler MJ, et al. Health-related quality of life	ife an of a group of a start of a	r
survivors with an ostomy: manifestations by sex. J Clin Oncol. 2009;27(28):4664-70.	elate	
24. Sideris L, Zenasni F, Vernerey D, Dauchy S, Lasser P, Pignon J-P, et al. Quality of life of patients operate	ited on the second	act
of the type of surgery and patients' characteristics. Diseases of the Colon & Rectum. 2005;48:2180-91.	$D_{rel}$	ctal
cancer survivors. Cancer Causes & Control. 2014;25:99-110.		Jui
26. Behroozian T, Fatima S, Finkelstein S, Kanee L, Bonomo P, Wolf JR, et al. Current quality of life assessm	smen teges may not fully address	S
dermatological adverse events from anti-cancer therapies. Supportive Care in Cancer. 2022:1-5.	d fr (Al	
27. Al-Habsi Z, Al-Noumani H, Al Hashmi I. Determinants of health-related quality of life among Omanis ho	hospea端울d patients with cancer	:: а
cross-sectional study. Quality of Life Research. 2022;31(7):2061-70.	functional aspects and health-	
related quality of life in patients with colorectal cancer: can handgrip strength be the measure of choice in clir	linica Foractice? Supportive Care	in
Cancer. 2023;31(2):144.	rain njog	
29. Green SB. How Many Subjects Does It Take To Do A Regression Analysis. Multivariate Behavioral Reserved	searca 1991;26(3):499-510.	
30. Mann Whitney U test calculator [Internet] 2017 [Available from: <u>http://www.statskingdom.com/170n</u>	<u>Dmedign Snann whitney.html</u>	
31. Alisherovna KM, Erkinovna KZ, Jamshedovna KD, Toshtemirovna EMm. Study of qualityof life indicator disease using the sf 26 quastionnaire. Web of Scientist: International Scientific Persoarch Journal, 2022;2(5):55	ors in patients with coronary hea	irt
32. Montazeri DA, Goshtashi DA, Nia MSV, Translation, Determination of Reliability And Validity Of Persia	sian Version Of SE-36 Standard to	ol.
Payesh. 2006;5(1):0	r tec	
33. Rifati S, Bagheri Z, Jafari P, Soltani N. Using Confirmatory Factor Analysis To Evaluate The Structure Of	Df quغخtia الم The Persian Versio	วท
Of The SF-36 Questionnaire In Healthy Individuals And People With Chronic Diseases. (MEDICAL JOURNAL OF H	F HORMOZGAN UNIVERSITY).	
2015;19(2): 24 Niloofar M. Avatollah SA. Zare N. Ali SHA. Evaluation Of Validity And Poliability Of A 26-Itom General F	e S Haalth Agreesment Questionnai	ro In
Shiraz Medical School-2001.		ie in
35. Asadollahi A, Ismaeli A, Fani-Saberi L. Validity and Reliability of Quality of life test among Ahwaz Older	er Adults 🛱 2016. Sociological	
studies. 2016;9(32):7-15.	nce	
36. Motamed N, Ayatollahi A, Zare N, Sadeghi Hassanabadi A. Validity and reliability of the Persian transla	ilation of 👺 e SF-36 version 2	
questionnaire. EMHJ-Eastern Mediterranean Health Journal, 11 (3), 349-357, 2005. 2005.	liog	
	raph	
	niqu	
For peer review only - http://bmjopen.bmj.com/site/about/guidelines.xhtml	e de	
	-	

Page 17 of 18

17 of 18	BMJ Open	/bmjope
	<ol> <li>Osoba D. Lessons learned from measuring health-related quality of life in oncology: 1. Rehabilitation Origon Sociation with health-related quality of life among colorectal cancer patients. Journal of Cancer Survivorship. 200;12(5):1237.</li> <li>Gjaic B, Nattenmüller J, Schneider M, Kulu Y, Syrjala KL, Böhm J, et al. The role of CT-quantified body control and colorectal cancer patients: the colocare study. Nutrients. 2020;12(5):1237.</li> <li>Halami Y, Essangri H, Majbar MA, Boutayeb S, Benamr S, El Malki HO, et al. Psychometric validation of the CDQC QLQ-G30 in colorectal cancer patients: the colocare study. Nutrients. 2020;12(5):1237.</li> <li>Flymm R, Mahic S, Grov EK, Joranger P. Health-related quality of life in patients with colorectal cancer in systematic review and meta-analysis. BMC Palliative Care. 2013;26(5):66-72.</li> <li>Domati F, Luppi G, Reggiani-Bonetti L, Zironi S, Depenni R, Fontana A, et al. The perception of health-related quality of life necessary. 2019;58(5):66-72.</li> <li>Domati F, Luppi G, Reggiani-Bonetti L, Zironi S, Depenni R, Fontana A, et al. The perception of health-related control concertal cancer and systematic review of the impact of demographic and socioeccompositomication; 2007.</li> <li>Näsvall P, Oahlstrand U, Löwenmark T, Rutegård J, Gunnarsson U, Strigård K. Quality of Life In Patients Weat and Stright M, Kazuma K. Health-Related Quality Of Life Among Persons Living In Japan With A Perman Structure of Long-term health-related quality of life in 10 countries. BIS Open. 2022;6(6):zrac085.</li> <li>Dahouri A, Sahebihagh M. Comparison of health-related quality of life in people with colorectal cancer at natorize program. 2005;32(3):178-83.</li> <li>Yristensen HØ, Thyø A, Emmettsen KJ, Smart NJ, Pinkney T, Warwick AM, et al. Surviving rectal cancer at surve of long-term health-related quality of life in 10 countries. BIS Open. 2022;6(6):zrac085.</li> <li>Dahouri A, Sahebihagh M. Comparison of health-related quality of life in p</li></ol>	<ul> <li>Agence Bibliographique de</li> <li>Agence Bibliographique de</li> <li>Agence Bibliographique de</li> </ul>

Enseignement Superieur (ABES) . Protected by copyright, including for uses related to text and data mining, Al training, and similar technologies.

2
3
1
4 7
5
6
7
8
9
10
10
11
12
13
14
15
16
10
17
18
19
20
21
22
22
23
24
25
26
27
20
20
29
30
31
32
33
24
54
35
36
37
38
30
10
40
41
42
43
44
45
16
40
4/
48
49
50
51
57
52
53
54
55
56
57
58
50
27

60

STROBE Statement—	-Checklist of items that should be included in reports of <i>cross-sec</i>	tional studies
DIRODE Statement	encennist er nemis und snould be meruded in repents er eress see	Nonne Steres

	Item No	Recommendation	Page No.
Title and abstract	1	(a) Indicate the study's design with a commonly used term in the title or the abstract $\checkmark$	1
		(b) Provide in the abstract an informative and balanced summary of what was done and what was found $\checkmark$	1
Introduction			
Background/rationale	2	Explain the scientific background and rationale for the investigation being reported $\checkmark$	2
Objectives	3	State specific objectives, including any prespecified hypotheses 🗸	2
Methods		A	
Study design	4	Present key elements of study design early in the paper $\checkmark$	3
Setting	5	Describe the setting, locations, and relevant dates, including periods of recruitment, exposure, follow-up, and data collection $\checkmark$	3 & 4
Participants	6	(a) Give the eligibility criteria, and the sources and methods of selection of participants $\checkmark$	4
Variables	7	Clearly define all outcomes, exposures, predictors, potential confounders, and effect modifiers. Give diagnostic criteria, if applicable $\checkmark$	3, 4 & 5
Data sources/ measurement	8*	For each variable of interest, give sources of data and details of methods of assessment (measurement). Describe comparability of assessment methods if there is more than one group $\checkmark$	3, 4 & 5
Bias	9	Describe any efforts to address potential sources of bias 🗸	4 & 5
Study size	10	Explain how the study size was arrived at $\checkmark$	3
Quantitative variables	11	Explain how quantitative variables were handled in the analyses. If applicable, describe which groupings were chosen and why $\checkmark$	3, 4 & 5
Statistical methods	12	( <i>a</i> ) Describe all statistical methods, including those used to control for confounding ✓	5
		(b) Describe any methods used to examine subgroups and interactions $\checkmark$	5
		(c) Explain how missing data were addressed $\checkmark$	5
		( <i>d</i> ) If applicable, describe analytical methods taking account of sampling strategy ✓	5
		( <i><u>e</u></i> ) Describe any sensitivity analyses $\checkmark$	5
Results			
Participants	13*	(a) Report numbers of individuals at each stage of study—eg numbers potentially eligible, examined for eligibility, confirmed eligible, included in the study completing follow-up, and analysed $\checkmark$	6, 7 & 8
		(b) Give reasons for non-participation at each stage	6.7 & 8
		(c) Consider use of a flow diagram ✓	6.7&8
Descriptive data	14*	(a) Give characteristics of study participants (eg demographic, clinical, social) and information on exposures and potential confounders $\checkmark$	6, 7 & 8
		(b) Indicate number of participants with missing data for each variable of interest $\checkmark$	6, 7 & 8
Outcome data	15*	Report numbers of outcome events or summary measures $\checkmark$	9 & 10
Main results	16	<ul> <li>(a) Give unadjusted estimates and, if applicable, confounder-adjusted estimates and their precision (eg, 95% confidence interval). Make clear which confounders were adjusted for and why they were included ✓</li> </ul>	9 & 10

		( <i>b</i> ) Report category boundaries when continuous variables were categorized	9 & 10
		(c) If relevant, consider translating estimates of relative risk into absolute risk for a meaningful time period $\checkmark$	9 & 10
Other analyses	17	Report other analyses done—eg analyses of subgroups and interactions, and sensitivity analyses $\checkmark$	
Discussion			
Key results	18	Summarise key results with reference to study objectives $\checkmark$	11 & 12
Limitations	19	Discuss limitations of the study, taking into account sources of potential	
		bias or imprecision. Discuss both direction and magnitude of any potential	11 & 12
		bias 🗸	
Interpretation	20	Give a cautious overall interpretation of results considering objectives,	
		limitations, multiplicity of analyses, results from similar studies, and other	11 & 12
		relevant evidence 🗸	
Generalisability	21	Discuss the generalisability (external validity) of the study results $\checkmark$	11 & 12
Other information			
Funding	22	Give the source of funding and the role of the funders for the present study	Title
		and, if applicable, for the original study on which the present article is based	nago
			page

\*Give information separately for exposed and unexposed groups.

Note: An Explanation and Elaboration article discusses each checklist item and gives methodological background and published examples of transparent reporting. The STROBE checklist is best used in conjunction with this article (freely available on the Web sites of PLoS Medicine at http://www.plosmedicine.org/, Annals of Internal Medicine at http://www.annals.org/, and Epidemiology at http://www.epidem.com/). Information on the STROBE Initiative is available at www.strobe-statement.org.

**BMJ** Open

# **BMJ Open**

# Predictive Factors Associated with Health-Related Quality of Life in Patients with Colorectal Cancer in Iran: A Cross-Sectional Study

Journal:	BMJ Open
Manuscript ID	bmjopen-2024-086544.R1
Article Type:	Original research
Date Submitted by the Author:	16-Jul-2024
Complete List of Authors:	dahouri, amirmohammad; Tabriz University of Medical Sciences, Community health nursing Sahebihagh, Mohammad Hasan; Tabriz University of Medical Sciences, Department of Community Health Nursing Gilani, Neda; Tabriz University of Medical Sciences
<b>Primary Subject Heading</b> :	Oncology
Secondary Subject Heading:	Nursing, Oncology
Keywords:	Risk Factors, ONCOLOGY, Aging, Chronic Disease, Gastrointestinal tumours < GASTROENTEROLOGY, Public health < INFECTIOUS DISEASES





I, the Submitting Author has the right to grant and does grant on behalf of all authors of the Work (as defined in the below author licence), an exclusive licence and/or a non-exclusive licence for contributions from authors who are: i) UK Crown employees; ii) where BMJ has agreed a CC-BY licence shall apply, and/or iii) in accordance with the terms applicable for US Federal Government officers or employees acting as part of their official duties; on a worldwide, perpetual, irrevocable, royalty-free basis to BMJ Publishing Group Ltd ("BMJ") its licensees and where the relevant Journal is co-owned by BMJ to the co-owners of the Journal, to publish the Work in this journal and any other BMJ products and to exploit all rights, as set out in our <u>licence</u>.

The Submitting Author accepts and understands that any supply made under these terms is made by BMJ to the Submitting Author unless you are acting as an employee on behalf of your employer or a postgraduate student of an affiliated institution which is paying any applicable article publishing charge ("APC") for Open Access articles. Where the Submitting Author wishes to make the Work available on an Open Access basis (and intends to pay the relevant APC), the terms of reuse of such Open Access shall be governed by a Creative Commons licence – details of these licences and which <u>Creative Commons</u> licence will apply to this Work are set out in our licence referred to above.

Other than as permitted in any relevant BMJ Author's Self Archiving Policies, I confirm this Work has not been accepted for publication elsewhere, is not being considered for publication elsewhere and does not duplicate material already published. I confirm all authors consent to publication of this Work and authorise the granting of this licence.

terez oni

Enseignement Superieur (ABES) Protected by copyright, including for uses related to text and data mining, AI training, and similar technologies



	BMJ Open	cted	/bmjc
		b۷	ope
	1	ŝ	n-2
1		Yr.	02
2		iah	
3			865
4 5	"Predictive Factors Associated with Health-Related Quality of Life in Patients with Colorectal Cancer in Iran: A	ជ្ថី០ខ	Sectional Study"
5	Amirmohammad Dahouri <sup>1</sup> , Mohammad Hassan Sahebihagh <sup>2*</sup> , Neda Gilani <sup>3</sup>	<u>a</u> ii	on
7	<sup>1</sup> Departement of community health nursing, Faculty of nursing and midwifery, Tabriz University of Medical Scient	es,	🗞 briz, Iran
8	<sup>2</sup> Professor of Nursing Education, Tabriz Health Services Management Research Center and Department of Comm	<b>Ģ</b> nit	Health Nursing, Tabriz
9	University of Medical Sciences, Tabriz, Iran	μ	pte
10	<sup>3</sup> Department of Statistics and Epidemiology, Faculty of Health, Tabriz University of Medical Sciences, Tabriz, Iran	n se	B
11	Article type: Original	e g a	er
12	Corresponding Author	itec	202
13	Mohammad Hassan Sahebihagh, sahebihagh@yahoo.com_Phone: +989143135837_Fax: 34796969	to	<u>4</u>
14	No. words: 3404 No. Tables: 3	t s	Σον
15		ta	nic .
16		nd	bad
17		da li	ed
18		a n B	fro
19 20		iini	3
20		ng.	Ť
22		≥	
23		tra	<u>ă</u>
24		nin	
25		ā	э. Б
26		anc	<u>.</u>
27		s.	8
28		nili	2
29 30		ar t	on
31		ech	- Un
32		no	e 1
33		<u>o</u>	,_ ,>
34		es.	02
35			5 at
36			Ag
37			Jenn
38 20			Хё П
39 40			316
41			log
42			Irap
43			shic
44			tue
45	For peer review only - http://bmjopen.bmj.com/site/about/guidelines.xhtml		de
46			
47			

Page 2 of 19

Page 3 of 19	BMJ Open	cted b
1	2	y copyr
2 3 4		4-08654
5	Abstract	4 on
6 7 8 9	<b>Objectives:</b> This study aims to identify the primary factors influencing health-related quality of life (HRQoL) in (CRC), hypothesizing that specific patient characteristics and clinical factors significantly impact HRQoL.	atents with colorectal cancer of contents of contents
10 11	<b>Design:</b> This was a cross-sectional study conducted over one month, from April 1 to May 1, 2022.	mber 2 es relat
12 13 14	Setting: The study was conducted in five hospitals in the northwest region of Iran, focusing on outpatient chemo	ie in So Han Apy services.
15 16 17 18	<b>Participants:</b> A total of 251 patients diagnosed with colon and rectal cancer participated in the study. Inclusion diagnosis by an oncologist, ability to communicate, willingness to participate, and being aware of their diagnosis were the presence of other chronic diseases, cognitive disorders, known mental disorders, and unwillingness to participate disorders.	And Seteria included a confirmed And Seteria included a confirmed
19 20	Interventions: No interventions were applied as this was an observational study.	rom htt ABES) .
21 22 23 24	<b>Primary and Secondary Outcome Measures:</b> The primary outcome was the HRQoL of CRC patients, measures questionnaire. Secondary outcomes included the impact of demographic and clinical factors on HRQoL.	eed signing a standardized SF-36
25 26 27 28	<b>Results:</b> The total score of HRQoL in these patients is 47.22±16.78, which indicates that HRQoL is disturbed in the statistical analysis revealed that among all the participants' characteristics considered, seven factors: I Cancer(P<0.001), receiving combined treatments(P<0.001), having a colostomy(P<0.001), female sex(P=0.046), ty residence(P=0.002), and finally not having a job(P=0.003), including are the factors that have the most predictive	Bese Batients. Also, the results of aving another disease besides per of housing (P=0.001), place of power in HRQoL.
30 31 32 33 34	<b>Conclusions:</b> The findings of this study encourage health service providers and planners to pay special attention with CRC as identified in this study. Notably, several HRQoL scores in CRC patients are low, and the study found to as presence of colostomy, unemployment, female gender, and comorbidities, significantly predict the overall HRQ focus on interventional studies aimed at minimizing the adverse effects of disease symptoms on HRQoL in these set.	the characteristics of patients by the characteristics of patients at atient characteristics, such core. Future research should wingable patients.
35 36 37	Strengths and Limitations of This Study	at Agei
38 39 40	<ul> <li>Utilized a well-established instrument to assess HRQoL.</li> <li>Considered cultural influences on HRQoL experiences.</li> <li>Addressed patential biases from colf reported question pairs.</li> </ul>	nce Biblio
41 42 43	• Addressed potential blases from sen-reported questionnalles.	graphiqu
44 45 46	For peer review only - http://bmjopen.bmj.com/site/about/guidelines.xhtml	ie de l

Keywords: Health-related quality of life, Demographic Factors, Risk Factors, Colorectal Cancer, Oncology

 BMJ Open 3 • The cross-sectional design limits the ability to establish causality. • Achieved a 100% response rate, which may introduce selection bias. **ywords:** Health-related quality of life, Demographic Factors, Risk Factors, Colorectal Cancer, Oncology **1.** Introduction Colorectal cancer (CRC) is one of the most common cancers worldwide, with its incidence projected to increased over the past 25 years **3.2** million new cases and 1.6 million deaths by 2040(1). In Iran, the incidence rate of CRC has notably increased over the past 25 years **3.2** million new cases and 1.6 million deaths by 2040(1). In Iran, the incidence rate of CRC has notably increased over the past 25 years 🗟 🖄. A recent report from the Iranian National Population-based Cancer Registry (INPCR) predicts a significant rise in the incidence of color at cancer (CRC) in Iran. The number of new CRC cases is expected to surge by 54.1%, increasing from 11,558 cases in 2016 to 17,812 ceseby 2025(4). Tragically, CRC claims the lives of approximately 30,000 individuals in Iran annually (5, 6). The rise in CRC can be attributed article attributed are such as increased life expectancy, lifestyle changes, and advancements in diagnostic and therapeutic methods(7). As the life  $\hat{\mathcal{P}}_{\mathbf{A}}$  and  $\hat{\mathcal{P}}_{\mathbf$ improved, there is growing recognition of the importance of addressing their quality of life (QOL) concerts. Numerous studies have emphasized the measurement and evaluation of cancer outcomes in terms of patient survival and QOL due in survival and que treatment (9-11). Assessing the health-related quality of life (HRQoL) in cancer patients provides valuable insights into una defense emotional, social, and psychological concerns, and assists in assessing the impact of the disease on survivors(10). ≥

HRQoL is a multidimensional concept that encompasses physical, mental, emotional, and social functionin (12). Several factors have been identified as influencing HRQoL in CRC patients, including sociodemographic characteristics, treatment-rela disctors, and lifestyle-related factors such as smoking, physical activity, diet, and alcohol consumption(13). HRQoL is significantly associated with non-communicable chronic diseases such as cancer, impacting both physical and mental health outcomes(14). Therefore, evaluating HRQoL can provide valuable information about the physical and mental well-being of cancer patients, as well as their social relationships and sverall perception of health and well-being(15).

Numerous studies have investigated the factors influencing HRQoL in CRC patients. One of them has showerthat specific patient subgroups may be at a higher risk of diminished HRQoL(16). Some others have showed that  $age_{1}(16-18)$  gender, (1 $\frac{16}{3}$  comorbid conditions, (16, 17) income, (19) and education (16, 18) may effect discernment of health. Additionally, cancer-related factors, suc as a may effect discernment of health. recurrence, multiple primary cancers, and recent initiation of cancer treatment, have been associated with HRQo 18). Disparities in HRQoL between genders have yielded variable results, with most studies reporting poorer HRQsL among women, although some studies have found no differences in patients living with ostomies. Variations across sociodemograped groups have also been documented (20-24). Furthermore, body mass index and physical activity have been recognized as essential factors in HRQoL, with obesity being linked to lower HRQoL(18, 25). bliographique de l

Page 5 of 19

5

6

7

8

9

10 11

12

13 14

15

16

17

18

19 20

21

22

23

24 25

26

27

28 29

30 31

32

33

34

35 36

37

38

39

40

41 42

43 44

45 46 47

BMJ Open 4 Healthcare providers involved in the care and management of CRC patients should consider HRQoL and its of fluencing factors (26, 27). Timely identification of patients at risk of impaired HRQoL enables early interventions to enhance their well-be fg( 28). Moreover, the influence of ethnicity, culture, and socioeconomic status can introduce fundamental variations in the factors influencin HREOL(16, 18, 19, 22). Despite the high prevalence and increasing trend of CRC in Iran, along with the importance of HRQoL, there is a scatting for ganized studies in this area. Therefore, this cross-sectional study aims to determine the predictive power of patient characteristic and RQoL in colorectal cancer tember 2024. Enseignemer patients in Iran.

#### 2. Methods

#### 2.1 Ethical consideration

This study adhered to ethical principles, with all necessary approvals and permissions obtained. The research giangeceived approval from the Research Council and the Research Vice-Chancellor of the Faculty of Nursing and Midwifery at Tabriz University Additionally, permission to conduct the research was obtained from the esteemed Research Vice-Chancellor of Tabriz University of Med诺羅 摹iences. The regional ethics committee approved the study with reference number IR.TBZMED.REC.1401.046. Prior to conducting the approved the study with reference number IR.TBZMED.REC.1401.046. from the research environment where the investigation took place. The research objectives were clear and splained to the potential participants, and their voluntary participation was sought. To safeguard confidentiality, participants were assured that their personal information would be treated with utmost confidentiality. Instead of using their actual names, a coding system was employed to anonymize the participants' identities in the questionnaire. The study strictly adhered to ethical principles regarding the use of the research and sources. Proper citation and referencing were employed, acknowledging the original authors and respecting intellectual property rights. Furthermore, upon request, the research findings were shared with the participants, promoting transparency and accountability, by adhering to these ethical considerations, the study aimed to protect the rights and well-being of the participants, maintain the confidering of their information, and similar ensure the integrity and reliability of the research findings. m on

#### 2.2 Study design

A cross-sectional study was conducted from April 1, 2022, to May 1, 2022. The target population consisted 🗟 patients diagnosed with colon and rectal cancer. During the sampling process, the distinction between the presence or absence of a colostomy, and whether the colostomy bag was permanent or temporary, was not considered. All participants were patients referred to out patient chemotherapy centers. Convenience sampling was employed as the sampling method. The researcher approached five hospitals, namely Sahid Madani, Shahid Ghazi, Alinasab, Shahriar, and Valiasr in Tabriz. Qualified and interested individuals were invited to participate in the study by completing the research questionnaire. The methodology of this research involved the researcher visiting the research environment, an dafter obtaining permission from hospital managers, distributing questionnaires to patients in a manner that did not interfere with their treat ment process. The inclusion criteria were: a definitive diagnosis of colon or rectal cancer by an oncologist; being able to communicate; williggness to participate in the study; referral for outpatient chemotherapy; having knowledge of their illness and the type of treatment receive defined he exclusion criteria were:

ස්

phique

de

BMJ Open 5 suffering from other chronic diseases such as diabetes, kidney diseases, or any organ defects that could affect the could affect quality of life according to the participants' statements; presence of cognitive disorders (such as Alzheimer's) according to terminate statements of the participant or their companions; known mental disorders according to the statements of the participant, their companies, or records in their file; and unwillingness to participate in the study.

### 2.3 Sample size calculation

willingness to participate in the study. **3 Sample size calculation** In our study, we carefully considered the number of independent factors, which amounted to 22. Adheding to "Green's rule of thumb," which suggests that the sample size should be a minimum of 50 plus 8 times the number of predictors, we cate at the sample size should be a minimum of 50 plus 8 times the number of predictors, we cate at the sample size should be a minimum of 50 plus 8 times the number of predictors. of 226 would be appropriate (29). This calculation took into account a significance level ( $\alpha$ ) of 0.05 and a des  $\alpha$  bower of 0.8. To ensure the detection of a medium effect size (0.14 for small effects, 0.39 for medium effects, and 0.59 for large effects), and a conservative 10% allowance for potential participant dropout, resulting in a minimum sample size of 251 (226 \* 0.9). Toute the sample size, we employed Statistics Kingdom as a reliable tool (30). eur (A data

mining, Al tra

# 2.4 Data collection

In this study, two questionnaires were used as follows:

# 2.4.1 Participants' characteristics

In this study, the characteristics of patients were assessed using a researcher-designed questionnaire aimed a capacity of patients demographic and clinical variables. These variables encompassed age, sex, marital status, educational background, occupations insurance coverage, place of residence, housing type, type of treatment received, duration of the most recent chemotherapy cycle, fame history of cancer among both close and distant relatives, presence of cancer metastasis, number of completed chemotherapy sessions concurrent presence of other diseases, duration of surgery (if applicable), weekly exercise frequency, height, weight, and body mass index (Bevil). The questionnaire was administered comprehensively to collect data on participant characteristics, facilitating a thorough an  $\frac{2}{3}$  ysis of the study population. Additionally, significant attention was directed towards "Income Adequacy," a measure that evaluates whether a household's income suffices to meet its expenses from a subjective standpoint. This assessment not only considers the actual income level but also gauges the perceived capability to cover necessary expenditures, thereby offering a nuanced insight into economic stress and finginc is satisfaction. Through the examination of income adequacy, the study aimed to discern households experiencing financial strain despite low expenses and those feeling financially secure despite lower incomes. gence Bibliographique de l

# 2.4.2 Health-related quality of life questionnaire with 36 questions (SF-36):

 

 BMJ Open

 **b** MJ Open

 6

 **b** MJ Open

 7

 **b** MJ Open

 7

 **b** MJ Open

 6

 **b** MJ Open

 7

 **b** MJ Open

 7

 **b** MJ Open

 6

 **b** MJ Open

 7

 **b** MJ Open

 7

 **b** MJ Open

 6

 **b** MJ Open

 7

 **b** MJ Open

 7

 **b** MJ Open

 7

 **b** MJ Open

 7

 **b** MJ Open

 the impact of health on individuals' overall quality of life. Comprising 36 questions and encompassing Aght distinct components, this questionnaire utilizes the Likert scale to measure health-related quality of life. The Likert scale employs a fige-point rating system, where a score of 1 denotes "completely false," 2 signifies "somewhat false," 3 represents "I don't know," 4 indicates "Bos y true," and 5 corresponds to "completely correct". The questionnaire generates scores ranging from zero to 100, without a predetermided utoff point. Scores in each dimension are interpreted relative to the minimum and maximum values reported for that specific dimension . He her score indicates a lower level of disability within the corresponding area, while a lower score suggests a higher degree of disability. score to 100 signifies reduced disability, whereas a closer proximity to 0 indicates increased disability within 🕷 🖄 me area. Researchers may also utilize the reported minimum and maximum values for each dimension to assess the obtained scores. The construction of the subject to various studies, consistently demonstrating good validity(32-34). Additionally, it exhibits strong reliabile we evidenced by a reported Cronbach's alpha coefficient of 0.92 in a study (33). Importantly, the questionnaire has been appropriately tra 🕏 🛱 d and standardized for use haded fr rieur (A nd data in Iranian society, ensuring its applicability within this context (35, 36).

### 2.5 Data analysis

The data analysis was performed using IBM SPSS Statistics version 24. To examine the characteristics of the samples, frequency and percentage distributions were employed. Additionally, for variables exhibiting normal distributions, descriptive statistics such as mean and standard deviation were utilized. The normality of variable distributions was evaluated using the Kolmogoro Snarnov test, accompanied by Skewness and Kurtosis indices. A significance level of 0.05 was adopted for all tests conducted within this study. 🐞 investigate the predictive influence of the variables, a step-by-step linear regression model was employed. All variables, including those with multiple categories (which were transformed into dummy variables), were entered into the regression analysis. The variables demonstrating the most substantial predictive effects were selected for inclusion in the subsequent statistical analysis. It is worth noting that the subsequent statistical analysis analysis.

quality of life score served as the dependent variable. **2.6 Patients and public involvement**Patients and members of the public did not participate in the formulation of the research design, the give cution of the study, or the some publication of the research design. 2025 at Agence Bibliographique de l communication of the research outcomes.

Page 8 of 19

BMJ Open

### 3. Results

Variable	Classes	N (Valid Percent)
	30 to 40	67 (26.2)
•	40 to 50	46 (18.0)
Age	50 to 60	95 (37.1)
	More than 60	48 (18.8)
<u> </u>	Male	129 (50.4)
Sex	Female	127 (49.6)
	Single	22 (8.6)
Aarital Status	Married	206 (80.5)
	Divorced and widowed	28 (10.9)
	Under Diploma	50 (19.5)
Education	Diploma	73 (28.5)
Education	Bachelor	81 (31.6)
	Post Graduate	52 (20.3)
	Employed	166 (64.8)
Job	Unemployed	90 (35.2)
	Income Equals Expenditure	138 (53.9)
Income	Income More Than Expenditure	42 (16.4)
Adequacy	Income Less Than Expenditure	76 (29.7)
Having	Yes	228 (89.1)
Insurance	No	28 (10.9)
Loodian	City	240 (93.8)
	Village	16 (6.3)
an a Trans	Personal	228 (89.1)
ousing type	Rent	28 (10.9)
	Only Chemotherapy	81 (31.6)
Type of	Chemotherapy-	98 (38.3)
Freatment	Radiotherapy-surgery	
	Chemotherapy-surgery	77 (30.1)
	<5	232 (90.6)
	≥5-10	24 (9.4)

/bmjopen-2024-086544 on 28 September 2024. Downloaded from http://bmjopen.bmj.com/ on June 11, 2025 at Agence Bibliographique de l cted by copyright, including for uses related to text and data mining, Al training, and similar technologies.

Page 9 of 19

Time of Last	Mean (SD)	3.10 (4.04)
Chemotherapy		
(week)		
	Positive	121 (47 3)
Family History	Negative	135 (52 7)
	Voc	149 (58 2)
Metastasis	No	107 (41.8)
Number	<10	137 (53 5)
Number of	>10-20	84 (32.8)
Chemotherapy	>20-30	35 (13.7)
Courses	Mean (SD)	9.34 (6.98)
(Number)		0.01 (0.00)
Anothor	Yes	106 (41.4)
	No	150 (58.6)
Disease		
Besides Cancer		
Time of Last	1-10	223 (87.1)
	≥11-20 And more	33 (12.9)
Surgery (Month)	Mean (SD)	6.11 (5.52)
Evercise (Hour /	≤10	229 (89.5)
	10-20 And more	27 (10.5)
Week)	Mean (SD)	3.42 (3.84)
Sexually Active	Active	251 (98)
Before the	Not Active	5 (2)
Disease		
	15-65	63 (24 6)
	>65-85	126 (49.2)
Weight (kg)	>85-105	67 (26 2)
	Mean (SD)	74 71 (14 42)
	70-130	3 (1 2)
Height (cm)	>130-192	253 (98.8)
	Mean (SD)	169.34 (13.48)
	<18,5	12 (4.7)
Body Mass	≥18.5-25	123 (48)
Index (kg/m <sup>2</sup> )	>25.20	67 (26 2)

/bmjopen-2024-086544 on 28 September 2024. Downloaded from http://bmjopen.bmj.com/ on June 11, 2025 at Agence Bibliographique de l Enseignement Superieur (ABES) . cted by copyright, including for uses related to text and data mining, Al training, and similar technologies.

For peer review only - http://bmjopen.bmj.com/site/about/guidelines.xhtml

	BMJ	Open	cted b
		9	oen-2024⊦ y copyrig
	≥30	54 (21.1)	ht, i
	Mean (SD)	25.88 (4.74)	ncl 44
Having	With	127 (49.6)	udi on
Colostomy	Without	129 (50.4)	ng fo
Table 1 shows the characteristics of th	e study participants. A tot	al of 256 patients conser	ited to participate and diligently completed the

questionnaires in accordance with the inclusion and exclusion criteria. Among these participants, 129 vare male (49.6%), with 49.6% possessing a colostomy bag and 51.2% without. Similarly, 127 female patients were included (50.4%), with 50.4% of females exhibiting a colostomy bag and 48.8% without. Most participants (206 individuals) were married. Regarding age distributing ign, the highest frequency (67 individuals) was in the 30-40 years age range, while the lowest frequency (28 individuals) was in the age range of we ding 60 years. One hundred ninety-six participants acknowledged having children. Concerning educational attainment, the majority (81 in www.gals) possessed a bachelor's degree, followed by 50 individuals with a diploma. Among the sample, 166 participants were employed. Furthe reference, 138 individuals indicated that their income matched their expenses, and insurance coverage was reported by 228 participants. In terresco the duration since their disease diagnosis, the highest proportion (17.6%) reported a duration of ten months. Two hundred forty pare diagnatic resided in urban areas, and within this group, 228 lived in their own residences. With respect to the type of treatment received, 81 patients underwent chemotherapy exclusively, 98 patients received a combination of chemotherapy, radiotherapy, and surgery, and 77 patients underwent chemotherapy in conjunction with surgery. Of the 232 participants who completed the questionnaire, two weeks had transpiced since their most recent chemotherapy session. One hundred twenty-one patients affirmed a positive family history of cancer, where is 149 cases, the tumor had metastasized to different regions of the body. Concerning the number of chemotherapy courses, 137 Patients received 1-10 courses. Additionally, 106 patients exhibited at least one comorbid condition alongside cancer. The majority of particiants (223 individuals) disclosed that 1-10 months had elapsed since their most recent surgery. Among the sample, 229 individuals engaged in spot activities for less than 10 hours per week. Two hundred fifty-one participants asserted that they were sexually active prior to their diseas diagnosis and commencement of treatment. In terms of weight distribution, 63 patients weighed between 45-65 kg, 126 patients fell within the 65-85 kg range, and 67 patients registered a weight of 85-105 kg. The majority of participants (253 individuals) exhibited heights ranging from 130-192 cm. Regarding body mass index (BMI), the majority (123 individuals) fell within the 18.5-25 range. Notably, the participant haracteristic questionnaire did gies. 2025 at Agence Bibliographique de l not include any information regarding cancer stage.

### Table2. Mean and standard deviation of health-related quality of life by gender

Itoms	Total		
	Mean	SD	95% CI

Page 11 of 19
1
2
3
4
5
6
7
8
9
10
11

13

14

15

16

17

18

19

20

21

22

23

24

25

26

27

28

42 43 44

45 46 47

BMJ Open	
10	

44.96

62.40

62.06

52.28

57.57

48.05

43.50

33.46

47.42

30.97

40.64

41.04

15.97

15.58

23.99

25.99

8.42

16.78

**Physical Functioning** 

Health

**Problems** 

Energy/Fatigue

Pain

**General Health** 

Role Limitations due to Physical Table 2 presents the health-related quality of Role Limitations due to Emotional respective dimensions. (Mean=47.42, highlights the range of entire group, as according to the **Emotional Well-being** questionnaire, a score Social Functioning crucial threshold for Comparatively, when from a similar study QoL score was 77.28 ± Health-Related Quality of Life 8.47 for rectal ± that apparent our

/bmjopen-2024-086544 on 28 Se configure hensive assessment of ៉ារខែតុ (HRQoL) scores and their within the ade ated in Table 2. Notably, a guidelines for the ਉਹਾਂ 🖥 can be considered as a HRQoL. ອົດວ່າສີ່ມແບບ in Iran (The average  $\frac{P}{r}$ 8.8 for colon cancer and 76.5 ≌carer)(37), it becomes Zpatents exhibit significant

cted by copyright, including for

a

Min-Max

0-100

0-100

0-100

5-100

20-100

0-100

0-100

6-56

6-75

disturbances in their HRQoL. This finding adds an intriguing aspect to the investigation, emphasizing the need for further exploration and potential pd j.com/ on J interventions to address the compromised well-being of these individuals. similar te

Table.3 Results from stepwise multiple regression for total score of HRQoL

FACTORS	β (95% Cl)	Beta*	
Another Disease Besides Cancer (yes)	12.91 (8.40 <i>,</i> 17.42)	0.38	.001>
Type of Treatment (Chemotherapy-surgery)	9.10 (4.12, 14.09)	0.25	\$001>
Having Colostomy (With)	10.27 (5.70 <i>,</i> 14.84)	0.30	<b>8</b> .001>
Sex (Male)	-4.52 (-8.95, -0.08)	-0.13	<sup>89</sup> 90.046
E			yraphique
For peer review only - http://b	omjopen.bmj.com/site/about/gui	delines.xhtml	de l

	BMJ Open		ă j
			ope by
	11		col u-2
			02 9 yr
			igh
Housing Type (Personal)	11 25 (1 77 17 73)	0.22	
nousing Type (Personal)	11.25 (4.77, 17.75)	0.22	
Location (Village)	17 74 (6 51 28 96)	0 20	້≣ີສິດ002
	17.74 (0.91, 20.90)	0.20	ng 28
.loh (Employed)	-7.47 (-12.31, -2.63)	-0.21	ຊີ "ປ.003
	,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	0.22	
R Square: 0.458 (Adjusted R Square: 0.428)			ins ins
			* * 5

\* Standardized beta coefficient

Table 3 summarizes the results of a stepwise regression analysis conducted on 22 factors to determine their in the total health-related guality of life score. Among these variables, seven were found to have a significant effect on the outcome measure a was have a significant effect on the outcome measure a seven were found to have a significant effect on the outcome measure a seven were found to have a significant effect on the outcome measure a seven were found to have a significant effect on the outcome measure a seven were found to have a significant effect on the outcome measure a seven were found to have a significant effect on the outcome measure a seven were found to have a significant effect on the outcome measure a seven were found to have a significant effect on the outcome measure a seven were found to have a significant effect on the outcome measure a seven were found to have a significant effect on the outcome measure a seven were found to have a significant effect on the outcome measure a seven were found to have a significant effect on the outcome measure a seven were found to have a significant effect on the outcome measure a seven were found to have a significant effect on the outcome measure a seven were found to have a significant effect on the outcome measure a seven were found to have a significant effect on the outcome measure a seven were found to have a exhibited the most substantial influence, with a standardized beta value and a 95% confidence interval ranging from **B**. **S** to 28.96 (P=0.002). These findings highlight the importance of considering the "Location" variable in understanding and improving overall head quality of life. The significance of these results brings excitement and underscores their potential implications for future research and inderscores their potential implications for future research enhancement of health-related quality of life in the studied population. mining

#### 4. Discussion

≥ HRQoL has emerged as a crucial outcome measure for patients afflicted with CRC(38). HRQoL goes beyond the well-being of cancer patients, as it also influences treatment response and survival rates. Several studies have extensively examined factors that in act HRQoL assessment in CRC, highlighting the substantial influence of symptoms, surgical procedures, and comorbidity burden on overall wel 🛱 (8). The aim of this study was to assess the influential factors associating HRQoL in individuals with colorectal cancer and provide a compreh asive analysis of its dimensions. The study findings revealed consistently low scores in various domains of HRQoL among individuals with colorect鍋 cancer. This suggests that the challenges posed by cancer and its treatment have a detrimental impact on the HRQoL experienced by individuation with colorectal cancer. These findings are consistent with previous studies reporting unfavorable HRQoL outcomes among CRC patients (39-41). Furthermore, systematic reviews conducted across diverse literature sources have consistently demonstrated a significant decline in qua it among these patients (42, 43).

In this study, a thorough evaluation and comparison of eight dimensions of HRQoL was undertaken. The findings revealed that the dimension scoring the lowest was general health, followed by physical functioning and pain. Conversely, emotional well-being chieved the highest score, followed by role limitations due to physical health and role limitations due to emotional issues. These outcomes are consistent with those of Domati et al., who examined HRQoL in individuals with colorectal cancer compared to healthy controls (44). Howevered discrepancies between our study and prior research could stem from variations in participant demographics, sample size, and cultural, ecogomic, and social contexts. Moreover, our study identified a significant association between reduced physical functioning and disability, which impacts independence (45).

čte /bn

phique de

Page 13 of 19

5

6

7 8

9

10 11

12

13

14

15

16 17

18

19

20

21 22

23

24

25

26 27

28

29 30

31

32

33

34

35 36

37

38 39

40

41 42

43 44

45 46 47 BMJ Open 12 Previous research has also underscored the importance of understanding how ostomies affect HRQoL to better pre-surgery (46). Therefore, comprehensive knowledge and improved physical function are pivotal for enhancing physical aspects **4** HRQoL and overall well-being. These findings underscore the imperative for oncologists, psychiatrists, oncology nurses, and health policymakers approximative HRQoL in colorectal cancer patients. Addressing these identified dimensions and fostering patient adaptation can markedly enhance 🛱 er 🕅 quality of life, particularly across the dimensions highlighted.

In accordance with the findings of this study, several participant characteristics have been identified as significant of this study. Specifically, the presence of other diseases besides cancer was associated with higher HRQoL scores compared to those to additional conditions. Regarding treatment type, individuals who underwent combined chemotherapy and radiotherapy demonstrated s about the source compared to those who only received chemotherapy followed by surgery. Participants without a colostomy reported higher R Constant those with a colostomy bag. Furthermore, male participants and tenants exhibited higher HRQoL scores than their female ன Berparts and homeowners, respectively. Urban residents also showed higher HRQoL scores compared to rural residents, and employed in 感遊島 reported better HRQoL than the unemployed. These findings align with studies by Naomi et al. (47), Kristensen et al. (48), and Dahouri et al 498 which similarly highlighted various factors influencing HRQoL such as age, marital status, employment, and presence of a colostomy. The dis age observed across studies can be attributed to cultural contexts and socioeconomic differences among populations. In our study conducted a wan, factors like housing type, geographic location, and treatment type, which are linked to income levels, emerged as significant determinants affecting HRQoL. Therefore, based on these findings and existing literature, it is evident that factors such as colostomy presence, unenployment, female gender, and comorbidities play crucial roles in influencing HRQoL. Health policymakers should consider these factors at a migo- keel to optimize healthcare interventions for individuals affected by colorectal cancer, thereby potentially improving their HRQoL through targeted strategies and timely support.

Furthermore, it is imperative to acknowledge the implications of the present study's findings for future interven and at mitigating the negative impact of disease symptoms on the HRQoL of CRC patients. Prospective longitudinal research end avors should comprehensively evaluate the influence of various factors, including lifestyle choices, health behaviors, psychological determinans, and other relevant variables, on HRQoL outcomes. As the population of cancer survivors continues to grow, addressing the multidimensional  $\overline{\mathbf{g}}$  spects of HRQoL through longterm nursing care provisions becomes increasingly crucial. This study highlights the robust correlation between so a or demographic factors and the overall HRQoL score among CRC patients. The identification of these socio-demographic factors underscores there is in the treatment and care of CRC patients, necessitating healthcare professionals to consider them in their clinical practice to enhance and control outcomes.

It is crucial to acknowledge both the strengths and limitations of this study. The utilization of a well-established instamment to assess HRQoL is a notable strength. Nevertheless, it is essential to consider the influence of cultural factors on the results, as culturad context can shape HRQoL experiences. Future studies should explore this aspect in various cultural contexts to enhance the generalizability of the findings. Additionally, addressing the study's time limitations and sample size in future research would further improve its applicability. Alt sough efforts were made to

phique de l

BMJ Open 13 ensure data anonymity and confidentiality, the reliance on self-reported questionnaires may introduce intentional biases. Furthermore, the cross-sectional nature of the study and the 100% response rate among participants may ptrobluce selection bias. These Iding limitations should be carefully considered when interpreting the results. 28 Sep

#### 5. Conclusion

Conclusion In conclusion, this study contributes significantly to our understanding of the factors influencing HRQoL in a patients, highlighting that several HRQoL scores in this population are notably low. It emphasizes the need to integrate these factors in the population are practices to improve patients' well-being and HRQoL outcomes. Specifically, the study identified several patient change Kistics, such as presence of colostomy, unemployment, female gender, and comorbidities, that exert predictive power over the ove 出 each the over the professionals should prioritize the quality of life of CRC patients and tailor interventions accordingly. By addeesing the influencing factors identified in this study, healthcare providers can significantly enhance HRQoL outcomes in CRC patients. Fater research should focus on developing targeted interventions and conducting longitudinal studies to further explore the multidimensiona a conducting longitudinal studies to further explore the multidimensiona population. ā́ъ́ (Aro

Declarations
Ethics approval and consent to participate
Ethical approval for the study was granted by Tabriz University of Medical Sciences with ID: IR.TBZMED.REC.1401 and Informed consent was obtained from all participants.
There was no under 16 participants in this research.
All methods were carried out in accordance with relevant guidelines and regulations.
Consent for publication
Not applicable
Competing interests
Authors declare no competing interest.
Funding
This study was supported by Tabriz University of Medical Sciences under grant number 69407. ttp://bmjogen.bmj.com/ on June 11, 2025

This study was supported by Tabriz University of Medical Sciences under grant number 69407.

# **Contributorship statement**

AD, the lead investigator and guarantor of the study, designed the empirical analysis, oversaw data creation and magement, and significantly contributed to writing the manuscript. MHS, a senior researcher and co-author, performed the literature search and made substantial contributions to the writing of the manuscript. NG, a research fellow and co-author, was involved in data creation and management, conducted

liographique

de

Page 15 of 19

5

6

7

8

9

10 11 12

13

14

15

16

17

18

19

20

21

22

23

24

25

26

27

28

29

30

31

32

33

34

35

36

37

38

39

45 46 47 BMJ Open 14 empirical analyses, and contributed to the manuscript writing. AD, a lecturer and co-author, assisted in data BMJ Open 14 empirical analyses, and contributed to the manuscript writing. AD, a lecturer and co-author, assisted in data BMJ Open 14 empirical analyses, and contributed to the manuscript writing. AD, a lecturer and co-author, assisted in data participated in the empirical analyses, and contributed to the manuscript writing. Iud **9** 

### Acknowledgements

This study was conducted as part of the Master Thesis of the first author (Amirmohammad Dahouri) at the Tabrized nicersity of Medical Sciences. for uses related

# . Data sharing statement

Data are available upon reasonable request.

6. References

Morgan E, Arnold M, Gini A, Lorenzoni V, Cabasag C, Laversanne M, et al. Global burden of colorectal can 🛱 🖞 2020 and 2040: incidence 1. and mortality estimates from GLOBOCAN. Gut. 2023;72(2):338-44.

Hasanpour-Heidari S, Fazel A, Semnani S, Khandoozi S-R, Amiriani T, Sedaghat S, et al. Temporal and geogia decade and second sec 2. cancer incidence in Northern Iran 2004–2013. Cancer Epidemiology. 2019;59:143-7.

Ostadghaderi M, Hanafi Bojd A, Nematollahi S, Holakoui-Naeini K. Spatial Analysis of Factors Affecting Co 3. of Geographical Weight Regression in Iran. Iranian Journal of Epidemiology. 2021;17(1):1-12.

Roshandel G, Ferlay J, Ghanbari-Motlagh A, Partovipour E, Salavati F, Aryan K, et al. Cancer in Iran 2008 te 2025: recent incidence trends 4. and short-term predictions of the future burden. International journal of cancer. 2021;149(3):594-605.

Khademi IKH, Tehnizi MAH, Shafizad S. The Effect Of Self-Care Education Program On Self-Efficacy And Quality of Life Of Patients With 5. Colorectal Cancer Undergoing Chemotherapy. Preventive Medicine. 2021;8(2):0-.

Collatuzzo G, Seyyedsalehi MS, Rezaeianzadeh A, Marzban M, Rashidian H, Hadji M, et al. Consumption of Yoghurt and Other Dairy 6. Products and Risk of Colorectal Cancer in Iran: The IROPICAN Study. Nutrients. 2022;14(12):2506.

Mohammadi E, Aminorroaya A, Fattahi N, Azadnajafabad S, Rezaei N, Farzi Y, et al. Epidemiologic pattern of the fattahi R and current 7. knowledge and future perspective. Journal of Diabetes & Metabolic Disorders. 2021;20(1):825-9.

Marventano S, Forjaz MJ, Grosso G, Mistretta A, Giorgianni G, Platania A, et al. Health related quality of lie incolorectal cancer patients: 8. state of the art. BMC surgery. 2013;13(2):1-7.

Moinpour CM, Sawyers Triplett J, McKnight B, Lovato LC, Upchurch C, Leichman CG, et al. Challenges posed by non-random missing 9. guality of life data in an advanced-stage colorectal cancer clinical trial. Psycho-Oncology: Journal of the Psycholog and Behavioral Dimensions of Cancer. 2000;9(4):340-54.

Mozafar Saadati H, Khodamoradi F, Salehiniya H. Associated factors of survival rate and screening for coldrectal cancer in Iran: a 10. systematic review. Journal of Gastrointestinal cancer. 2020;51:401-11.

Weis J, Gschwendtner K, Güthlin C, Holmberg C, Horneber M. Utilisation of complementary medicine in cance patients and survivors: 11. Expected benefits and its association to psychosocial factors. European Journal of Cancer Care. 2022;31(6):e13690.

Ratliff CR, Haugen V. Selecting a tool for assessing health-related quality of life in ostomates. Journal of Wound Ostomy & Continence 12. Nursing. 2013;40(5):462-7. bliographique de l

BMJ Open 15 Tiselius C, Rosenblad A, Strand E, Smedh K. Risk factors for poor health-related quality of life in patients with epidemion cancer include stoma

Xiao M, Zhang F, Xiao N, Bu X, Tang X, Long Q. Health-related quality of life of hypertension patients: A point Long A cross-sectional

1 2 3

4

5

6

7

8

9

10

11

12

13

14

15

16

17

18

19

20

21

22

23

24

25

26

27

28

29

30

31

32

33

34

35

36

37

38

39

40

45 46 47

13.

14.

and smoking habits. Health and Quality of Life Outcomes. 2021;19(1):1-11.

study in Chongging, China. International journal of environmental research and public health. 2019;16(13):2348.  $\overline{\mathbf{a}}$ Rodriguez JL, Hawkins NA, Berkowitz Z, Li C. Factors associated with health-related quality of life among concertain concertainty of life among concertainty 15. American journal of preventive medicine. 2015;49(6):S518-S27. Weaver KE, Forsythe LP, Reeve BB, Alfano CM, Rodriguez JL, Sabatino SA, et al. Mental and Physical Healt 🖧 🕷 🖬 ated Quality of Life 16. among US Cancer Survivors: Population Estimates from the 2010 National Health Interview SurveyHealth-Related at the among US Cancer Survivors. Cancer Epidemiology, Biomarkers & Prevention. 2012;21(11):2108-17. Trentham-Dietz A, Remington P, Moinpour C, Hampton JM, Sapp A, Newcomb P. Health-related quality of the in female long-term 17. colorectal cancer survivors. The oncologist. 2003;8(4):342-9. Jansen L, Koch L, Brenner H, Arndt V. Quality of life among long-term (≥ 5 years) colorectal cancer surviv 🛱 🛱 🕏 stematic review. 18. European journal of cancer. 2010;46(16):2879-88. Ramsey SD, Berry K, Moinpour C, Giedzinska A, Andersen MR. Quality of life in long term survivors of color and concer. The American 19. journal of gastroenterology. 2002;97(5):1228-34. Mahjoubi B, Mirzaei R, Azizi R, Jafarinia M, Zahedi-Shoolami L. A cross-sectional survey of quality of life in strong strong to the section of the section o 20. Iran. Health and Quality of Life Outcomes. 2012;10(1):1-6. Verweij N, Bonhof C, Schiphorst A, Maas H, Mols F, Pronk A, et al. Quality of life in elderly patients with a box box box from the 21. population-based PROFILES registry. Colorectal Disease. 2018;20(4):092-0102. Kement M, Gezen C, Aydın H, Haksal M, Can U, Aksakal N, et al. A descriptive survey study to evaluate the relationship between socio-22. demographic factors and quality of life in patients with a permanent colostomy. Ostomy Wound Management. 2014. Krouse RS, Herrinton LJ, Grant M, Wendel CS, Green SB, Mohler MJ, et al. Health-related quality of life antong long-term rectal cancer 23. survivors with an ostomy: manifestations by sex. J Clin Oncol. 2009;27(28):4664-70. Sideris L, Zenasni F, Vernerey D, Dauchy S, Lasser P, Pignon J-P, et al. Quality of life of patients operated on for low rectal cancer: impact 24. of the type of surgery and patients' characteristics. Diseases of the Colon & Rectum. 2005;48:2180-91. Schlesinger S, Walter J, Hampe J, von Schönfels W, Hinz S, Küchler T, et al. Lifestyle factors and health-related auality of life in colorectal 25. cancer survivors. Cancer Causes & Control. 2014;25:99-110. Behroozian T, Fatima S, Finkelstein S, Kanee L, Bonomo P, Wolf JR, et al. Current quality of life assessmen  $\frac{1}{6}$  to  $\frac{1}{6}$ s may not fully address 26. dermatological adverse events from anti-cancer therapies. Supportive Care in Cancer. 2022:1-5. Al-Habsi Z, Al-Noumani H, Al Hashmi I. Determinants of health-related quality of life among Omanis hospitalized patients with cancer: a 27. cross-sectional study. Quality of Life Research. 2022;31(7):2061-70. Barbosa MV, Dos Santos MP, Leite JA, Rodrigues VD, de Pinho NB, Martucci RB. Association between functional aspects and health-28. related quality of life in patients with colorectal cancer: can handgrip strength be the measure of choice in clinical practice? Supportive Care in Cancer. 2023;31(2):144. iographique de l For peer review only - http://bmjopen.bmj.com/site/about/guidelines.xhtml

cted by copyrig /bmjopen-2024-( **BMJ** Open Page 17 of 19 16 1 2 Green SB. How Many Subjects Does It Take To Do A Regression Analysis. Multivariate Behavioral Research 1991;26(3):499-510. 3 29. 4 Mann Whitney U test calculator [Internet] 2017 [Available from: http://www.statskingdom.com/170med an ann whitney.html. 30. 5 Alisherovna KM, Erkinovna KZ, Jamshedovna KD, Toshtemirovna EMm. Study of qualityof life indicators in epateents with coronary heart 31. 6 disease using the sf-36 questionnaire. Web of Scientist: International Scientific Research Journal. 2022;3(5):558-64. 7 Montazeri DA, Goshtasbi DA, Nia MSV. Translation, Determination Of Reliability And Validity Of Persian Version Of SF-36 Standard tool. 32. 8 Payesh. 2006;5(1):0-. 9 Rifati S, Bagheri Z, Jafari P, Soltani N. Using Confirmatory Factor Analysis To Evaluate The Structure Of que to The Persian Version 10 33. 11 Of The SF-36 Questionnaire In Healthy Individuals And People With Chronic Diseases. (MEDICAL JOURNAL OF HO 前级交流GAN UNIVERSITY). 12 2015;19(2):-. 13 Niloofar M, Ayatollah SA, Zare N, Ali SHA. Evaluation Of Validity And Reliability Of A 36-Item General Heal Research Questionnaire In 34. 14 Shiraz Medical School-2001. 15 Asadollahi A, Ismaeli A, Fani-Saberi L. Validity and Reliability of Quality of life test among Ahwaz Older Ad 🛚 🛱 🗗 2016. Sociological 35. 16 studies. 2016;9(32):7-15. 17 Motamed N, Ayatollahi A, Zare N, Sadeghi Hassanabadi A. Validity and reliability of the Persian translation of the SF-36 version 2 36. 18 questionnaire. EMHJ-Eastern Mediterranean Health Journal, 11 (3), 349-357, 2005. 2005. 19 Akhondi-Meybodi M, Akhondi-Meybodi S, Vakili M, Javaheri Z. Quality of life in patients with colorectal care in Iran. Arab Journal of 20 37. 21 Gastroenterology. 2016;17(3):127-30. 22 Osoba D. Lessons learned from measuring health-related quality of life in oncology.: 1. Rehabilitation On alog. 1994;12(2):18. 38. 23 Bonhof CS, van de Poll-Franse LV, Wasowicz DK, Beerepoot LV, Vreugdenhil G, Mols F. The course of perite neuropathy and its 39. 24 association with health-related quality of life among colorectal cancer patients. Journal of Cancer Survivorship. 2(21:15:190-200. 25 Gigic B, Nattenmüller J, Schneider M, Kulu Y, Syrjala KL, Böhm J, et al. The role of CT-quantified body composition on longitudinal health-40. 26 related quality of life in colorectal cancer patients: the colocare study. Nutrients. 2020;12(5):1247. 27 41. El Alami Y, Essangri H, Majbar MA, Boutayeb S, Benamr S, El Malki HO, et al. Psychometric validation of the Moroccan version of the 28 EORTC QLQ-C30 in colorectal Cancer patients: cross-sectional study and systematic literature review. BMC cancer 2021;21(1):1-8. 29 30 Flyum IR, Mahic S, Grov EK, Joranger P. Health-related quality of life in patients with colorectal cancer in 👼e 妇 liative phase: a 42. 31 systematic review and meta-analysis. BMC Palliative Care. 2021;20:1-18. 32 Kristensen HØ, Thyø A, Christensen P. Systematic review of the impact of demographic and socioeconom to factors on quality of life in 43. 33 ed colorectal cancer survivors. Acta Oncologica. 2019;58(5):566-72. ostomized colorectal cancer survivors. Acta Oncologica. 2019;58(5):566-72. 34 44. 35 cancer patients during chemotherapy: differences between men and women. Internal and emergency medicine. 201 10:423-9. 36 Organization WH. International Classification Of Functioning, Disability, and Health: Children & Youth Version CY: World Health 45. 37 Organization; 2007. 38 39 Näsvall P, Dahlstrand U, Löwenmark T, Rutegård J, Gunnarsson U, Strigård K. Quality of Life In Patients With Appermanent Stoma After 46. 40 Rectal Cancer Surgery. Quality Of Life Research. 2017;26(1):55-64. liographique de l 41 42 43 44 For peer review only - http://bmjopen.bmj.com/site/about/guidelines.xhtml 45

BMJ Open 17 Ito N, Tanaka M, Kazuma K. Health-Related Quality Of Life Among Persons Living In Japan With A Permanent option of the second se , y Of L ,-83. . t NJ, Pinkney T, Wa. . n 10 countries. BJS open. . . t of health-related quality of life n. 47. Wound Ostomy & Continence Nursing. 2005;32(3):178-83.

Kristensen HØ, Thyø A, Emmertsen KJ, Smart NJ, Pinkney T, Warwick AM, et al. Surviving rectal cancer at the Sost of a colostomy: global of long-term health-related quality of life in 10 countries. BJS open, 2022;6(6):zrac085. 48. survey of long-term health-related quality of life in 10 countries. BJS open. 2022;6(6):zrac085.

d Ostomy & Continence Nursing. 2005;32(3):178-83. Kristensen HV, Thye A, Emeretsen KJ, Smart NJ, Pinkney T, Warwick AM, et al. Surviving rectal cancer at the east of a colostomy: global soft ong-term health-related quality of life in 10 countries. BJS open. 2022;6(6):zrac085. Dahouri A, Sahebihagh M. Comparison of health-related quality of life in people with colorectal cancer at the fore the soft of a colostomy bag riz hospitals 2022. 2022. 49. in Tabriz hospitals 2022. 2022.

	Item No	Recommendation	Page
Title and abstract	1	( <i>a</i> ) Indicate the study's design with a commonly used term in the title or the abstract $\checkmark$	1
		(b) Provide in the abstract an informative and balanced summary of what	1
Introduction		was done and what was found 🗸	
Background/rationale	2	Explain the scientific background and rationale for the investigation being reported $\checkmark$	2
Objectives	3	State specific objectives, including any prespecified hypotheses 🗸	2
Methods			
Study design	4	Present key elements of study design early in the paper $\checkmark$	3
Setting	5	Describe the setting, locations, and relevant dates, including periods of recruitment, exposure, follow-up, and data collection $\checkmark$	3 &
Participants	6	(a) Give the eligibility criteria, and the sources and methods of selection of participants $\checkmark$	4
Variables	7	Clearly define all outcomes, exposures, predictors, potential confounders, and effect modifiers. Give diagnostic criteria, if applicable $\checkmark$	3, 4 &
Data sources/ measurement	8*	For each variable of interest, give sources of data and details of methods of assessment (measurement). Describe comparability of assessment methods if there is more than one group $\checkmark$	3, 4 8
Bias	9	Describe any efforts to address potential sources of bias $\checkmark$	4 &
Study size	10	Explain how the study size was arrived at $\checkmark$	3
Quantitative variables	11	Explain how quantitative variables were handled in the analyses. If applicable, describe which groupings were chosen and why $\checkmark$	3, 4 &
Statistical methods	12	( <i>a</i> ) Describe all statistical methods, including those used to control for confounding ✓	5
		(b) Describe any methods used to examine subgroups and interactions $\checkmark$	5
		(c) Explain how missing data were addressed $\checkmark$	5
		(d) If applicable, describe analytical methods taking account of sampling strategy $\checkmark$	5
		(e) Describe any sensitivity analyses ✓	5
Results			
Participants	13*	<ul> <li>(a) Report numbers of individuals at each stage of study—eg numbers potentially eligible, examined for eligibility, confirmed eligible, included in the study, completing follow-up, and analysed ✓</li> </ul>	6, 7 8
		(b) Give reasons for non-participation at each stage ✓	6, 7 8
		(c) Consider use of a flow diagram $\checkmark$	6, 7 8
Descriptive data	14*	(a) Give characteristics of study participants (eg demographic, clinical, social) and information on exposures and potential confounders ✓	6, 7 8
		(b) Indicate number of participants with missing data for each variable of interest $\checkmark$	6, 7 8
Outcome data	15*	Report numbers of outcome events or summary measures 🗸	9 &
Main results	16	( <i>a</i> ) Give unadjusted estimates and, if applicable, confounder-adjusted estimates and their precision (eg, 95% confidence interval). Make clear	9 &

Enseignement Superieur (ABES) Protected by copyright, including for uses related to text and data mining, Al training, and similar technologies.

		( <i>b</i> ) Report category boundaries when continuous variables were categorized ✓	9 & 10
		( <i>c</i> ) If relevant, consider translating estimates of relative risk into absolute risk for a meaningful time period $\checkmark$	9 & 10
Other analyses	17	Report other analyses done—eg analyses of subgroups and interactions, and sensitivity analyses $\checkmark$	
Discussion			
Key results	18	Summarise key results with reference to study objectives $\checkmark$	11 & 12
Limitations	19	Discuss limitations of the study, taking into account sources of potential bias or imprecision. Discuss both direction and magnitude of any potential bias $\checkmark$	11 & 12
Interpretation	20	Give a cautious overall interpretation of results considering objectives, limitations, multiplicity of analyses, results from similar studies, and other relevant evidence $\checkmark$	11 & 12
Generalisability	21	Discuss the generalisability (external validity) of the study results $\checkmark$	11 & 12
Other information			
Funding	22	Give the source of funding and the role of the funders for the present study and, if applicable, for the original study on which the present article is based $\checkmark$	Title page

\*Give information separately for exposed and unexposed groups.

**Note:** An Explanation and Elaboration article discusses each checklist item and gives methodological background and published examples of transparent reporting. The STROBE checklist is best used in conjunction with this article (freely available on the Web sites of PLoS Medicine at http://www.plosmedicine.org/, Annals of Internal Medicine at http://www.annals.org/, and Epidemiology at http://www.epidem.com/). Information on the STROBE Initiative is available at www.strobe-statement.org.

**BMJ** Open

# **BMJ Open**

# Predictive Factors Associated with Health-Related Quality of Life in Patients with Colorectal Cancer in Iran: A Cross-Sectional Study

Journal:	BMJ Open
Manuscript ID	bmjopen-2024-086544.R2
Article Type:	Original research
Date Submitted by the Author:	24-Aug-2024
Complete List of Authors:	dahouri, amirmohammad; Tabriz University of Medical Sciences, Community health nursing Sahebihagh, Mohammad Hasan; Tabriz University of Medical Sciences, Community Health Nursing Gilani, Neda; Tabriz University of Medical Sciences
<b>Primary Subject Heading</b> :	Oncology
Secondary Subject Heading:	Nursing, Oncology
Keywords:	Risk Factors, ONCOLOGY, Aging, Chronic Disease, Gastrointestinal tumours < GASTROENTEROLOGY, Public health < INFECTIOUS DISEASES





I, the Submitting Author has the right to grant and does grant on behalf of all authors of the Work (as defined in the below author licence), an exclusive licence and/or a non-exclusive licence for contributions from authors who are: i) UK Crown employees; ii) where BMJ has agreed a CC-BY licence shall apply, and/or iii) in accordance with the terms applicable for US Federal Government officers or employees acting as part of their official duties; on a worldwide, perpetual, irrevocable, royalty-free basis to BMJ Publishing Group Ltd ("BMJ") its licensees and where the relevant Journal is co-owned by BMJ to the co-owners of the Journal, to publish the Work in this journal and any other BMJ products and to exploit all rights, as set out in our <u>licence</u>.

The Submitting Author accepts and understands that any supply made under these terms is made by BMJ to the Submitting Author unless you are acting as an employee on behalf of your employer or a postgraduate student of an affiliated institution which is paying any applicable article publishing charge ("APC") for Open Access articles. Where the Submitting Author wishes to make the Work available on an Open Access basis (and intends to pay the relevant APC), the terms of reuse of such Open Access shall be governed by a Creative Commons licence – details of these licences and which <u>Creative Commons</u> licence will apply to this Work are set out in our licence referred to above.

Other than as permitted in any relevant BMJ Author's Self Archiving Policies, I confirm this Work has not been accepted for publication elsewhere, is not being considered for publication elsewhere and does not duplicate material already published. I confirm all authors consent to publication of this Work and authorise the granting of this licence.

terez oni

Enseignement Superieur (ABES) Protected by copyright, including for uses related to text and data mining, AI training, and similar technologies



	BMJ Open Gree B
	ber
1	<u>الأ</u> كُلُ
ן כ	yrig Yrig
2	
4	, 66 5.
5	"Predictive Factors Associated with Health-Related Quality of Life in Patients with Colorectal Cancer in Iran: A @cossSectional Study"
6	Amirmohammad Dahouri <sup>1</sup> , Mohammad Hasan Sahebihagh <sup>2*</sup> , Neda Gilani <sup>3</sup>
7	<sup>1</sup> Departement of community health nursing, Faculty of nursing and midwifery, Tabriz University of Medical Scienters, wabriz, Iran
8	<sup>2</sup> Professor of Nursing Education, Tabriz Health Services Management Research Center and Department of Community Health Nursing, Tabriz
9	University of Medical Sciences, Tabriz, Iran
10	³Department of Statistics and Epidemiology, Faculty of Health, Tabriz University of Medical Sciences, Tabriz, Iran 🚆 👸 👼
11	Article type: Original
12	Corresponding Author
13 17	Mohammad Hasan Sahebihagh, <u>sahebihagh@tbzmed.ac.ir</u> , Phone: +989143135837, Fax: 34796969
15	No. words:3404, No. Tables: 3 နိုင္က ရွိ
16	
17	
18	ata Afr
19	<u>n B</u> BB
20	
21	
22	
23 24	aini ș
25	
26	a B
27	d s C
28	
29	lar on
30	
31 27	hnc
33	
34	pies 202
35	
36	
37	
38	Ce
39 40	
40 41	
42	
43	bio di la constanza di la const
44	
45	For peer review only - http://bmjopen.bmj.com/site/about/guidelines.xhtml
46	-
47	

Page 2 of 20

of 20	BMJ Open	cted b	/bmjop
	2	у сору	ben-202
	Abstract	right, incl	.4-086544
	<b>Objectives:</b> This study aims to identify the primary factors influencing health-related quality of life (HRQoL) in (CRC), hypothesizing that specific patient characteristics and clinical factors significantly impact HRQoL.	uding for	kents with colorectal cancer
	<b>Design:</b> This was a cross-sectional study conducted over one month, from April 1 to May 1, 2022.	USes I	ptemb
	Setting: The study was conducted in five hospitals in the northwest region of Iran, focusing on outpatient chemo	elated	rapy services.
	<b>Participants:</b> A total of 251 patients diagnosed with colon and rectal cancer participated in the study. Inclusion diagnosis by an oncologist, ability to communicate, willingness to participate, and being aware of their diagnosis were the presence of other chronic diseases, cognitive disorders, known mental disorders, and unwillingness to participate disorders.	todex# and	Reria included a confirmed Beatment. Exclusion criteria
	Interventions: No interventions were applied as this was an observational study.	data mi	ed fron
	<b>Primary and Secondary Outcome Measures:</b> The primary outcome was the HRQoL of CRC patients, measu questionnaire. Secondary outcomes included the impact of demographic and clinical factors on HRQoL.	ining, Alt	sing a standardized SF-36
	<b>Results:</b> The total score of HRQoL in these patients is $47.22\pm16.78$ , which indicates that HRQoL is disturbed in the stepwise multiple regression revealed that among all the participants' characteristics considered, seven fact besides Cancer (P<0.001, $\beta$ : 12.91, 95% CI: 8.40, 17.42), only receiving chemotherapy (P<0.001, $\beta$ : 9.10, 95% cl: 5.70, 14.84), female sex(P=0.046, $\beta$ : -4.52, 95% CI:-8.95, -0.08), living in the 95% CI: 4.77, 17.73), living in city (P=0.002, 17.74, 95% CI: 6.51, 28.96), and finally not having a job(P=0.003, including are the factors that have the most predictive power in HRQoL.	raiໜິກ໘ ຊີກິd <u>s</u> imilar techrgol	catients. Also, the results of mot having another disease (1, 4.12, 14.09), not having whouse (P=0.001, β: 11.25, 47, 95% Cl: -12.31, -2.63), che characteristics of patients
	with CRC as identified in this study. Notably, several HRQoL scores in CRC patients are low, and the study found as presence of colostomy, unemployment, female gender, and comorbidities, significantly predict the overall HRQ focus on interventional studies aimed at minimizing the adverse effects of disease symptoms on HRQoL in these	ta Ba Ba La Vuli	t Ratient characteristics, such Refere. Future research should nerable patients.
	Strengths and Limitations of This Study		lgence
	<ul> <li>Utilized a well-established instrument to assess HRQoL.</li> <li>Considered cultural influences on HRQoL experiences.</li> </ul>		Bibliographi
	For peer review only - http://bmjopen.bmj.com/site/about/guidelines.xhtml		yue de l

**BMJ** Open

3

- Addressed potential biases from self-reported questionnaires. .
- The cross-sectional design limits the ability to establish causality. .
- Achieved a 100% response rate, which may introduce selection bias.

Keywords: Health-related quality of life, Demographic Factors, Risk Factors, Colorectal Cancer, Oncology

### 1. Introduction

1 2 3

4

5

6 7

8 9

10 11

12

13

14 15

16

17

18

19

20 21

22

23 24

25

26

27

28 29

30

31 32

33

34

35

36 37

38

39

40

45 46 47

cted by copyright, including for uses rel /bmjopen-2024-086544 on 28 September Enseig Colorectal cancer (CRC) is one of the most common cancers worldwide, with its incidence projected to incre 🖧 💩 3.2 million new cases and 1.6 million deaths by 2040(1). In Iran, the incidence rate of CRC has notably increased over the past 25 years 25 . A recent report from the Iranian National Population-based Cancer Registry (INPCR) predicts a significant rise in the incidence of color in CRC) in Iran. The number of new CRC cases is expected to surge by 54.1%, increasing from 11,558 cases in 2016 to 17,812 case by 2025(4). Tragically, CRC claims the lives of approximately 30,000 individuals in Iran annually (5, 6). The rise in CRC can be attributed ன 🕱 tors such as increased life expectancy, lifestyle changes, and advancements in diagnostic and therapeutic methods(7). As the life and the changes are compared by the second improved, there is growing recognition of the importance of addressing their quality of life (QOL) concerting). Numerous studies have emphasized the measurement and evaluation of cancer outcomes in terms of patient survival and QOL during and after treatment(9-11). Assessing the health-related quality of life (HRQoL) in cancer patients provides valuable insights into unaddressed emotional, social, and psychological concerns, and assists in assessing the impact of the disease on survivors(10).

HRQoL is a multidimensional concept that encompasses physical, mental, emotional, and social functionin (12). Several factors have been identified as influencing HRQoL in CRC patients, including sociodemographic characteristics, treatment-related factors, and lifestyle-related factors such as smoking, physical activity, diet, and alcohol consumption(13). HRQoL is significantly associated with non-communicable chronic diseases such as cancer, impacting both physical and mental health outcomes(14). Therefore, evaluating HEQoL can provide valuable information about the physical and mental well-being of cancer patients, as well as their social relationships and gverall perception of health and well-being(15). Jun

Numerous studies have investigated the factors influencing HRQoL in CRC patients. One of them has show that specific patient subgroups may be at a higher risk of diminished HRQoL(16). Some others have showed that age,(16-18) gender,(12) comorbid conditions,(16, 17) income, (19) and education (16, 18) may effect discernment of health. Additionally, cancer-related factors, such as me since diagnosis, cancer recurrence, multiple primary cancers, and recent initiation of cancer treatment, have been associated with HRQo cancer patients (16, 18). Disparities in HRQoL between genders have yielded variable results, with most studies reporting poorer HRO kampa women, although some studies have found no differences in patients living with ostomies. Variations across sociodemograpic groups have also been documented (20-24). Furthermore, body mass index and physical activity have been recognized as essential factors in HRQoL, with obesity being linked to lower HRQoL(18, 25). ographique de l

Page 5 of 20

5

6

7

8

9

10 11

12

13 14

15

16

17

18

19 20

21

22

23

24 25

26

27

28 29

30 31

32

33

34

35 36

37

38

39

40

41 42

43 44

45 46 47

BMJ Open 4 Healthcare providers involved in the care and management of CRC patients should consider HRQoL and its of fluencing factors (26, 27). Timely identification of patients at risk of impaired HRQoL enables early interventions to enhance their well-be fg( 🔊). Moreover, the influence of ethnicity, culture, and socioeconomic status can introduce fundamental variations in the factors influencin HREOL(16, 18, 19, 22). Despite the high prevalence and increasing trend of CRC in Iran, along with the importance of HRQoL, there is a scatting for ganized studies in this area. Therefore, this cross-sectional study aims to determine the predictive power of patient characteristic and RQoL in colorectal cancer tember 2024. Enseignemer patients in Iran.

#### 2. Methods

#### 2.1 Ethical consideration

This study adhered to ethical principles, with all necessary approvals and permissions obtained. The research giangeceived approval from the Research Council and the Research Vice-Chancellor of the Faculty of Nursing and Midwifery at Tabriz University Additionally, permission to conduct the research was obtained from the esteemed Research Vice-Chancellor of Tabriz University of Med诺羅 摹iences. The regional ethics committee approved the study with reference number IR.TBZMED.REC.1401.046. Prior to conducting the approved the study with reference number IR.TBZMED.REC.1401.046. from the research environment where the investigation took place. The research objectives were clear and splained to the potential participants, and their voluntary participation was sought. To safeguard confidentiality, participants were assured that their personal information would be treated with utmost confidentiality. Instead of using their actual names, a coding system was employed to anonymize the participants' identities in the questionnaire. The study strictly adhered to ethical principles regarding the use of the research and sources. Proper citation and referencing were employed, acknowledging the original authors and respecting intellectual property rights. Furthermore, upon request, the research findings were shared with the participants, promoting transparency and accountability, by adhering to these ethical considerations, the study aimed to protect the rights and well-being of the participants, maintain the confidering of their information, and similar ensure the integrity and reliability of the research findings. m on

#### 2.2 Study design

A cross-sectional study was conducted from April 1, 2022, to May 1, 2022. The target population consisted 🗟 patients diagnosed with colon and rectal cancer. During the sampling process, the distinction between the presence or absence of a colostomy, and whether the colostomy bag was permanent or temporary, was not considered. All participants were patients referred to out patient chemotherapy centers. Convenience sampling was employed as the sampling method. The researcher approached five hospitals, namely Sahid Madani, Shahid Ghazi, Alinasab, Shahriar, and Valiasr in Tabriz. Qualified and interested individuals were invited to participate in the study by completing the research questionnaire. The methodology of this research involved the researcher visiting the research environment, an dafter obtaining permission from hospital managers, distributing questionnaires to patients in a manner that did not interfere with their treat ment process. The inclusion criteria were: a definitive diagnosis of colon or rectal cancer by an oncologist; being able to communicate; williggness to participate in the study; referral for outpatient chemotherapy; having knowledge of their illness and the type of treatment receive defined he exclusion criteria were:

ස්

phique

de

BMJ Open 5 suffering from other chronic diseases such as diabetes, kidney diseases, or any organ defects that could affect the could affect quality of life according to the participants' statements; presence of cognitive disorders (such as Alzheimer's) according to te statements of the participant or their companions; known mental disorders according to the statements of the participant, their companies, or records in their file; and unwillingness to participate in the study.

### 2.3 Sample size calculation

willingness to participate in the study. **3 Sample size calculation** In our study, we carefully considered the number of independent factors, which amounted to 22. Adheding to "Green's rule of thumb," which suggests that the sample size should be a minimum of 50 plus 8 times the number of predictors, we cate at the sample size should be a minimum of 50 plus 8 times the number of predictors, we cate at the sample size should be a minimum of 50 plus 8 times the number of predictors. of 226 would be appropriate (29). This calculation took into account a significance level ( $\alpha$ ) of 0.05 and a des  $\alpha$  bower of 0.8. To ensure the detection of a medium effect size (0.14 for small effects, 0.39 for medium effects, and 0.59 for large effects), and a conservative 10% allowance for potential participant dropout, resulting in a minimum sample size of 251 (226 \* 0.9). Toudet rmine the sample size, we employed Statistics Kingdom as a reliable tool (30). eur (A data

mining, Al tra

# 2.4 Data collection

In this study, two questionnaires were used as follows:

# 2.4.1 Participants' characteristics

In this study, the characteristics of patients were assessed using a researcher-designed questionnaire aimed a capacity of patients demographic and clinical variables. These variables encompassed age, sex, marital status, educational background, occupations insurance coverage, place of residence, housing type, type of treatment received, duration of the most recent chemotherapy cycle, fame history of cancer among both close and distant relatives, presence of cancer metastasis, number of completed chemotherapy sessions concurrent presence of other diseases, duration of surgery (if applicable), weekly exercise frequency, height, weight, and body mass index (Bevil). The questionnaire was administered comprehensively to collect data on participant characteristics, facilitating a thorough an  $\frac{2}{3}$  ysis of the study population. Additionally, significant attention was directed towards "Income Adequacy," a measure that evaluates whether a household's income suffices to meet its expenses from a subjective standpoint. This assessment not only considers the actual income level but also gauges the perceived capability to cover necessary expenditures, thereby offering a nuanced insight into economic stress and finginc is satisfaction. Through the examination of income adequacy, the study aimed to discern households experiencing financial strain despite low expenses and those feeling financially secure despite lower incomes. gence Bibliographique de l

# 2.4.2 Health-related quality of life questionnaire with 36 questions (SF-36):

 

 BMJ Open

 **b** MJ Open

 6

 **b** MJ Open

 7

 **b** MJ Open

 7

 **b** MJ Open

 6

 **b** MJ Open

 7

 **b** MJ Open

 7

 **b** MJ Open

 6

 **b** MJ Open

 7

 **b** MJ Open

 7

 **b** MJ Open

 6

 **b** MJ Open

 7

 **b** MJ Open

 7

 **b** MJ Open

 7

 **b** MJ Open

 7

 **b** MJ Open

 the impact of health on individuals' overall quality of life. Comprising 36 questions and encompassing Aght distinct components, this questionnaire utilizes the Likert scale to measure health-related quality of life. The Likert scale employs a fige-point rating system, where a score of 1 denotes "completely false," 2 signifies "somewhat false," 3 represents "I don't know," 4 indicates "Bos y true," and 5 corresponds to "completely correct". The questionnaire generates scores ranging from zero to 100, without a predetermided utoff point. Scores in each dimension are interpreted relative to the minimum and maximum values reported for that specific dimension . He her score indicates a lower level of disability within the corresponding area, while a lower score suggests a higher degree of disability. score to 100 signifies reduced disability, whereas a closer proximity to 0 indicates increased disability within 🕷 🖄 me area. Researchers may also utilize the reported minimum and maximum values for each dimension to assess the obtained scores. The construction of the subject to various studies, consistently demonstrating good validity(32-34). Additionally, it exhibits strong reliabile we evidenced by a reported Cronbach's alpha coefficient of 0.92 in a study (33). Importantly, the questionnaire has been appropriately tra 🕏 🛱 d and standardized for use haded fr rieur (A nd data in Iranian society, ensuring its applicability within this context (35, 36).

### 2.5 Data analysis

The data analysis was performed using IBM SPSS Statistics version 24. To examine the characteristics of the samples, frequency and percentage distributions were employed. Additionally, for variables exhibiting normal distributions, descriptive statistics such as mean and standard deviation were utilized. The normality of variable distributions was evaluated using the Kolmogoro Snarnov test, accompanied by Skewness and Kurtosis indices. A significance level of 0.05 was adopted for all tests conducted within this study. 🐞 investigate the predictive influence of the variables, a step-by-step linear regression model was employed. All variables, including those with multiple categories (which were transformed into dummy variables), were entered into the regression analysis. The variables demonstrating the most substantial predictive effects were selected for inclusion in the subsequent statistical analysis. It is worth noting that the subsequent statistical analysis analysis.

quality of life score served as the dependent variable. **2.6 Patients and public involvement**Patients and members of the public did not participate in the formulation of the research design, the give cution of the study, or the some publication of the research design. 2025 at Agence Bibliographique de l communication of the research outcomes.

 BMJ Open 7 **3. Results** Table 1 shows the characteristics of the study participants. A total of 256 patients consented to participate and diligently completed the questionnaires in accordance with the inclusion and exclusion criteria. Among these participants, 129 were male 49%), with 49.6% possessing a colostomy bag and 51.2% without. Similarly, 127 female patients were included (50.4%), with 50.4% of female ext biting a colostomy bag and 48.8% without. Most participants (206 individuals) were married. Regarding age distribution, the highest frequen with individuals) was in the 30-40 years age range, while the lowest frequency (28 individuals) was in the age range exceeding 60 years. One had red ninety-six participants acknowledged having children. Concerning educational attainment, the majority (81 individuals) possessed a bage br's degree, followed by 50 individuals with a diploma. Among the sample, 166 participants were employed. Furthermore, 138 individuals indi 🛱 🗟 🛣 that their income matched their expenses, and insurance coverage was reported by 228 participants. In terms of the duration since thei proportion (17.6%) reported a duration of ten months. Two hundred forty participants resided in urban areas, ar sign function of ten months. Two hundred forty participants resided in urban areas, ar sign function of ten months. their own residences. With respect to the type of treatment received, 81 patients underwent chemotherapy exau advection of the type of treatment received a combination of chemotherapy, radiotherapy, and surgery, and 77 patients underwent chemotherapy in conjuting with surgery. Of the 232 participants who completed the questionnaire, two weeks had transpired since their most recent chemotherap 🛱 😹 sion. One hundred twentyone patients affirmed a positive family history of cancer, while in 149 cases, the tumor had metastasized to determine the body. Concerning the number of chemotherapy courses, 137 patients received 1-10 courses. Additionally, 106 patients exhibited at least one comorbid condition alongside cancer. The majority of participants (223 individuals) disclosed that 1-10 months had elapsed Since their most recent surgery. Among the sample, 229 individuals engaged in sports activities for less than 10 hours per week. Two hundred fifter or participants asserted that they were sexually active prior to their disease diagnosis and commencement of treatment. In terms of weight distribution, 63 patients weighed between 45-65 kg, 126 patients fell within the 65-85 kg range, and 67 patients registered a weight of 85-105 kg. The Fajority of participants (253 individuals) exhibited heights ranging from 130-192 cm. Regarding body mass index (BMI), the majority (123 in dividuals) fell within the 18.5-25 range. Notably, the participant characteristic questionnaire did not include any information regarding cancer stage. g

Table 2 presents the comprehensive assessment of health-related quality of life (HRQoL) scores and their respective dimensions. The average score obtained (Mean=47.42, SD=16.76, Min=6, Max=75) highlights the range of values observed within the entire group, as indicated in Table 2. Notably, according to the analysis guidelines for the questionnaire, a score of 50 can be considered as a crucial Birebiold for evaluating HRQoL. Comparatively, when considering scores obtained from a similar study conducted in Iran (The average QoL score was 7.28 ± 8.86 for colon cancer and 76.5 ± 8.47 for rectal cancer)(37), it becomes apparent that our patients exhibit significant disturbances in their BRQoL. This finding adds an intriguing aspect to the investigation, emphasizing the need for further exploration and potential interventions to addess the compromised wellbeing of these individuals. Bibliographique de l

Page 9 of 20

5

6

7 8

9

10 11

12

13 14

15

16

17

18

19 20

21

22

23 24

25

26

27 28

29

30

31

32 33

34

35

36

37 38

39

40 41

42

43 44

45 46 47 BMJ Open 8 8 Table 3 summarizes the results of a stepwise regression analysis conducted on 22 factors to determine their impaction the total health-related quality of life score. Among these variables, seven were found to have a significant effect on the outcome measure. 4 ot bly, the "Location" variable exhibited the most substantial influence, with a standardized beta value and a 95% confidence interval ranging fro 🖨 6. 🕉 1 to 28.96 (P=0.002). These findings highlight the importance of considering the "Location" variable in understanding and improving overall 🛱 alt -related quality of life. The significance of these results brings excitement and underscores their potential implications for future research and treventions targeting the tember 2024 Enseimm enhancement of health-related quality of life in the studied population.

### 4. Discussion

HRQoL has emerged as a crucial outcome measure for patients afflicted with CRC(38). HRQoL goes beyond the wall being of cancer patients, as it also influences treatment response and survival rates. Several studies have extensively examined factors that in 22 HRQoL assessment in CRC, highlighting the substantial influence of symptoms, surgical procedures, and comorbidity burden on overall well be (8). The aim of this study was to assess the influential factors associating HRQoL in individuals with colorectal cancer and provide a compreh 奇唱 analysis of its dimensions. The study findings revealed consistently low scores in various domains of HRQoL among individuals with colorectars and the suggests that the challenges posed by cancer and its treatment have a detrimental impact on the HRQoL experienced by individuals the colorectal cancer. These findings are consistent with previous studies reporting unfavorable HRQoL outcomes among CRC patients (32-41. Furthermore, systematic reviews conducted across diverse literature sources have consistently demonstrated a significant decline in qua ity of life among these patients (42, 43).

In this study, a thorough evaluation and comparison of eight dimensions of HRQoL was undertaken. The findings revealed that the dimension scoring the lowest was general health, followed by physical functioning and pain. Conversely, emotional well-being achieved the highest score, followed by role limitations due to physical health and role limitations due to emotional issues. These outcomes are consistent with those of Domati et al., who examined HRQoL in individuals with colorectal cancer compared to healthy controls (44). How every discrepancies between our study and prior research could stem from variations in participant demographics, sample size, and cultural, economic, and social contexts. Moreover, our study identified a significant association between reduced physical functioning and disability, which Empacts independence (45). Previous research has also underscored the importance of understanding how ostomies affect HRQoL to better prepare patients pre-surgery (46). Therefore, comprehensive knowledge and improved physical function are pivotal for enhancing physical aspects **e** HRQoL and overall well-being. These findings underscore the imperative for oncologists, psychiatrists, oncology nurses, and health policymakers to phoritize HRQoL in colorectal cancer patients. Addressing these identified dimensions and fostering patient adaptation can markedly enhance over all quality of life, particularly across the dimensions highlighted.

In accordance with the findings of this study, several participant characteristics have been identified as significant predetors of HRQoL. Specifically, the presence of other diseases besides cancer was associated with higher HRQoL scores compared to those witeout additional conditions. Regarding treatment type, individuals who underwent combined chemotherapy and radiotherapy demonstrated superior HRQoL scores compared

ohique

de

#### **BMJ** Open

9

cted by copyrigh /bmjopen-2024-0 to those who only received chemotherapy followed by surgery. Participants without a colostomy reported higher BR BC scores than those with a colostomy bag. Furthermore, male participants and tenants exhibited higher HRQoL scores than their female gourterparts and homeowners, respectively. Urban residents also showed higher HRQoL scores compared to rural residents, and employed in divide als reported better HRQoL than the unemployed. These findings align with studies by Naomi et al. (47), Kristensen et al. (48), and Dahouri et al 49 which similarly highlighted various factors influencing HRQoL such as age, marital status, employment, and presence of a colostomy. The dispariaes observed across studies can be attributed to cultural contexts and socioeconomic differences among populations. In our study conducted 🛱 🛱 and, factors like housing type, geographic location, and treatment type, which are linked to income levels, emerged as significant determina is affecting HRQoL. Therefore, based on these findings and existing literature, it is evident that factors such as colostomy presence, unen being whent, female gender, and comorbidities play crucial roles in influencing HRQoL. Health policymakers should consider these factors at a migre-level to optimize healthcare interventions for individuals affected by colorectal cancer, thereby potentially improving their HRQoL through the strategies and timely support.

Furthermore, it is imperative to acknowledge the implications of the present study's findings for future interven at mitigating the negative impact of disease symptoms on the HRQoL of CRC patients. Prospective longitudinal research end are should comprehensively evaluate the influence of various factors, including lifestyle choices, health behaviors, psychological determinan big wind other relevant variables, on HRQoL outcomes. As the population of cancer survivors continues to grow, addressing the multidimensional  $g_{spec}$  ts of HRQoL through longterm nursing care provisions becomes increasingly crucial. This study highlights the robust correlation between so do- mographic factors and the overall HRQoL score among CRC patients. The identification of these socio-demographic factors underscores their significance in the treatment and care of CRC patients, necessitating healthcare professionals to consider them in their clinical practice to enhance IRQoL outcomes.

It is crucial to acknowledge both the strengths and limitations of this study. The utilization of a well-established Bistedment to assess HRQoL is a notable strength. Nevertheless, it is essential to consider the influence of cultural factors on the results, as culurated context can shape HRQoL experiences. Future studies should explore this aspect in various cultural contexts to enhance the generalizability of the findings. Additionally, addressing the study's time limitations and sample size in future research would further improve its applicability aAlthough efforts were made to ensure data anonymity and confidentiality, the reliance on self-reported questionnaires may introduce intentional and unintentional biases. Furthermore, the cross-sectional nature of the study and the 100% response rate among participants may streeduce selection bias. These 2025 a limitations should be carefully considered when interpreting the results. ies.

#### 5. Conclusion

In conclusion, this study contributes significantly to our understanding of the factors influencing HRQoL in CR patients, highlighting that several HRQoL scores in this population are notably low. It emphasizes the need to integrate these factors into transmission and care practices to improve patients' well-being and HRQoL outcomes. Specifically, the study identified several patient characteristics, such as presence of colostomy, unemployment, female gender, and comorbidities, that exert predictive power over the overa HRQoL score. Healthcare

phique de l

Page 11 of 20	BMJ Open BMJ Open
1	10 10 10
2 3 4 5 6 7 8	professionals should prioritize the quality of life of CRC patients and tailor interventions accordingly. By addressing the influencing factors identified in this study, healthcare providers can significantly enhance HRQoL outcomes in CRC patients. For the research should focus on developing targeted interventions and conducting longitudinal studies to further explore the multidimensional spects of HRQoL in this patient population.
9 10 11 12 13	<ul> <li>Ethics approval and consent to participate</li> <li>Ethical approval for the study was granted by Tabriz University of Medical Sciences with ID: IR.TBZMED.REC.1401</li> <li>Informed consent was obtained from all participants.</li> <li>There was no under 16 participants in this research.</li> </ul>
14 15 16 17 18	All methods were carried out in accordance with relevant guidelines and regulations.  Consent for publication Not applicable Competing interests
19 20 21	Authors declare no competing interest.  • Funding
22 23	This study was supported by Tabriz University of Medical Sciences under grant number 69407.Tabriz
24 25 26 27	Informed verbal consent was obtained from all participants prior to their involvement in the study. Participants were fully informed about the study's purpose, procedures, and their rights, including the right to withdraw at any time.
28 29 30 31 32	AD, the lead investigator and guarantor of the study, designed the empirical analysis, oversaw data creation and magagement, and significantly contributed to writing the manuscript. MHS, a senior researcher and co-author, performed the literature search and made substantial contributions to the writing of the manuscript. NG, a research fellow and co-author, was involved in data creation and management, conducted empirical analyses, and contributed to the manuscript writing. AD, a lecturer and co-author, assisted in data creation and management.
33 34 35	participated in the empirical analyses, and contributed to the manuscript writing.  Acknowledgements This study was conducted as part of the Master Thesis of the first author (Amirmohammed Dahauri) at the Tabria Uni@errity of Madical Sciences
36 37 38	<ul> <li>Data Availability Statment</li> <li>Data are accessible upon reasonable request. Interested parties can obtain the data by submitting a written request by the first or corresponding</li> </ul>
38 39 40 41 42 43	authors (MHS and AD).
44 45 46	For peer review only - http://bmjopen.bmj.com/site/about/guidelines.xhtml

### 6. References

 

 BMJ Open
 11

 11
 11

 References
 Morgan E, Arnold M, Gini A, Lorenzoni V, Cabasag C, Laversanne M, et al. Global burden of colorectal canger
 2020 and 2040: incidence

 1. and mortality estimates from GLOBOCAN. Gut. 2023;72(2):338-44.

Hasanpour-Heidari S, Fazel A, Semnani S, Khandoozi S-R, Amiriani T, Sedaghat S, et al. Temporal and geog and cal variations in colorectal 2. cancer incidence in Northern Iran 2004–2013. Cancer Epidemiology. 2019;59:143-7.

Ostadghaderi M, Hanafi Bojd A, Nematollahi S, Holakoui-Naeini K. Spatial Analysis of Factors Affecting Co 3. of Geographical Weight Regression in Iran. Iranian Journal of Epidemiology. 2021;17(1):1-12.

Roshandel G, Ferlay J, Ghanbari-Motlagh A, Partovipour E, Salavati F, Aryan K, et al. Cancer in Iran 2008 to 35: recent incidence trends 4. and short-term predictions of the future burden. International journal of cancer. 2021;149(3):594-605.

Khademi IKH, Tehnizi MAH, Shafizad S. The Effect Of Self-Care Education Program On Self-Efficacy And Q and Comparent Action Program On Self-Efficacy And Comparent Action Program Ac 5. Colorectal Cancer Undergoing Chemotherapy. Preventive Medicine. 2021;8(2):0-.

Collatuzzo G, Seyyedsalehi MS, Rezaeianzadeh A, Marzban M, Rashidian H, Hadji M, et al. Consumption of Definition of Definition of Definition of the Definit 6. Products and Risk of Colorectal Cancer in Iran: The IROPICAN Study. Nutrients. 2022;14(12):2506.

Mohammadi E, Aminorroaya A, Fattahi N, Azadnajafabad S, Rezaei N, Farzi Y, et al. Epidemiologic pattern of cancers in Iran; current 7. knowledge and future perspective. Journal of Diabetes & Metabolic Disorders. 2021;20(1):825-9.

Marventano S, Forjaz MJ, Grosso G, Mistretta A, Giorgianni G, Platania A, et al. Health related quality of life in colorectal cancer patients: 8. state of the art. BMC surgery. 2013;13(2):1-7.

Moinpour CM, Sawyers Triplett J, McKnight B, Lovato LC, Upchurch C, Leichman CG, et al. Challenges posed by non-random missing 9. quality of life data in an advanced-stage colorectal cancer clinical trial. Psycho-Oncology: Journal of the Psycholog cal Social and Behavioral Dimensions of Cancer. 2000;9(4):340-54.

Mozafar Saadati H, Khodamoradi F, Salehiniya H. Associated factors of survival rate and screening for cole ectal cancer in Iran: a 10. systematic review. Journal of Gastrointestinal cancer. 2020;51:401-11.

Weis J, Gschwendtner K, Güthlin C, Holmberg C, Horneber M. Utilisation of complementary medicine in concern patients and survivors: 11. Expected benefits and its association to psychosocial factors. European Journal of Cancer Care. 2022;31(6):e1369

Ratliff CR, Haugen V. Selecting a tool for assessing health-related quality of life in ostomates. Journal of WBund Ostomy & Continence 12. Nursing. 2013;40(5):462-7.

Tiselius C, Rosenblad A, Strand E, Smedh K. Risk factors for poor health-related quality of life in patients with solon cancer include stoma 13. and smoking habits. Health and Quality of Life Outcomes. 2021;19(1):1-11.

Xiao M, Zhang F, Xiao N, Bu X, Tang X, Long Q. Health-related quality of life of hypertension patients: A population-based cross-sectional 14. study in Chongqing, China. International journal of environmental research and public health. 2019;16(13):2348.

Rodriguez JL, Hawkins NA, Berkowitz Z, Li C. Factors associated with health-related quality of life among color concers survivors. 15. American journal of preventive medicine. 2015;49(6):S518-S27. ographique de l

Page 13 of 20

2 3

e 13 of 20	BMJ Open	cted b	Льшјор
	12	v copvr	ven-202
	<ol> <li>Weaver KE, Forsythe LP, Reeve BB, Alfano CM, Rodriguez JL, Sabatino SA, et al. Mental and Physical Healt among US Cancer Survivors: Population Estimates from the 2010 National Health Interview SurveyHealth-Related Cancer Survivors. Cancer Epidemiology, Biomarkers &amp; Prevention. 2012;21(11):2108-17.</li> <li>Trentham-Dietz A, Remington P, Moinpour C, Hampton JM, Sapp A, Newcomb P. Health-related quality of colorectal cancer survivors. The oncologist. 2003;8(4):342-9.</li> <li>Jansen L, Koch L, Brenner H, Arndt V. Quality of life among long-term (&gt; 5 years) colorectal cancer survivors of cold journal of cancer. 2010;46(16):2879-88.</li> <li>Ramsey SD, Berry K, Moinpour C, Giedzinska A, Andersen MR. Quality of life in long term survivors of cold journal of gastroenterology. 2002;97(5):1228-34.</li> <li>Mahjoubi B, Mirzaei R, Azizi R, Jafarinia M, Zahedi-Shoolami L. A cross-sectional survey of quality of life in Ina. Health and Quality of Life Outcomes. 2012;10(1):1-6.</li> <li>Verweij N, Bonhof C, Schiphorst A, Maas H, Mols F, Pronk A, et al. Quality of life in elderly patients with a population-based PROFILES registry. Colorectal Disease. 2018;20(4):092-0102.</li> <li>Krouse RS, Herrinton LJ, Grant M, Wendel CS, Green SB, Mohler MJ, et al. Health-related quality of life an survivors with an ostomy: manifestations by sex. J Clin Oncol. 2009;27(28):4664-70.</li> <li>Schlesinger S, Walter J, Hampe J, von Schönfels W, Hinz S, Küchler T, et al. Lifestyle factors and health-rely Schlesinger S, Walter J, Hampe J, von Schönfels W, Hinz S, Küchler T, et al. Lifestyle factors and health-rela- ermatological adverse events from anti-cancer therapies. Supportive Care in Cancer. 2022;1-15.</li> <li>Al-Habsi Z, Al-Noumani H, Al Hashmi I. Determinants of health-related quality of life among Omanis hosp cross-sectional study. Quality of Life Research. 202;31(7):2061-70.</li> <li>Barbosa MV, Dos Santos MP, Leite JA, Rodrigues VD, de Pinho NB, Martucci RB. Association between func rel</li></ol>	R u fe Enseighemend Superieur (ABESE: fc c o li or 1 n a s Prinhton Pludin I for uses related to text and data Azin Bao. Algraininto. and similar technologoies: in p a s	A patients with cancer: a patients with cancer: a patients with coronary heart of SF-36 Standard tool.
	Payesh. 2006;5(1):0		bliograp
	For peer review only - http://bmjopen.bmj.com/site/about/guidelines.xhtml		shique de l

BMJ Open	oted by	
13		en-2022
33. Rifati S, Bagheri Z, Jafari P, Soltani N. Using Confirmatory Factor Analysis To Evaluate The Structure Of que Of The SF-36 Questionnaire In Healthy Individuals And People With Chronic Diseases. (MEDICAL JOURNAL OF HOR 2015:19(2):	stiq	GAN UNIVERSITY).
34. Niloofar M, Ayatollah SA, Zare N, Ali SHA. Evaluation Of Validity And Reliability Of A 36-Item General Heal Shiraz Medical School-2001.	h A	န္တာ Sessment Questionnaire In ကို
35. Asadollahi A, Ismaeli A, Fani-Saberi L. Validity and Reliability of Quality of life test among Ahwaz Older Ad studies. 2016;9(32):7-15.		n 2016. Sociological
36. Motamed N, Ayatollahi A, Zare N, Sadeghi Hassanabadi A. Validity and reliability of the Persian translation guestionnaire. EMHJ-Eastern Mediterranean Health Journal, 11 (3), 349-357, 2005. 2005.	iggem	the SF-36 version 2
37. Akhondi-Meybodi M, Akhondi-Meybodi S, Vakili M, Javaheri Z. Quality of life in patients with colorectal castroenterology. 2016;17(3):127-30.		fin Iran. Arab Journal of
<ol> <li>Osoba D. Lessons learned from measuring health-related quality of life in oncology.: 1. Rehabilitation On</li> <li>Bonhof CS, van de Poll-Franse LV, Wasowicz DK, Beerepoot LV, Vreugdenhil G, Mols F. The course of perig</li> </ol>		57. 1994;12(2):18. I neuropathy and its
association with health-related quality of life among colorectal cancer patients. Journal of Cancer Survivorship. 20 40. Gigic B, Nattenmüller J, Schneider M, Kulu Y, Syrjala KL, Böhm J, et al. The role of CT-quantified body com		5:190-200. Son on longitudinal health-
41. El Alami Y, Essangri H, Majbar MA, Boutayeb S, Benamr S, El Malki HO, et al. Psychometric validation of the EQRTC QLQ-C20 in colorectal Cancer patients: cross sectional study and systematic literature review. BMC cancer	γ e Μ Δ	proccan version of the
42. Flyum IR, Mahic S, Grov EK, Joranger P. Health-related quality of life in patients with colorectal cancer in the systematic review and meta-analysis. BMC Palliative Care. 2021;20:1-18.	je r	alliative phase: a
43. Kristensen HØ, Thyø A, Christensen P. Systematic review of the impact of demographic and socioeconomic ostomized colorectal cancer survivors. Acta Oncologica. 2019;58(5):566-72.	s fa	tors on quality of life in
44. Domati F, Luppi G, Reggiani-Bonetti L, Zironi S, Depenni R, Fontana A, et al. The perception of health-relation cancer patients during chemotherapy: differences between men and women. Internal and emergency medicine.	ed ( 01:	uality of life in colon 210:423-9.
45. Organization WH. International Classification Of Functioning, Disability, and Health: Children & Youth Verg	ion	HCF-CY: World Health
46. Näsvall P, Dahlstrand U, Löwenmark T, Rutegård J, Gunnarsson U, Strigård K. Quality of Life In Patients Wa Rectal Cancer Surgery. Quality Of Life Research. 2017;26(1):55-64.	th A	Permanent Stoma After
<ol> <li>Ito N, Tanaka M, Kazuma K. Health-Related Quality Of Life Among Persons Living In Japan With A Permane Wound Ostomy &amp; Continence Nursing. 2005;32(3):178-83.</li> </ol>	ent (	olostomy. Journal of
48. Kristensen HØ, Thyø A, Emmertsen KJ, Smart NJ, Pinkney T, Warwick AM, et al. Surviving rectal cancer at t survey of long-term health-related quality of life in 10 countries. BJS open. 2022;6(6):zrac085.	he	bst of a colostomy: global
49. Dahouri A, Sahebihagh M. Comparison of health-related quality of life in people with colorectal cancer wit in Tabriz hospitals 2022. 2022.	th a	d without colostomy bag
For peer review only - http://bmjopen.bmj.com/site/about/guidelines.xhtml	1	

Page 15 of 20

		<b>,</b>	
Variable	Classes	N (Valid Percent)	
	30 to 40	67 (26.2)	
A	40 to 50	46 (18.0)	
Age	50 to 60	95 (37.1)	
	More than 60	48 (18.8)	
0	Male	129 (50.4)	
Sex	Female	127 (49.6)	
	Single	22 (8.6)	
Marital Status	Married	206 (80.5)	
	Divorced and widowed	28 (10.9)	
	Under Diploma	50 (19.5)	
Education and a second s	Diploma	73 (28.5)	
Education	Bachelor	81 (31.6)	
	Post Graduate 🗸 🦲	52 (20.3)	
	Employed	166 (64.8)	
JOD	Unemployed	90 (35.2)	
	Income Equals Expenditure	138 (53.9)	
Income	Income More Than	42 (16.4)	
	Expenditure		
Adequacy	Income Less Than	76 (29.7)	
	Expenditure		
Having	Yes	228 (89.1)	
Insurance	No	28 (10.9)	
Lesster	City	240 (93.8)	
Location	Village	16 (6.3)	
	Personal	228 (89.1)	
Housing Type	Rent	28 (10.9)	
	Only Chemotherapy	81 (31.6)	
Type of Treatment	Chemotherapy-	98 (38.3)	
	Radiotherapy-surgery		
	Chemotherapy-surgery	77 (30.1)	
	<5	232 (90.6)	

/bmjopen-2024-086544 on 28 September 2024. Downloaded from http://bmjopen.bmj.com/ on June 11, 2025 at Agence Bibliographique de l Enseignement Superieur (ABES) . cted by copyright, including for uses related to text and data mining, Al training, and similar technologies.

Page 16 of 20

BMJ Open

Time of Last	≥5-10	24 (9.4)
Chemotherapy	Mean (SD)	3.10 (4.04)
(week)		
	Positivo	121 (47.2)
Family History	Negative	121 (47.3)
	Vos	135 (52.7)
Metastasis	No	145 (30.2)
	N0	107 (41.8)
Number of	>10 20	137 (33.3) 94 (32.9)
Chemotherapy	>20.20	25 (12 7)
Courses	220-50 Moon (SD)	<u> </u>
(Number)	weart (SD)	9.34 (0.98)
	Ver	100 (11 1)
Another	Yes	106 (41.4)
Disease	NO	150 (58.6)
Besides Cancer		
	1-10	223 (87.1)
Time of Last	>11-20 And more	33 (12.9)
Surgery (Month)	Mean (SD)	6.11 (5.52)
	<u>≤10</u>	229 (89.5)
Exercise (Hour /	10-20 And more	27 (10.5)
Week)	Mean (SD)	3.42 (3.84)
Sexually Active	Active	251 (98)
	Not Active	5 (2)
Before the		.,
Disease		
	45-65	63 (24.6)
Mainht (ka)	≥65-85	126 (49.2)
vveignt (kg)	≥85-105	67 (26.2)
	Mean (SD)	74.71 (14.42)
	70-130	3 (1.2)
	>120 102	253 (98.8)
Height (cm)	2130-192	=55 (5616)
Height (cm)	Mean (SD)	169.34 (13.48)
Height (cm)	 Mean (SD) <18.5	<u>169.34 (13.48)</u> 12 (4.7)
Height (cm) Body Mass	2130-192 Mean (SD) <18.5 ≥18.5-25	169.34 (13.48) 12 (4.7) 123 (48)

/bmjopen-2024-086544 on 28 September 2024. Downloaded from http://bmjopen.bmj.com/ on June 11, 2025 at Agence Bibliographique de l Enseignement Superieur (ABES) . cted by copyright, including for uses related to text and data mining, Al training, and similar technologies.

	≥30	54 (21.1)
	Mean (SD)	25.88 (4.74)
Having	With	127 (49.6)
Colostomy	Without	129 (50.4)

Table2. Mean and standard deviation of he	alth-related quality of life by gender

	≥30	5		
	Mean (SD)	25		
Having	Having With			
Colostomy	Without	13		
Table2. Mean and	I standard deviation of h	ealth-relate	d quality o	of life by gender
Items		Total		
		Mean	SD	95% Cl Min-Max
Physica	44.96	30.97	0-100	
Role Limitatio	62.40	40.64	0-100	
Role Limitations due to Emotional Problems		62.06	41.04	0-100
Energ	52.28	15.97	5-100	
Emotion	57.57	15.58	20-100	
Social	48.05	23.99	0-100	
	43.50	25.99	0-100	
	33.46	8.42	6-56	

/bmjopen-2024-086544 on 28 September 2024. Downloaded from http://bmjopen.bmj.com/ on June 11, 2025 at Agence Bibliographique de l Enseignement Superieur (ABES) . cted by copyright, including for uses related to text and data mining, Al training, and similar technologies. 



Page 19 of 20 1 2		BMJ Open 18		/bmjopen-2024-C cted by copyrigl
3 4 5	FACTORS	β (95% CI)	Beta*	بة <u>ق</u> P <u></u> ¥Value
6 7	Another Disease Besides Cancer (yes)	12.91 (8.40, 17.42)	0.38	ding <b>9.001</b> >
8	Type of Treatment (Chemotherapy-surgery)	9.10 (4.12, 14.09)	0.25	ັດ ເ <sub>ມີ</sub> ມ <b>ີຍ</b> .001>
10	Having Colostomy (With)	10.27 (5.70, 14.84)	0.30	
12	Sex (Male)	-4.52 (-8.95, -0.08)	-0.13	ated to 20,046
13 14	Housing Type (Personal)	11.25 (4.77, 17,73)	0.22	
16	Location (Village)	17.74 (6.51, 28.96)	0.20	tand e.002
17 18	Lob (Employed)	-7.47 (-12.31, -2.63)	-0.21	
19 20	R SQUARE: 0.458 (ADJUSTED R SQUARE: 0.428)	,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	0.21	nining
21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44	* STANDARDIZED BETA COEFFICIENT			p://bmjopen.bmj.com/ on June 11, 2025 at Agence Bibliographique , Al training, and similar technologies.
45 46	For peer review only - http://l	bmjopen.bmj.com/site/about/guic	lelines.xhtml	de I

Enseignement Superieur (ABES) . Protected by copyright, including for uses related to text and data mining, Al training, and similar technologies.

2
3
1
4 7
5
6
7
8
9
10
10
11
12
13
14
15
16
10
17
18
19
20
21
22
22
23
24
25
26
27
20
20
29
30
31
32
33
24
54
35
36
37
38
30
10
40
41
42
43
44
45
16
40
47
48
49
50
51
52
52
53
54
55
56
57
58
50
27

60

STROBE Statement—	Checklist of items that should be included in reports of <i>cross-sectional studies</i>	
STRODE Statement	encennist of nemis that should be meraded in reports of cross sectional situates	

	Item No	Recommendation	Page No.
Title and abstract	1	(a) Indicate the study's design with a commonly used term in the title or the abstract $\checkmark$	1
		(b) Provide in the abstract an informative and balanced summary of what was done and what was found $\checkmark$	1
Introduction			
Background/rationale	2	Explain the scientific background and rationale for the investigation being reported $\checkmark$	2
Objectives	3	State specific objectives, including any prespecified hypotheses 🗸	2
Methods		A	
Study design	4	Present key elements of study design early in the paper $\checkmark$	3
Setting	5	Describe the setting, locations, and relevant dates, including periods of recruitment, exposure, follow-up, and data collection $\checkmark$	3 & 4
Participants	6	(a) Give the eligibility criteria, and the sources and methods of selection of participants $\checkmark$	4
Variables	7	Clearly define all outcomes, exposures, predictors, potential confounders, and effect modifiers. Give diagnostic criteria, if applicable $\checkmark$	3, 4 & 5
Data sources/ measurement	8*	For each variable of interest, give sources of data and details of methods of assessment (measurement). Describe comparability of assessment methods if there is more than one group $\checkmark$	3, 4 & 5
Bias	9	Describe any efforts to address potential sources of bias 🗸	4 & 5
Study size	10	Explain how the study size was arrived at $\checkmark$	3
Quantitative variables	11	Explain how quantitative variables were handled in the analyses. If applicable, describe which groupings were chosen and why $\checkmark$	3, 4 & 5
Statistical methods	12	( <i>a</i> ) Describe all statistical methods, including those used to control for confounding ✓	5
		(b) Describe any methods used to examine subgroups and interactions $\checkmark$	5
		(c) Explain how missing data were addressed $\checkmark$	5
		( <i>d</i> ) If applicable, describe analytical methods taking account of sampling strategy ✓	5
		( $\underline{e}$ ) Describe any sensitivity analyses $\checkmark$	5
Results			
Participants	13*	(a) Report numbers of individuals at each stage of study—eg numbers potentially eligible, examined for eligibility, confirmed eligible, included in the study, completing follow-up, and analysed $\checkmark$	6, 7 & 8
		(b) Give reasons for non-participation at each stage	6.7 & 8
		(c) Consider use of a flow diagram ✓	6.7&8
Descriptive data	14*	<ul> <li>(a) Give characteristics of study participants (eg demographic, clinical, social) and information on exposures and potential confounders ✓</li> </ul>	6, 7 & 8
		(b) Indicate number of participants with missing data for each variable of interest $\checkmark$	6, 7 & 8
Outcome data	15*	Report numbers of outcome events or summary measures $\checkmark$	9 & 10
Main results	16	<ul> <li>(a) Give unadjusted estimates and, if applicable, confounder-adjusted estimates and their precision (eg, 95% confidence interval). Make clear which confounders were adjusted for and why they were included ✓</li> </ul>	9 & 10

		( <i>b</i> ) Report category boundaries when continuous variables were categorized	9 & 10
		(c) If relevant, consider translating estimates of relative risk into absolute risk for a meaningful time period $\checkmark$	9 & 10
Other analyses	17	Report other analyses done—eg analyses of subgroups and interactions, and sensitivity analyses $\checkmark$	
Discussion			
Key results	18	Summarise key results with reference to study objectives $\checkmark$	11 & 12
Limitations	19	Discuss limitations of the study, taking into account sources of potential	
		bias or imprecision. Discuss both direction and magnitude of any potential	11 & 12
		bias 🗸	
Interpretation	20	Give a cautious overall interpretation of results considering objectives,	
		limitations, multiplicity of analyses, results from similar studies, and other	11 & 12
		relevant evidence 🗸	
Generalisability	21	Discuss the generalisability (external validity) of the study results $\checkmark$	11 & 12
Other information			
Funding	22	Give the source of funding and the role of the funders for the present study	Title
		and, if applicable, for the original study on which the present article is based	naga
			page

\*Give information separately for exposed and unexposed groups.

Note: An Explanation and Elaboration article discusses each checklist item and gives methodological background and published examples of transparent reporting. The STROBE checklist is best used in conjunction with this article (freely available on the Web sites of PLoS Medicine at http://www.plosmedicine.org/, Annals of Internal Medicine at http://www.annals.org/, and Epidemiology at http://www.epidem.com/). Information on the STROBE Initiative is available at www.strobe-statement.org.