Zahedan J Res Med Sci. 2024 January; 26(1):e133328. https://doi.org/10.5812/zjrms-133328.

Published online 2023 August 21. **Research Article**

Refining Risk Factors for Colorectal Cancer in Patients Presenting with Gastrointestinal Complaints: A Cross-Sectional Study

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Received 2022 November 16; **Revised** 2023 July 13; **Accepted** 2023 July 23.

Abstract

Background: Colorectal cancer (CRC) is a prevalent malignancy with a significant mortality rate. The epidemiology of CRC varies in different societies, and there are many risk factors. Information about epidemiological characteristics and factors associated with this cancer among Persian individuals is scarce.

Objectives: We evaluated the frequency of CRC and its risk factors in patients referring to Shahid Rahimi and Shohada-ye Ashayer hospitals in Khorramabad, Iran, in 2017 - 2020.

Methods: This was a descriptive-analytical cross-sectional study on 600 patients with gastrointestinal complaints. A researcher-made checklist was applied to collect the demographic characteristics, including age, gender, educational levels, marital status, and data related to the history of inflammatory bowel disease (IBD), smoking status, drug abuse, and family history of CRC. Data were analyzed by SPSS software version 21 at a significance level of 0.05.

Results: In this study, 303 out of 600 patients (50.5%) were male, and 297 cases (49.5%) were female. The mean age of the patients was 55.06 ± 20.62 years. There was not a significant relationship between CRC and gender (P = 0.84), age (P = 0.13), history of IBD (P = 0.522), family history of CRC (P = 0.682), educational level (P = 0.37), smoking (P = 0.815), or drug abuse (P = 0.99). However, there was a significant relationship between marital status and CRC (P = 0.049).

Conclusions: Latent genetic disorders and environmental risk factors should be considered in the etiology of CRCs. Evaluation of these factors and precise screening of patients based on standard guidelines is crucial.

Keywords: Colorectal Cancer, Inflammatory Bowel Disease, Risk Factor, Gastrointestinal Neoplasm

1. Background

Colorectal cancer (CRC) is a colon or rectum gastrointestinal malignancy. The colon and rectum cancers usually merge due to their common characteristics (1). Colorectal cancer is the third most frequent malignancy and the fourth cause of death due to cancer (2). Colorectal cancer usually originates from the glandular epithelial cells of the large bowel. A series of genetic or epigenetic mutations cause the hyper-proliferation of specific epithelium cells, leading to benign adenomas, which may sometimes progress to carcinomas (3). The main risk factors for CRC include increasing age, positive family history, pre-cancerous conditions, insufficient physical activity, obesity, and alcohol consumption (1, 4). Inflammatory bowel disease (IBD) is also associated with a two-fold risk of affliction by CRC (3). Colorectal cancer may present with rectal bleeding, abdominal lump, abdominal pain, altered bowel habits, unexplained weight reduction, and iron deficiency anemia (5). However, these symptoms are not specific to CRC, and endoscopy remains the main method for diagnosing CRC (5, 6). Different factors should be considered to choose the best treatment method for CRC. Nevertheless, the most frequent therapeutic option is surgery (7). Despite the improvements in the treatment strategies, the survival rate during five years remains at 14% in patients with distant stages of CRC (4). Information on the epidemiological characteristics and factors associated with this malignancy among the Persian population is scarce.

2. Objectives

Due to the significance of CRC and the uncertainty of its causes, we decided to conduct a study to determine the prevalence of CRC and its risk factors in patients referring to Shahid Rahimi and Shohada-ye Ashayer hospitals of Khorramabad from 2017 to 2020.

3. Methods

3.1. Study Design and Participants

This cross-sectional study was conducted at Shahid Rahimi and Shohada-ye Ashayer hospitals in Khorramabad, Iran, from 2017 to 2020. Inclusion criteria were being hospitalized in the selected hospitals due to gastrointestinal complaints, having medical records containing required data, and consent to participate in the study. The patients were excluded if they did not consent to participate in the study, had other types of cancer, or had incomplete medical records. The sampling method was a combination of stratified sampling and systematic sampling. The selected hospitals were considered as strata, and then, in these strata, the samples were selected by systematic sampling in a year-based order. Finally, 600 patients who met the inclusion criteria were included.

3.2. Data Collection

In this study, a researcher-made checklist was used to collect the data. The demographic characteristics, including age, gender, educational levels, marital status, and data related to the history of IBD, smoking status, drug abuse, and family history of CRC, were obtained by reading the medical files and the results recorded in checklists.

3.3. Data Analysis

The collected data were analyzed by SPSS software version 21. Measures of central tendency and index of dispersion were calculated. To analyze the data, a chi-square test was used. The significant level was set at 0.05 for all statistical tests.

3.4. Ethical Considerations

Written, informed, and voluntary consent was obtained from all patients. The checklists were designed anonymously, and patients' personal information remained confidential. The principles Helsinki Declaration were observed.

4. Results

In this study, 600 patients with gastrointestinal disorders were included, of whom 303 cases (50.5%) were male, and 297 patients (49.5%) were female. The mean age of patients was 55.06 ± 20.62 years. Two-hundred and sixty-five patients (44.1%) were elderly. A total of 28 patients (13 females and 15 males) were diagnosed with CRC. Other data are listed in Table 1.

Of 15 men (2.5%) and 13 women (2.2%) had been diagnosed with CRC. There was no significant relationship between gender and CRC (P = 0.84) (Table 2). Regarding the age group, 5 out of 28 patients with CRC (0.9%) were young, 12 cases (2%) were middle-aged, and 11 cases (1.8 %) were elderly. There was no significant relationship between age and CRC (P = 0.13). Regarding a history of IBD, 24 patients (4%) had no history of IBD, and four cases (0.7%) reported a history of IBD. There was no considerable relationship between IBD and CRC (P = 0.522). Regarding family history, 26 patients (4.3%) had no family history of CRC, and two cases (0.3%) mentioned a history of CRC in their first-grade relatives. Family history and CRC had no significant link (P = 0.682). In terms of marital status, 23 patients (3.8%) were married, 1 case (0.2%) was single, 3 cases (0.5%) were widows/widowers, and 1 case (0.2%) was divorced. Marital status and CRC had a significant relationship (P = 0.049). In terms of educational levels, 19 patients (4.2%) had education less than 12th grade, 3 cases (0.7%) had a high school diploma, and three cases (0.7%) had a college or university degree. There was no significant link between educational level and CRC (P = 0.37). Regarding smoking history, 23 cases (3.8%) were non-smokers, and 5 cases (0.8%) were smokers. Smoking and CRC had no remarkable relationship (P = 0.815). Also, 25 patients (4.2%) had no history of drug abuse, and three cases (0.5%) were drug abusers. Drug abuse and CRC had no significant association (P = 0.99). Further information is listed in Table 2.

5. Discussion

In the present study, 600 patients with gastrointestinal disorders were included. A total of 28 individuals (13 women and 15 men) had been diagnosed with CRC. However, there was no statistically significant relationship between CRC and gender. Gao et al., in a study on 313,350 new cases of CRC, found that more men were diagnosed with CRC (162,741 men versus 150,609 women). They reported that the age-adjusted incidence of CRC was higher in men than women (8). Also, de Kok et al. reported that the age-standardized incidence rate of CRC was 40.1 per 100,000 person-years in males and 29.4

Table 1. Demographic and Clinical Characteristics of the Patients

Characteristic	Frequency (%)
Gender	
Female	297 (49.5)
Male	303 (50.5)
Age group	
Young	172 (28.7)
Middle-aged	163 (27.2)
Elderly	265 (44.1)
Marital status	
Married	415 (69.2)
Single	107 (17.8)
Divorced	4 (0.7)
Widow/widower	74 (12.3)
Educational level [a]	
Less than 12th grade	373 (81.6)
High school diploma	58 (12.7)
College or university degree	26 (5.7)
Smoking	
Yes	129 (21.5)
No	471 (78.5)
Drug abuse	
Yes	70 (11.7)
No	530 (88.3)
Inflammatory bowel disease (IBD)	
Yes	63 (10.5)
No	537 (89.5)
Family history of colorectal cancer (CRC)	
Yes	36 (6)
No	564 (94)
CRC	
Yes	28 (4.7)
No	572 (95.3)

[a] Data on educational levels were present in 457 of patients' medical files.

per 100,000 person-years in females (9). Abotchie et al. showed that the incidence rate ratio for CRC between males and females was 1.38 (10). Overall, it has been suggested that the lifetime risk of CRC is similar in males and females; however, the incidence rate is higher in men due to a longer life expectancy in women (4). We found no statistically significant relationship between CRC and age. Inconsistent with our findings, it has been reported that the incidence rate of CRC increases rapidly with age (4). Siegel et al. found that 60% of CRC cases occurred in individuals aged $\geq$ 65 years (11). However, the proportion of cases diagnosed with CRC before the age of 50 years has increased in recent decades (12). In our study sample, 17 out of 28 patients with CRC were young and middle-aged, which may indicate that the age at diagnosis is lower in the Persian population than in other populations. In the present study, there was no considerable relationship between CRC and the history of IBD. The relationship

Table 2. Contingency Table of Colorectal Cancer by Patients' Demographic and Medical Characteristics [a,b]

Variables	No	Yes	P-Value
Gender			0.84
Male	288 (95.05)	15 (4.95)	
Female	284 (95.62)	13 (4.38)	
Age group			
Young	167 (97.09)	5 (2.91)	0.13
Middle-aged	151 (92.64)	12 (7.36)	
Elderly	254 (95.85)	11 (4.15)	
Inflammatory bowel disease (IBD)			0.522
No	513 (95.53)	24 (4.47)	
Yes	59 (93.65)	4 (6.35)	
Family history of colorectal cancer (CRC)			0.682
No	538 (95.4)	26 (4.6)	
Yes	34 (94.44)	2 (5.56)	
Marital status			0.049*
Married	392 (94.46)	23 (5.54)	
Single	106 (99.07)	1 (0.93)	
Divorced	71 (95.95)	3 (4.05)	
Widow/widower	3 (75)	1 (25)	
Educational level			0.37
Less than 12th grade	354 (94.91)	19 (5.09)	
High school diploma	55 (94.83)	3 (5.17)	
College or university degree	23 (88.46)	3 (11.54)	
Smoking			0.815
No	448 (95.12)	23 (4.88)	
Yes	124 (96.12)	5 (3.88)	
Drug abuse			0.99
No	505 (95.28)	25 (4.72)	
Yes	67 (95.71)	3 (4.29)	

[a] Values are presented as No. (%).
[b] Statistically significant relationship.

between IBD and CRC has been described in several studies. Gillen et al. found an 18-fold rise in the risk of developing CRC in patients with Crohn's colitis and a 19-fold rise in patients with ulcerative colitis compared to the general population (13). However, Jess et al. reported that the overall risk of CRC among individuals with ulcerative colitis was similar to that of the general population (14). We found no remarkable relationship between CRC and a family history of CRC. In contrast to our study, Weigl et al. found a strong association between family history and CRC risk (15). Roos et al., in a meta-analysis, reported a relative risk of 1.92 for CRC in patients with 1 first-degree relative in case-control studies and 1.37 in cohort studies (16). Savijärvi et al. reported that colon cancer incidence was higher among individuals with high educational levels (17). However, the present study had no statistically significant association between CRC and educational levels. We found no significant relationship between CRC and smoking. In contrast to our study, Botteri et al., in a meta-analysis, concluded that cigarette smoking was considerably associated with CRC incidence (18). Also, Liang et al. reported a 17% higher risk of developing CRC in smokers than those who never smoked (19). There was no significant relationship between CRC and a history

of drug use. However, Naghibzadeh-Tahami et al., in a case-control study, concluded that opioid use could increase CRC risk (20). Furthermore, Bidary et al. reported an increased risk of colon cancer in opium consumers compared to non-consumers (21). In the present study, 23 out of 28 patients with CRC were married. There was a significant relationship between CRC and marital status. Li et al. reported that 55.20% of CRC patients were married and had a survival advantage (22). The differences observed between our findings and previous studies' findings may reflect the presence of latent genetic disorders and unknown environmental risk factors among our population. This may indicate the need for designing screening programs according to the epidemiological features of this population. Currently, several screening programs have been recommended for CRC. Based on the U.S. Multi-Society Task Force on Colorectal Cancer, screening should be suggested to all average-risk people aged 45 to 49. If they have not begun screening before 50, they should be suggested to initiate screening at 50. A colonoscopy every 10 years or an annual fecal immunochemical test (FIT) are the first-line options for screening (23).

5.1. Limitations

The limitations of the present study are data obtained from a single center and a need for country-wide generalization to more accurately analyze the prevalence and risk factors of CRC.

5.2. Conclusions

Latent genetic disorders and environmental risk factors should be considered in the etiology of CRC. Evaluation of these factors and precise screening of patients based on standard guidelines are essential. Prospective studies with larger sample sizes focusing on possible risk factors may help reduce CRC cases.

Footnotes

Authors' Contribution: A. K. R. contributed to data collection and drafting, G. M. contributed to data collection and drafting, M. K. S. reviewed and revised the manuscript, M. A. participated in data collection, and M. B. conceptualized and designed the study. All authors read and approved the final manuscript.

Conflict of Interests: There is no conflict of interest.

Data Reproducibility: The dataset presented in the study is available on request from the corresponding author during submission or after publication. The data are not publicly available due to ethical considerations.

Ethical Approval: This study was conducted with the permission of the Research Ethics Committee of Lorestan University of Medical Sciences with the ethical code IR.LUMS.REC.1400.256.

Funding/Support: This research received no specific grant from any funding agency in the public, commercial, or not-for-profit sectors.

Informed Consent: Written, informed, and voluntary consent was obtained from all patients.

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