Natural Resources for Human Health
eISSN: 2583-1194

Original Research

Received 24 April 2026
Revised 28 May 2026
Accepted 18 June 2026

Natural Resources for Human Health 2026, Vol. 6 (5): 412–417

KEYWORDS:
Colorectal cancer, Risk factors, dietary habits.

Assessment of Risk Factors Associated with Colorectal Cancer among Patients in a Tertiary Care Cancer Centre: A Hospital-based Observational Study

Dr. Dhivyaprasath Palaniappan[1], Dr. Velavan.K[2], Dr. A. Anita Doreen[2], Dr. Angelin Grace T[3], Dr. Palur Ramakrishnan Anand Vijayakumar[*1]

[1]Department of Pharmacology, JSS College of Pharmacy, Ooty, Tamil Nadu, India
[2]Consultant Radiation Oncologist, Erode Cancer Centre, Erode, Tamil Nadu, India
[3]Department of Pharmacy Practice, Swamy Vivekanandha College of Pharmacy, Tiruchengode, Tamil Nadu, India.
Corresponding Author: Dr. Palur Ramakrishnan Anand Vijayakumar
pranandvijayakumar@gmail.com

ABSTRACT:

Background: Colorectal cancer (CRC) is a leading cause of morbidity and mortality related to cancer globally, with a rapidly increasing incidence in Asia due to urbanization and lifestyle changes. A hospital-based case-control A study was performed at the Erode Cancer Centre, Erode, Tamil Nadu, India to evaluate the sociodemographic and behavioral risk factors for colorectal cancer (CRC).

Methods: We recruited 63 histologically confirmed cases of colorectal cancer and 63 controls matched for age according to the established criteria. Demographic data were collected using standardized questionnaires and records, such as domicile, education, marital status, tobacco and alcohol consumption, dietary habits, consumption of fruits and vegetables, body mass index (BMI), physical activity and comorbidities (especially type 2 diabetes). Associations were evaluated using odds ratios (ORs) with A 95% confidence interval (CI) and a p-value of less than 0.05 were deemed statistically significant.

Results: CRC was significantly associated with age >40 years (OR 315; 95% CI 18.74–5293.74; $p<0.01$) and urban living conditions (OR 7.09; 95% CI 2.89–12.40; $p<0.01$). The group had increased odds ratios for indicators possibly suggestive of socioeconomic or contextual factors such as literacy (OR 9.38; 2.56–146.40; $p<0.01$) and married status (OR 75.60; 28.14–203.05; $p<0.01$). Significant correlations were found for modifiable exposures: smoking (OR 353.80; 65.95-1900.34; $p<0.01$), regular high-fat/processed meat intake (OR 232; 61.87-871.66; $p<0.01$) and alcohol use (OR 2520; 133.04-47727.41; $p<0.01$). The prevalence of type 2 diabetes was significantly higher in cases (OR 291.45, 38.46–2208.47, $p<0.01$). The consumption of fruits and vegetables was not significantly correlated (OR 0.78; 0.37–1.65; $p>0.05$). The inverse association with high BMI categories was significant as compared to normal BMI (OR 0.24; 0.07–0.78; $p<0.01$). Many cells contained zeros and had irregular distributions leading to very large odds ratios with wide confidence intervals.

Conclusions: In this South Indian population, the likelihood of colorectal carcinoma was significantly connected to age, urban residence, tobacco use, alcohol use, high fat and

processed meat intake, and type 2 diabetes. The results for marital status, literacy and the inverse association with BMI probably reflect contextual factors and likely confounding variables, and should be interpreted with caution. Targeted, locally adapted prevention programs focusing on tobacco and alcohol regulation, dietary changes, diabetes management and earlier screening in urban populations are essential. These correlations need to be supported by thorough, updated research and contradictory results explained.

1. INTRODUCTION

Colorectal cancer (CRC) is a neoplasm of colon or rectum and one of the most commonly diagnosed diseases worldwide . CRC remains an important etiology of cancer-associated morbidity and death. Colorectal cancer (CRC) is a multi-stage disease marked by the accumulation of genetic and epigenetic alterations that convert normal colonic epithelium into adenomatous polyps and eventually into invasive carcinoma. Genetic predisposition, environmental factors, lifestyle, and inflammatory processes all play a role in the progression of the disease. Colorectal cancer (CRC) ranks as the third most prevalent cancer globally and is the second foremost cause of cancer-related mortality, continuing to provide a significant health challenge[1,2]. The epidemiological picture of colorectal cancer in Asia has changed markedly over the past few decades. In the past, Asian countries had lower CRC incidence rates than Western countries; however, rapid socioeconomic development, urbanisation and Western lifestyle adoption have led to a dramatic increase in disease occurrence and fatality. Asia is home to over fifty percent of the global population and now has the highest number of cases of colorectal cancer. In 2020 alone, over 1 million new CRC cases and nearly 5 lakhs CRC- related deaths occurred in Asia. Countries such as China, Japan, South Korea, Singapore and Malaysia have much higher incidence and prevalence rates, while India, Indonesia and several South Asian countries have comparatively lower rates[3,4]. The rising incidence of CRC among Asian populations is ascribed to multiple interconnected risk factors. These can be divided into non- modifiable and modifiable factors. Non- modifiable risk factors are: Increasing age, especially after 50 years of age; male gender; hereditary syndromes and genetic predisposition; family history of colorectal cancer; genetic differences and ethnicity; and history of inflammatory bowel disease or adenomatous polyps. Modifiable risk factors include: High BMI and obesity; sedentary lifestyle and lack of physical activity; smoking cigarettes; excessive alcohol intake; elevated consumption of red and processed meats; insufficient intake of fruits, vegetables, and dietary fiber; metabolic syndrome and diabetes mellitus; and changes in gut microbiota and chronic inflammatory diseases[2,5]. The adoption of Western food habits and less physical activity in many Asian countries is believed to be an important contributing factor to the increasing incidence of colorectal cancer (CRC). Knowledge of the epidemiological features and risk determinants of colorectal carcinoma among Asian people is important for improving prevention strategies, facilitating early diagnosis and reducing the disease burden through targeted therapies and screening programmes[2–5]. Colorectal cancer (CRC) is a significant health problem worldwide with a rising incidence among Asian populations due to rapid urbanization, lifestyle modifications and dietary changes[1,3]. Colorectal cancer (CRC) develops due to the combined effect of genetic predisposition and modifiable factors like obesity, smoking, alcohol intake, sedentary lifestyle and altered gut flora[2,5].

Materials and Methods:

This study was a hospital-based observational research done in Erode Cancer Centre, Erode, Tamil Nadu, India to assess the risk factors of colorectal cancer (CRC).

Study Population and Sample Size:

The study population comprised 63 patients with colorectal cancer and 63 controls. Participants during the study period were selected on the basis of defined inclusion and exclusion criteria.

Inclusion Criteria:

- Patients with histopathologically verified colorectal carcinoma
- Persons aged 18 years and above
- Patients who are prepared to participate and furnish informed consent

Exclusion Criteria:

- Patients possessing insufficient medical records
- Patients diagnosed with alternative malignancies
- Patients reluctant to engage in the study

Data Collection Demographic:

Clinical data were obtained from a standardized questionnaire and patient medical records. Information on possible risk factors related to colorectal cancer was collected and documented such as age, sex, family history, diet, smoking status, Alcohol intake, body mass index (BMI), physical activity, comorbid conditions, and lifestyle choices.

Research Design:

The data of 63 colorectal cancer patients and 63 controls were classified and analyzed for finding the prevalence and distribution of the major risk variables associated with development of CRC.

Statistical analysis:

Data were collected and entered in Microsoft Excel, and analyzed using appropriate statistical methods. Descriptive statistics were used to summarize the demographic and clinical characteristics of the subjects. Categorical variables are expressed as frequency and percentage. Statistical significance was considered at $P < 0.05$.

Ethical Considerations:

The Institutional Ethics Committee approved the research. All participants were recruited after obtaining informed consent.

Result :

Risk variables	Cases (n=63) N (%)	Control (n = 63) n (%)	OR(95% CI)	P Value
Age			315	< 0.01
Less than 40	0	45 (71.4)	(18.74 - 5293.74)	
More than 40	63 (100)	18 (28.5)		
Residence			7.09 (2.89 – 12.40)	< 0.01
Urban	55 (87.3)	31 (49.2)		
Rural	08 (2.7)	32 (50.7)		
Education qualification			9.38	< 0.01
Literate	62 (98.4)	48 (76.1)	(2.56 – 146.40)	
illliterate	01 (1.6)	15 (23.8)		
Marital status			75.60	< 0.01
Yes	57 (90.5)	07 (11.1)	(28.14 – 203.05)	
No	06 (9.5)	56 (88.8)		
Smoking			353.80	< 0.01
Yes	58 (92.1)	02 (3.1)	(65.95 – 1900.34)	
No	05 (7.9)	61 (96.8)		

Consumption of high-fat meats, processed meats and fat				< 0.01
Yes			232	
No	60 (95.2)	05 (7.9)	(61.87 – 871.66)	
	03 (4.8)	58 (92)		
Consumption of Alcohol			2520	< 0.01
Yes	60 (95.2)	00 (0)	(133.04 -47727.41)	
No	03 (4.8)	63 (100)		
Consumption of Fruits and Vegetables				< 0.01
Yes			0.78	
No	45 (71.4)	48 (76.1)	(0.37 – 1.65)	
	18 (28.6)	15 (23.8)		
BMI				< 0.01
Underweight	0	00 (0)	0.24	
Normal	59 (93.7)	49 (77.7)	(0.07 – 0.78)	
Over Weight	03 (4.8)	07 (11.1)		
Obese	01 (1.6)	07 (11.1)		
Type 2 diabetes			291.45	< 0.01
Yes	62 (98.4)	11 (17.4)	(38.46 – 2208.47)	
No	01 (1.6)	52 (82.5)		

We studied several sociodemographic and behavioral risk factors in A case-control study comprising 63 patients and 63 controls. Advanced age (all subjects were >40 years compared with 28.6% of controls) showed a strong association with outcome (OR 315; 95% CI 18.74–5293.74; p<0.01). Cases (87.3%) were more likely to be urban residents than controls (49.2%), indicating increased odds for urban dwellers (OR 7.09; 2.89–12.40; p<0.01). The incidence of literacy was greater among patients (98.4%) than controls (76.1%) and was associated with higher odds (OR 9.38; 2.56–146.40; p<0.01). Marital status was significantly higher in cases (90.5%) than controls (11.1%) (OR 75.60; 28.14–203.05; p<0.01). A number of lifestyle characteristics were significantly positively correlated. Cases had a much higher smoking prevalence (92.1%) than controls (3.1%), which resulted in substantial odds (OR 353.80; 65.95–1900.34; p<0.01). 95.2% of cases reported frequent consumption of high-fat and processed meats compared to 7.9% of controls (OR 232; 61.87–871.66; p<0.01). Alcohol consumption was observed in 95.2% of cases and 0% in controls, with a significantly increased odds ratio (OR 2520; 133.04–47727.41; p<0.01). On the other hand there was no substantial disparity in reported intake of fruits and vegetables between groups (71.4% of cases versus 76.1% of controls) and no significant correlation with the outcome (OR 0.78; 0.37–1.65; p>0.01). Most cases had normal BMI (93.7%) in terms of adiposity and there was a lower prevalence of overweight/obese cases than controls. In general, cases had a lower prevalence of higher BMI categories indicating lower risk (OR 0.24; 0.07-0.78; p<0.01). Type 2 diabetes was significantly higher in cases (98.4%) compared to controls (17.4%) (OR 291.45; 38.46-2208.47; p<0.01) indicating a strong association. Overall, we found strong and statistically significant associations with the outcome for age over 40, urban residence, literacy, marital status, smoking, high fat or Consumption of processed meat, alcohol, and type 2 diabetes but not for fruit and vegetable consumption. Some of the cells have zeros and are very unevenly distributed . Thus very large odds ratios and wide confidence intervals . These results should be interpreted with caution and, where possible, validated with larger samples or models that control for confounding factors.

DISCUSSION:

As discussed in the referenced articles [1, 3], Colorectal cancer (CRC) persists as a global health problem with a significant and increasing burden in Asia. This study is an observational study executed at Erode Cancer Centre, Erode, India, to find out the risk determinants for colorectal carcinoma in a particular group of patients. The findings are consistent with known CRC risk factors, and also reveal interesting patterns specific to the study sample. The demographic data from this analysis confirm that all CRC cases were in adults over the age of 40 years, consistent Given the established rise in the prevalence of colorectal cancer with advancing age, particularly post-50 years[2]. The high proportion of cases that are urban residents (87.3%) and the very high odds ratio (7.09) indicate that urbanization is an important contributing factor. This is consistent with the general epidemiologic transition occurring throughout Asia where rapid urbanization and accompanying lifestyle changes are associated with increasing rates of colorectal cancer. The study showed high levels of literacy among patients with CRC . This is not a direct risk factor but may be an indirect marker of socioeconomic position and access to information, or simply reflects the demographic profile of the clientele of the hospital . In the current study, married status was significantly associated with CRC (OR=75.60). Further investigation of this specific finding to clarify the possible reasons would be useful, as married status is not usually considered an immediate biological risk factor for CRC. This may be due to lifestyle and food habits in a household or health-seeking behavior of married and unmarried people in the area. This study confirmed the significant associations of modifiable risk factors including smoking, high fat and processed meat consumption and alcohol consumption with colorectal cancer in agreement with the global literature[2, 5]. The odds ratios of these features were significantly high, especially for alcohol consumption (OR=2520), indicating a strong association in this particular cohort. Dietary habits are one of the main contributors to this problem, as the subjects' relatively low intake of fruits and vegetables (28.6% of them reported "No" consumption) indicates. These findings highlight the necessity for public health initiatives. to target diet and lifestyle modification for CRC prevention. The BMI statistics were all over the place. Ninety-three point seven percent of CRC cases had a "normal" BMI. The odds ratio of 0.24 for overweight and obese individuals shows an inverse relationship with those with a normal BMI. This is paradoxical as high BMI and obesity are known risk factors for colorectal cancer (CRC)[2, 5]. This result may be affected by the percentage of overweight and obese people in the control group or other characteristics of the study population which require further research. The high prevalence of Type 2 diabetes in CRC cases (98.4%) and an extremely high odds ratio (291.45) strongly support the well-established association between diabetes and increased risk of CRC[2]. This was an observational study with a small sample size (63 cases and 63 controls) which may limit the generalisability of some of the findings. The cross-sectional design precludes the establishment of definitive causation. The study provides important insights into the epidemiological trends and risk factor profile of the colorectal cancer patients of this part of India.

CONCLUSION:

This hospital-based observational study at Erode Cancer Centre reveals a number of major risk factors for colorectal carcinoma throughout the population studied, in agreement with world trends, and brings certain unique regional aspects to light. Those over the age of 40 who live in metropolitan areas, smoke, eat high-fat or processed meats, taking alcohol, and have Type 2 diabetes showed a strong correlation with colorectal cancer (CRC). Smoking, consumption of alcohol and type 2 diabetes were identified as important modifiable targets for preventive interventions in this population, given their significantly increased odds ratios. The unexpected findings for marital status and BMI warrant further investigation into their specific roles in this demographic. The study underscores the immediate necessity for focused public health initiatives aimed at lifestyle change and early identification to mitigate the increasing incidence of colorectal cancer across Asia.

CONFLICTS OF INTEREST

There are no Conflicts of interest

FUNDING SOURCES

There were no Funding sources

ACKNOWLEDGMENTS

We would like to thank our management for the support.

AUTHOR CONTRIBUTION

Dr. Palur Ramakrishnan Anandvijayakumar – Conceived the idea.

Dr. Dhivyaprasath Palaniappan – Prepared the Article.
Dr. Velavan.K – Reviewed the Article.
Dr. A. Anita Doreen - Reviewed the Article.
Dr. Angelin Grace T – Edited.
All authors read and finalised the manuscript.

AI USE STATEMENT

No AI has been used.

ETHICAL APPROVAL

DHR/2025-2026/A005 (EC/NEW/INST/2024/4372)

REFERENCE:

[1] Sung H, Ferlay J, Siegel RL, Laversanne M, Soerjomataram I, Jemal A, et al. Global cancer statistics 2020: GLOBOCAN estimates of incidence and mortality worldwide for 36 cancers in 185 countries. *CA Cancer J Clin*. 2021;71(3):209–249. doi:10.3322/caac.21660.

[2] Vuik FER, Nieuwenburg SAV, Bardou M, et al. Colorectal cancer: epidemiology, risk factors, and prevention. *Cancers (Basel)*. 2024;16(8):1530.

[3] Wong MCS, Ding H, Wang J, Chan PSF, Huang J. Prevalence and risk factors of colorectal cancer in Asia. *Intest Res*. 2019;17(3):317–329. doi:10.5217/ir.2019.00021.

[4] Wu S, Zhang Y, Lin Z, Wei M. Epidemiology and socioeconomic correlates of colorectal cancer in Asia in 2020 and projections to 2040. *Sci Rep*. 2025;15:2145.

[5] Dekker E, Tanis PJ, Vleugels JLA, Kasi PM, Wallace MB. Colorectal cancer. *Lancet*. 2019;394(10207):1467–1480. doi:10.1016/S0140-6736(19)32319-0.