

RISK FACTORS OF COLO-RECTAL CANCER IN BASRA A CASE-CONTROL STUDY

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ABSTRACT

Background: Colorectal cancer (CRC) is a major public health concern worldwide, with various sociodemographic and lifestyle factors contributing to its development. Understanding the risk factors associated with CRC is essential for early detection, prevention, and improved treatment strategies, particularly in regions with limited cancer registry data, such as Basrah, Iraq. **Aim:** This study aimed to explore the association between colorectal cancer and selected sociodemographic and lifestyle risk factors in patients from Basrah governorate. **Method:** A case-control study was conducted in Basrah in 2017. The study included 50 histopathologically confirmed CRC cases from the Oncology Centre at Al-Sadr Teaching Hospital. A control group of 100 individuals, free from colorectal cancer and matched for age, sex, and residence, was selected for comparison. Data on smoking, dietary habits, family history of CRC, history of other cancers, education level, age, and occupation were collected and analyzed. **Results:** The study identified a significant association between colorectal cancer and smoking, red meat consumption, family history of CRC, and a history of other cancers. However, no clear association was found between CRC and education level, age, or occupational field. **Conclusion:** The findings highlight the role of environmental and lifestyle factors in CRC development. Strengthening cancer registration in Basrah is crucial for future research and healthcare planning. Expanding this study on a larger scale is recommended to validate the findings.

KEYWORDS: Colorectal cancer, case-control study, Basrah, risk factors, smoking, red meat, family history.

INTRODUCTION

Cancer arises due to the abnormal behavior of body cells, growing uncontrollably and evading normal regulatory mechanisms. Under normal conditions, body cells grow, divide, and die in a controlled manner, primarily during childhood and adolescence. However, cancer cells continue to divide abnormally, forming masses without serving any useful function.^[1] The uncontrolled growth results from DNA damage, which can be inherited or acquired through environmental exposures such as smoking and radiation.^[2] While many cancers form tumors, some, like leukemia, affect blood-forming organs and circulate systemically.^[3] Different cancer types exhibit distinct behaviors, growth rates, and responses to treatment, necessitating specific therapeutic approaches.^[3] Malignant tumors, including colorectal cancer (CRC), are characterized by their potential to invade local tissues and metastasize via blood and lymphatic pathways. Often, cancer is first detected at a metastatic site, making diagnosis and treatment more challenging.^[4] CRC is a malignant tumor of the large bowel, with adenocarcinoma constituting 98% of cases. Most adenocarcinomas originate from adenomatous

polyps, progressing through dysplasia to invasive carcinoma. The peak incidence occurs between 60 and 79 years, with fewer than 10% of cases diagnosed before age 50.^[4] CRC is the second most common internal malignancy and the second leading cause of cancer death in Western countries. In the UK, its incidence is 60 per 100,000^[5], while in the U.S., 153,760 new cases and 52,180 deaths were reported in 2007.^[6] The mortality rate has declined, particularly among females, due to advancements in early detection and treatment. Although less common in developing countries, CRC ranks among the top ten cancers and cancer-related deaths in Southern Iraq.^[7] Nationally, it is the seventh leading cause of cancer mortality.^[8] The incidence in Middle Eastern countries remains lower than in the West, with Jordan reporting rates of 0.5 (colon) and 0.6 (rectum) per 100,000.^[9,10] Studies suggest that while CRC was previously considered rare in Iraq, its incidence is rising, with many patients presenting at advanced stages, including a significant proportion of younger individuals.^[11] Environmental factors account for 80–90% of CRC cases, particularly in developed countries.^[5] Major dietary risks include high consumption of red

meat and saturated animal fats, which promote carcinogenic bile acid production.^[5,12] Conversely, a diet rich in fruits, vegetables, fiber, calcium, and folic acid is protective.^[5] Non-dietary risk factors include smoking (12% of CRC deaths)^[13], alcohol consumption^[13], physical inactivity^[13], and older age (90% of cases occur after age 50).^[12] Radiation exposure, a personal history of CRC or colorectal polyps, chronic inflammatory bowel diseases, and genetic predispositions such as hereditary non-polyposis colorectal cancer (HNPCC) and familial adenomatous polyposis (FAP) also contribute to risk.^[13] In Basrah, the incidence of CRC increased from 1.7 to 3.2 per 100,000 between 1997 and 2005⁽⁷⁾. This rise may be partly due to improved diagnostic capabilities and reporting but likely also reflects an actual increase in cancer risk. CRC mortality in Basrah increased from 0.6 to 1.3 per 100,000 between 1989 and 2005.^[7] Given the increasing incidence and mortality, this study aims to explore the association between CRC and selected sociodemographic and environmental factors in Basrah, contributing to a better understanding of its epidemiology and potential preventive strategies.

METHOD

This preliminary case-control study aimed to explore the association between colorectal cancer (CRC) and selected sociodemographic and environmental risk factors in Basrah as a foundation for future large-scale research. Cases included 50 patients with histopathologically confirmed CRC who were residents of Basrah and attended the Oncology Centre at Al-Sadr Teaching Hospital for chemotherapy between February 1, 2017, and January 30, 2018. This comprised nearly all new CRC cases at the center during the study period. Controls consisted of 100 individuals without a history

of CRC, ulcerative colitis, Crohn’s disease, adenomatous polyps, or cancer at the time of the study.

They were recruited from outpatient departments at Al-Sadr Teaching Hospital, attending for acute, non-neoplastic diseases. Each case was matched with two controls by age, sex, and broad area of residence (district/sub-district). Data were obtained through a structured questionnaire designed to capture sociodemographic information, medical history, lifestyle habits, dietary patterns, physical activity, aspirin use, BMI, and other potential risk factors for CRC (Appendix 1). Both cases and controls were interviewed directly at the hospital. The investigator ensured minimal bias in responses. Interviews lasted approximately 20 minutes, and all participants consented to participate. Variables analyzed included sex, age, education level, occupation, marital status, smoking and alcohol history, diabetes, hypertension, family history of CRC and other cancers, dietary intake (red meat, chicken, fish, fruits, vegetables, milk), physical activity level, bowel movement patterns, and history of pelvic radiation exposure. Additional factors such as aspirin use, night shift work, and total sleep hours were also recorded. Statistical analysis was conducted using SPSS version 11. Significance was set at $p < 0.05$. Odds ratios (ORs) and 95% confidence intervals (CIs) were calculated using Woolf’s method.^[14,15]

RESULTS

The age, sex, work field, and education levels of cases and controls were similar, indicating that matching was effective in the study design. No significant differences were observed ($P > 0.05$), suggesting these factors do not play a major role in colorectal cancer risk.

Table 1: Demographics with P-Values.

Category	Cases No.	Cases %	Controls No.	Controls %	P-Value
Less than 30	6	12	8	8	-
31-40	7	14	15	15	-
41-50	18	36	38	38	-
51-60s	15	30	29	29	-
61 and above	4	8	10	10	-
Males	28	56	56	56	$P > 0.05$
Females	22	44	44	44	-
Government Employees	13	26	27	27	$P > 0.05$
Housewives	21	42	43	43	-
All Others	16	32	30	30	-
Illiterate	10	20	27	27	$P > 0.05$
1-6 years	22	44	39	39	-
7-12 years	15	30	33	33	-
Above 12 years	3	6	1	1	-
Total	50	100	100	100	-

Smoking was significantly associated with colorectal cancer cases ($P < 0.05$), with a higher proportion of smokers among cases than controls. However, physical activity, night shifts, and sleep hours showed no

significant associations, except for reduced sleep duration being more common among cases ($P < 0.05$).

Table 2: Lifestyle Factors with P-Values.

Category	Cases No.	Cases %	Controls No.	Controls %	P-Value
Smokers	18	36	15	15	P<0.05
Non-Smokers	32	64	85	85	-
Light Physical Activity	13	26	20	20	P>0.05
Moderate Physical Activity	37	74	80	80	-
Night Shift Present	2	4	0	0	P>0.05
Night Shift Absent	48	96	100	100	-
Sleep ≤ 10 hrs	38	76	45	45	P<0.05
Sleep > 10 hrs	12	24	55	55	-
Total	50	100	100	100	-

Increased red meat consumption and lower vegetable intake were significantly associated with colorectal cancer cases (P<0.05). However, fish, milk, fruit, and

chicken consumption did not show significant differences between groups (P>0.05).

Table 3: Dietary Factors with P-Values.

Category	Cases No.	Cases %	Controls No.	Controls %	P-Value
Meat < 3x/week	26	52	69	69	P<0.05
Meat ≥ 3x/week	24	48	31	31	-
Vegetables < 3x/week	36	72	43	43	P<0.05
Vegetables ≥ 3x/week	14	28	57	57	-
Fish < 3x/week	47	94	97	97	P>0.05
Fish ≥ 3x/week	3	6	3	3	-
Milk < 3x/week	44	88	96	96	P>0.05
Milk ≥ 3x/week	6	12	4	4	-
Fruits < 3x/week	39	78	84	84	P>0.05
Fruits ≥ 3x/week	11	22	16	16	-
Total	50	100	100	100	-
Chicken < 3x/week	47	94	89	89	P>0.05
Chicken ≥ 3x/week	3	6	11	11	-
Total	50	100	100	100	-

Pelvic radiation exposure, hypertension, diabetes, and aspirin consumption were not significantly different between cases and controls (P>0.05), indicating no

strong associations with colorectal cancer risk in this study population.

Table 4: Medical History with P-Values.

Category	Cases No.	Cases %	Controls No.	Controls %	P-Value
Exposed to Pelvic Radiation	36	72	78	78	P>0.05
Not Exposed	14	28	22	22	-
Hypertensive	7	14	18	18	P>0.05
Non-Hypertensive	43	86	82	82	-
Diabetic	2	4	8	8	P>0.05
Non-Diabetic	48	96	92	92	-
Aspirin < 25x/month	50	100	95	95	P>0.05
Aspirin ≥ 25x/month	0	0	5	5	-
Total	50	100	100	100	-

A significant association was found between colorectal cancer cases and a positive family history of colorectal and other cancers (P<0.05). However, history of polyps

did not show a significant difference between groups (P>0.05).

Table 5: Family History & Precancerous Conditions with P-Values.

Category	Cases No.	Cases %	Controls No.	Controls %	P-Value
Family History of Colorectal Cancer	5	10	0	0	P<0.05
No Family History	45	90	100	100	-
Family History of Other Cancers	6	12	0	0	P<0.05

No Family History	44	88	100	100	-
History of Polyps	1	2	0	0	P>0.05
No History of Polyps	49	98	100	100	-
Total	50	100	100	100	-

Frequent bowel motions were more common in cases than controls, showing a significant association ($P<0.05$). However, weight, height, and BMI did not show major

differences, suggesting these anthropometric factors were not strongly linked to colorectal cancer risk in this study.

Table 6: Other Comparative Variables with P-Values.

Category	Cases No.	Cases %	Controls No.	Controls %	P-Value
Once Bowel Motion	38.0	76	49.0	49	P<0.05
Twice Bowel Motion	12.0	24	51.0	51	-
Every Other Day	1.0	2	0.0	0	-
Total	50.0	100	100.0	100	-
Weight (kg)	65.2	-	77.06	-	-
Height (m)	1.67	-	1.72	-	-
BMI (kg/m ²)	23.3	-	25.8	-	-

DISCUSSION

This case-control study explored the association between colorectal cancer (CRC) and selected sociodemographic and environmental risk factors in Basrah. Case-control studies are particularly useful for rare diseases like CRC, though they have inherent limitations such as recall bias and difficulty in establishing causality.^[14] Selection bias was minimized by including histopathologically confirmed cases from Al-Sadr Teaching Hospital, which serves as a referral center for southern Iraq. Despite this, the exact number of CRC cases in Basrah remains unknown. Most CRC cases in this study were between 40 and 50 years, similar to other studies^[11,15-18], but younger than the Western age range of 60-70 years.^[19,20] The proportion of cases under 40 years was 26%, comparable to other Iraqi (24.46%) and studies^[16-18], but higher than in Western populations (15%). This difference may reflect demographic variations, as younger individuals constitute a larger proportion of the Iraqi and Arab populations. The male-to-female ratio in this study was 1.27:1, higher than the Western ratio (1:0.9)^[21] but similar to Iraqi^[11] and other studies^[16-18]. This could indicate a true sex-based difference or a referral bias. Smoking was significantly associated with CRC in this study, with exposed cases outnumbering controls. This aligns with cohort.^[23] and case-control.^[25] studies linking smoking with CRC. Red meat consumption also showed a strong association with CRC, consistent with studies suggesting that animal fats promote anaerobic gut flora, converting bile acids into carcinogens.^[6] Conversely, vegetable consumption was lower among cases than controls, supporting evidence that vegetables reduce CRC risk and may prevent adenoma progression.^[24] A strong association was found between CRC and family history of colorectal and other cancers, such as breast, ovarian, and endometrial cancers. About 30% of CRC cases have a familial component, especially when relatives are affected before age 60.^[13] This may result from shared environmental exposures, genetic susceptibility, or both.^[24] Night shift work and insufficient sleep (<10 hours) were more common among

cases, aligning with studies suggesting an increased CRC risk among night workers due to melatonin disruption.^[13] Bowel movement frequency also showed an association, with most cases reporting once-daily movements, potentially linked to dietary habits or CRC-related changes in bowel function. Other factors, including education, occupation, physical activity, pelvic radiation, aspirin use, diabetes, and hypertension, showed no significant association with CRC. This suggests that their role may be less prominent or requires larger studies for conclusive results.

CONCLUSION

Environmental risk factors including smoking, food, and genetics may increase colorectal cancer risk. Colorectal cancer is more frequent in Iraq than previously thought, and its frequency may be rising as the country westernises. Smoking and meat eating are linked to colorectal cancer.

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