EPIDEMIOLOGY AND RISK FACTORS FOR COLORECTAL RECTAL CANCER: AN UPDATE SYSTEMATIC REVIEW

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ABSTRACT

Background: *The global burden of colorectal cancer (CRC) has been rising rapidly with population growth, changes in demographics and Westernization of lifestyle habits. It was estimated to have 18.1 million new cancer cases, and 9.6 million deaths caused by cancer in year 2018. CRC is the third commonest diagnosed cancer and the second leading cause of cancer-related mortality. According to the World+Health Organization (WHO) GLOBOCAN database, there are 1,849,518 estimated new CRC cases and 880,792 CRC-related deaths in 2018. Regional estimates show that among half of the new cases, deaths and 5-year prevalent cases were found in Asia.*

The aim: *The aim of this study to show about epidemiology and risk factors for colorectal cancer.*

Methods: *By the Preferred Reporting Items for Systematic Review and Meta-Analysis (PRISMA) 2020, this study was able to show that it met all of the requirements. This search approach, publications that came out between 2014 and 2024 were taken into account. Several different online reference sources, like Pubmed, SagePub, and Google Scholar were used to do this. It was decided not to take into account review pieces, works that had already been published, or works that were only half done.*

Result: *In the PubMed database, the results of our search get 41 articles, whereas the results of our search on SagePub get 151 articles, on Google Scholar 2598 articles. Records remove before screening are 800, so we get 1990 articles fos screening. After we screened based on record exclude, we compiled a total of 12 papers. We included five research that met the criteria.*

Conclusion: *Colorectal cancer is effectively preventable through primary and secondary prevention. Environmental risk factor mediation by the provision of information and encouragement of healthy behaviors, while striving for early diagnosis through appropriate screening tests, can lead to a reduction in the stagnant incidence and mortality rates.*

Keyword: *Colorectal cancer, epidemiology, risk factor.*

INTRODUCTION

Colorectal cancer (CRC) is already the third leading cause of cancer death in the world, and its incidence is steadily rising in developing nations. Also known as colorectal adenocarcinoma, CRC usually emerges from the glandular, epithelial cells of the large intestine. The cancer arises when certain cells of the epithelium acquire a series of genetic or epigenetic mutations that confer on them a selective advantage. With abnormally heightened replication and survival, these hyper-proliferative cells give rise to a benign adenoma, which may then evolve into carcinoma and metastasize over decades.[1]

The most common cancer diagnosed in both sexes is lung cancer (11.6% of the total cases), followed by breast cancer in women (11.6%) and prostate cancer in men (7.1%). Colorectal cancer (CRC) is third in terms of recognition (6.1%) and second in terms of mortality (9.2%). It is estimated that by the year 2035, the total number of deaths from rectal and colon cancer will increase by 60% and 71.5%, respectively. These figures may differ from country to country depending on the degree of economic development. Therefore, the disease is widely recognized as a marker of the country's socioeconomic development. The increase in morbidity is also influenced by lifestyle, body fatness and dietary patterns. There is convincing evidence that physical activity has a protective effect. The risk of developing the disease is increased by more frequent red and processed meat and alcohol drinks. The progress of civilization and economic development, apart from improving socioeconomic conditions, also causes a change in dietary patterns, referred to as the westernization of the lifestyle.[2,3]

The majority of colorectal cancer, including rectal cancer, is sporadic (70%), with an average age diagnosis after 50 years old. A minority of patients (10%) show a true inheritance pattern (which carries a higher risk in patients younger than 50), and the remaining 20% of rectal cancer is seen as familial clustering in the absence of identifiable inherited syndrome. Approximately 5% of all CRC cancers are attributed to familial adenomatous polyposis (FAP) and Lynch syndrome (hereditary non-polyposis colorectal cancer [HNPCC]), the most common named cancer syndromes.[4,5]

Hereditary colorectal cancer syndromes are discussed in a different StatPearls chapter. Risk factors include: personal or family history of colorectal cancer, adenomatous polyps, and polyps with villous or tubulovillous dysplasia. Patients with these features are at high risk for synchronous or metachronous colorectal primary cancer (up to 3% to 5% at five years) and require close screening. Inflammatory bowel disease (more commonly ulcerative colitis (UC) than Crohn disease) with rectal involvement increases cancer risk. For UC, there is an estimated incidence of 0.5% per year between 10 to 20 years after UC diagnosis, then 1% per year after that with up to 30% probability of colorectal cancer by the fourth decade after diagnosis. Large studies have seen an increased risk of rectal cancer associated with the history of radiation for prostate cancer (HR, 2.06; 95% CI, 1.42 to 2.99).[4,6]

METHODS

Protocol

By following the rules provided by Preferred Reporting Items for Systematic Review and Meta-Analysis (PRISMA) 2020, the author of this study made certain that it was up to par with the requirements. This is done to ensure that the conclusions drawn from the inquiry are accurate.

Criteria for Eligibility

For the purpose of this literature review, we compare and contrast about epidemiology and risk factors for colorectal cancer. It is possible to accomplish this by researching or investigating about epidemiology and risk factors for colorectal cancer. As the primary purpose of this piece of writing, demonstrating the relevance of the difficulties that have been identified will take place throughout its entirety.

In order for researchers to take part in the study, it was necessary for them to fulfil the following requirements: 1) The paper needs to be written in English, and it needs to determine about about epidemiology and risk factors for colorectal cancer. In order for the manuscript to be considered for publication, it needs to meet both of these requirements. 2) The studied papers include several that were published after 2014, but before the time period that this systematic review deems to be relevant. Examples of studies that are not permitted include editorials, submissions that do not have a DOI, review articles that have already been published, and entries that are essentially identical to journal papers that have already been published.

Search Strategy

We used " about epidemiology and risk factors for colorectal cancer." as keywords. The search for studies to be included in the systematic review was carried out using the PubMed and SagePub databases by inputting the words: *(("Colorectal cancer"[MeSH Subheading] OR "Epidemiology"[All Fields] OR "Risk factor" [All Fields]) AND ("Mechanism"[All Fields] OR " Management of colorectal cancer "[All Fields]) AND ("Diagnosed"[All Fields]) OR ("Diagnostic" [All Fields]))* used in searching the literature.

Data retrieval

After reading the abstract and the title of each study, the writers performed an examination to determine whether or not the study satisfied the inclusion criteria. The writers then decided which previous research they wanted to utilise as sources for their article and selected those studies. After looking at a number of different research, which all seemed to point to the same trend, this conclusion was drawn. All submissions need to be written in English and cannot have been seen anywhere else.
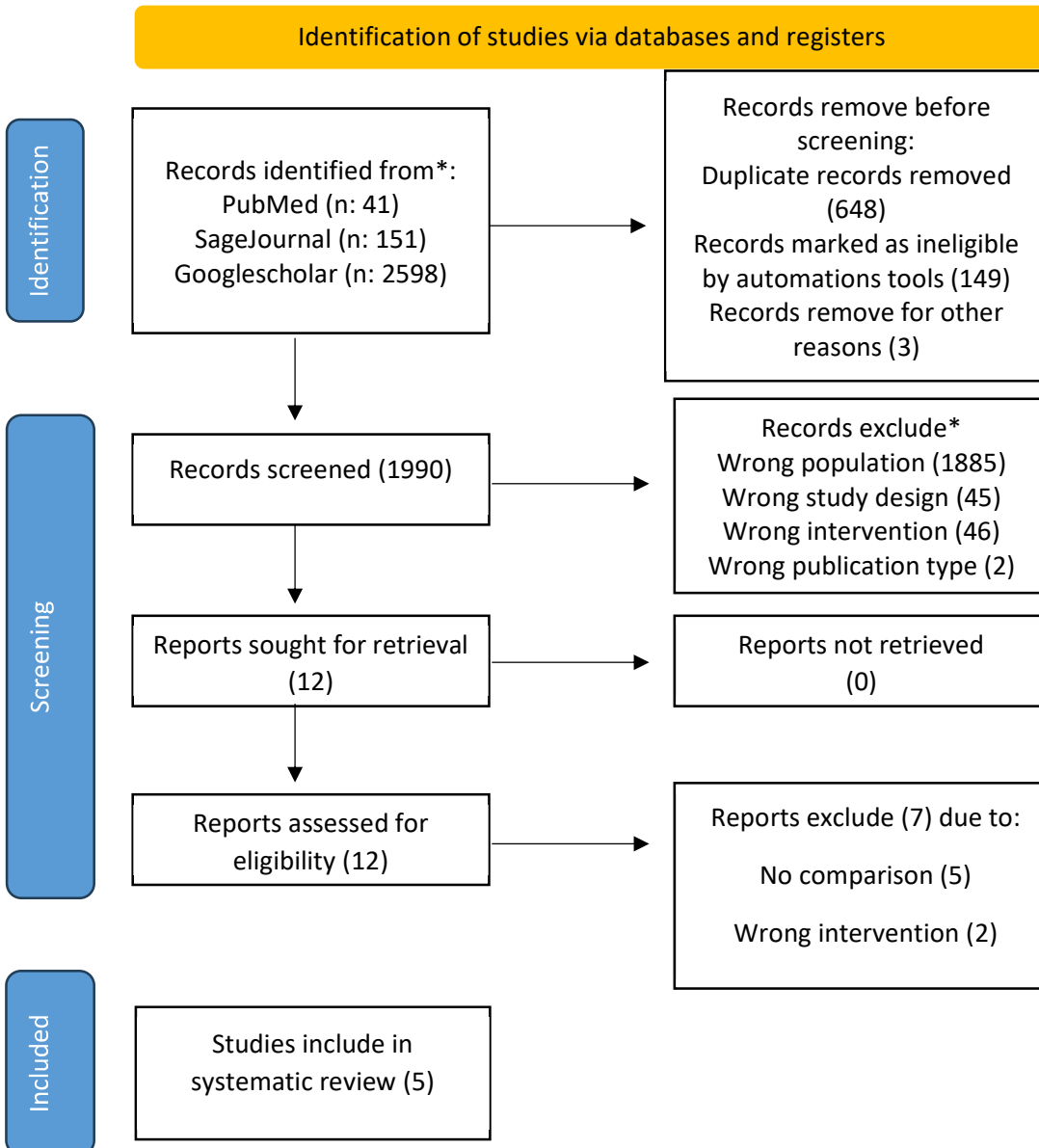
Figure 1. Article search flowchart

Only those papers that were able to satisfy all of the inclusion criteria were taken into consideration for the systematic review. This reduces the number of results to only those that are pertinent to the search. We do not take into consideration the conclusions of any study that does not satisfy our requirements. After this, the findings of the research will be analysed in great detail. The following pieces of information were uncovered as a result of the inquiry that was carried out for the purpose of this study: names, authors, publication dates, location, study activities, and parameters.

Quality Assessment and Data Synthesis

Each author did their own study on the research that was included in the publication's title and abstract before making a decision about which publications to explore further. The next step will be to evaluate all of the articles that are suitable

for inclusion in the review because they match the criteria set forth for that purpose in the review. After that, we'll determine which articles to include in the review depending on the findings that we've uncovered. This criteria is utilised in the process of selecting papers for further assessment. in order to simplify the process as much as feasible when selecting papers to evaluate. Which earlier investigations were carried out, and what elements of those studies made it appropriate to include them in the review, are being discussed here.

RESULT

From the PubMed database, the results of our search get 41 articles, whereas the results of our search on SagePub get 151 articles, on Google Scholar 2598 articles. Records remove before screening are 800, so we get 1990 articles fos screening. After we screened based on record exclude, we compiled a total of 12 papers. We included five research that met the criteria.

Chang, VC et al (2021)[7] showed modifiable factors, particularly sedentary behavior and unhealthy diet including sugary drink consumption, may be associated with EO-CRC risk. Our findings, if replicated, may help inform prevention strategies targeted at younger persons.

Demb, J et al (2019)[8] showed candidate CRC risk factor associations vary significantly by anatomic site. Accounting for site may enable better insights into CRC pathogenesis and cancer control strategies.

Table 1. The litelature include in this study

Author	Origin	Method	Sample Size	Result
Chang, VC et al., 2021[7]	Canada	A population-based case–control study was conducted in Ontario, Canada during 2018–2019.	428	Family history of CRC in a first- or second-degree relative (OR 2.37; 95% CI 1.47–3.84), longer sedentary time (≥ 10 vs. < 5 h/day, OR 1.93; 95% CI 1.02–3.65), greater consumption of sugary drinks (≥ 7 vs. < 1 drinks/week, OR 2.99; 95% CI 1.57–5.68), and a more Westernized dietary pattern (quartile 4 vs. 1, OR 1.92; 95% CI 1.01–3.66) were each associated with an increased risk of EO-CRC. Conversely, calcium supplement use (OR 0.53; 95% CI 0.31–0.92), history of allergy or asthma (OR 0.62; 95% CI 0.39–0.98), and greater parity in females (≥ 3 vs. nulliparity, OR 0.29; 95% CI 0.11–0.76) were each associated with a reduced risk.
Demb, J et al., 2019[8]	USA	Case–control study of US veterans with >1 colonoscopy during 1999–2011.	21744	21 744 CRC cases (n=7017 rectal; n=7039 distal; n=7688 proximal) and 612 646 controls were included. Males had significantly higher odds relative to females for rectal cancer (OR=2.84, 95% CI 2.25 to 3.58) than distal cancer (OR=1.84, 95% CI 1.50 to 2.24). Relative to whites, blacks had significantly lower rectal cancer odds (OR=0.88, 95% CI 0.82 to 0.95), but increased distal (OR=1.27, 95% CI 1.19 to 1.37) and proximal odds (OR=1.62, 95% CI 1.52 to 1.72). Diabetes prevalence was more strongly associated with proximal (OR=1.29, 95% CI 1.22 to

				1.36) than distal (OR=1.15, 95% CI 1.08 to 1.22) or rectal cancer (OR=1.12, 95% CI 1.06 to 1.19). Current smoking was more strongly associated with rectal cancer (OR=1.81, 95% CI 1.68 to 1.95) than proximal cancer (OR=1.53, 95% CI 1.43 to 1.65) or distal cancer (OR=1.46, 95% CI 1.35 to 1.57) compared with never smoking. Aspirin use was significantly more strongly associated with reduced rectal cancer odds (OR=0.71, 95% CI 0.67 to 0.76) than distal (OR=0.85, 95% CI 0.81 to 0.90) or proximal (OR=0.91, 95% CI 0.86 to 0.95).
Lewandowska, A et al., 2022[9]	Poland	The case-control study, which was an observational and analytical study with a control group, was conducted among patients of the Podkarpackie Clinical Oncology Center and the Provincial Hospital in Rzeszów in 2019–2020.	800	The mean age of the patients was 64.53 ± 8.86 years, of the control group I – 59.64 ± 9.33 and the control group II – 57.5 (7.83). There was a strong positive association between the incidence of ulcerative colitis and the risk of colorectal cancer ($P < .01$). Among obese subjects, the risk of developing colorectal cancer was 1.27 (95% CI, 1.06–1.53) compared with nonobese subjects. A strong positive relationship was found between low physical activity converted to metabolic equivalent of MET effort per week and the risk of colorectal cancer ($P < .001$). The relative risk for current smokers was 2.17 (95% CI 1.79–2.66). There was an association between higher fat consumption and higher red meat consumption and the risk of developing colorectal cancer ($P < .01$).
Boustany, A et al., 2023[10]	USA	A validated multicenter and research platform database of more than 360 hospitals was queried. Patients aged 18-65 years were included in our cohort.	360	A total of 47,714,750 patients were selected after application of the inclusion and exclusion criteria. The 20-year-period prevalence rate of CRC in the United States population from 1999 to September 2022 was 370 of 100,000 individuals (0.37%). According to multivariate analysis, the risk of CRC was higher in smokers (odds ratio [OR] 2.52, 95% confidence interval [CI] 2.47-2.57), obese patients (OR 2.26, 95%CI 2.22-2.30), those with irritable bowel syndrome (OR 2.02, 95%CI 1.94-2.09), or type 2 diabetes mellitus (OR

				2.89, 95%CI 2.84-2.95), and patients who had a diagnosis of *H. pylori* infection (OR 1.89, 95%CI 1.69-2.10).
Hajri, A et al., 2022[11]	Morocco	Our work is a retrospective study with a descriptive aim on a series of 11 female patients aged less than 40 years, operated for rectal cancer in the department of digestive cancer surgery and liver transplantation Casablanca Morocco, over a period of 7 years from January 2013 to December 2019.	11	The average age of our patients was 34.8 years. The average diagnostic delay was 10 months. The most frequent clinical sign was rectorrhagia (90.9% of cases). On rectal examination, the tumor was inaccessible in 18.8% of cases and externalized in 9.09% of cases. It was located in the lower rectum in 36.36% of cases, the same for the middle rectum. Rectoscopy showed that the majority of tumors were circumferential (36.36%). The budding ulcerative aspect was the most frequently found with 7 cases or 63.63%. The histological study showed the predominance of lieberkühnian adenocarcinoma (63.63%). Thoracic-abdominal-pelvic CT scan showed liver metastases in only one patient (9.09%). Pelvic MRI showed invasion of the mesorectum in 5 cases (45.45%) and of the internal sphincter in 3 cases (27.27%). All our patients underwent laparotomy. Curative surgery was performed in 8 patients and 3 patients had palliative surgery. Preoperative radiotherapy was performed in 81.81% of cases. The evolution was marked by 27.27% of locoregional recurrences. The operative mortality was nil in our series.

Lewandowska, A et al (2022)[9] showed obesity, low physical activity, active and passive smoking and high salt and red meat consumption have been associated with an increased risk of colorectal cancer. These findings provide further evidence of the importance of maintaining a healthy lifestyle.

Boustany, A et al (2023)[10] showed first evidence from a large population-based study demonstrating an independent association between a history of *H. pylori* infection and CRC risk.

Hajri, A et al (2022)[11] showed detection of patients with precancerous conditions, screening for cancer in subjects at risk (familial recto-colic cancer, familial recto-colonic polyposis and ulcerative colitis), suspicion of cancer in the presence of any proctological sign, early diagnosis and curative surgical resection preceded by radiotherapy are the means that can improve the prognosis of rectal cancer in young women.

DISCUSSION
Colorectal cancer (CRC), which comprises colon and/or rectum cancer, represents a significant health problem as the world's third most commonly diagnosed and second most fatal cancer globally. Approximately 9.4% of cancer-related deaths were due to CRC in 2020. However, in light of the significant increase in the number of identified cases in the older population, it is estimated that the global incidence of CRC will more than double by 2035, with the most significant increase occurring in less developed nations.[12,13]

CRC is a disorder that occurs exclusively in the colon or rectum and is caused by the colon's aberrant proliferation of glandular epithelial cells. There are three principal types of CRC: Sporadic, hereditary, and colitis-associated. The number of CRC cases is increasing globally day by day. Both environmental and genetic factors determine the risk of developing CRC. In addition, the risk of developing CRC in patients with long-standing ulcerative colitis and Crohn's disease increases with age. Multiple studies have demonstrated that risk factors for CRC include diet and lifestyle, family history, and chronic inflammation.[12,14]

According to the World Cancer Research Fund (WCRF) International, obesity increases the risk for CRC incidence by 50% in men and 20% in women. Subcutaneous fat normally serves as an energy deposit within the body, but as adiposity increases, fat penetrates deeper into the visceral zone, accumulating ectopically in the liver, heart, skeletal muscles, pancreas, and gut, inducing metabolic imbalances, such as hepatic steatosis, fatty liver disease and other chronic diseases including cancer. The accumulation of visceral fat deep in the liver, pancreas, and intestine interferes with organ homeostasis, stimulating the secretion of hormones and pro-inflammatory cytokines, such as TNF-a, leptin, IL-1β, IL-6, IL-7, and IL-8 from adipocytes, which in turn promote oxidative stress and immunosuppression, and induce chronic low-level inflammation via higher C-reactive protein and serum amyloid A in the blood. Similarly, excess body fat is associated with higher levels of sugar, insulin growth factor I, insulin, and insulin-like growth factor-binding proteins 1 and 6 in the blood. Inflammatory and growth factors, in turn, may induce metabolic and endocrine disorders and oncogenesis. However, studies of leptin-deficient mice point to multiple conflicting factors regarding the role of obesity, suggesting that obese individuals are not necessarily prone to metabolic disorders and systemic low-grade inflammation. Obese people having healthy cholesterol levels and normal blood pressure are not more prone to developing obesity-linked type II diabetes or cancer.[15,16]

CONCLUSION

Colorectal cancer is effectively preventable through primary and secondary prevention. Environmental risk factor mediation by the provision of information and encouragement of healthy behaviors, while striving for early diagnosis through appropriate screening tests, can lead to a reduction in the stagnant incidence and mortality rates.

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