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Impact of augmented consumption of fruits, vegetables, and prebiotics on the severity and frequency of irritable bowel syndrome

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Abstract

AIM: the objective of this research was to determine whether there was a significant association between the confirmed diagnosis of IBS and the incidence of colorectal cancer (CRC) or polyps in the gastrointestinal complaints of Jordanian patients seen at our Gastroenterology Unit at King Hussein Medical Centre.

Methods: This retrospective study investigates the connections between polyps, irritable bowel syndrome (IBS), and colorectal cancer in Jordanian adults. The research focuses on adult participants who underwent colonoscopy and obtained definitive results. A Chi Square test was used to determine statistical significance. The study found that lack of regular exercise, body mass index, and a lower ratio of fiber to fat in the diet were the main causes of the issues. The diet's overall nutritional profile was assessed using a subjective approach. The data was analyzed using SPSS version 25, with a p value of less than 0.05 indicating statistical significance.

Results: A study revealed that 20.61% (61 /296) of the tested patients had negative results, while 79.39% (235/296) had positive results of polyps or colorectal cancer. The gender distribution was significant, with females and males in Group I and II respectively. Inflammatory bowel diseases were more likely than irritable bowel syndrome.

Conclusion: In this study, we revealed a significance association for the inflammatory bowel diseases (IBD) but not the irritable bowel syndrome (IBS) for colorectal cancer and/or polyps' incidence for the attended Jordanian symptomatic tested patients.

Keywords: Irritable Bowel Syndrome; Inflammatory Bowel Disease; Colorectal Cancer; Polyps; Colonoscopy

1. Introduction

Colon carcinoma is a prevalent cancer worldwide, with a lifetime risk of 6% and 5% for those over 50 [1]. The risk is higher in those with a family history of colorectal cancer and a previous personal history of colorectal cancer and adenomatous polyps [2]. Colorectal cancer (CRC) is a significant concern due to its high incidence rate and potential financial strain [3]. Irritable bowel syndrome (IBS) is a functional disorder affecting the intestinal tract, associated with frequent medical visits, a decline in living standards, and high costs [4]. Factors such as a sedentary lifestyle, high-fat diet, age, overweight status, tobacco smoking, moderate alcohol consumption, diabetes, and prior abdominal radiation exposure can heighten the risk of developing both IBS and colorectal polyps/cancer [5]. Early detection increases the likelihood of a positive outcome, with a five-year survival rate of 65% [6].

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Colon cancer and IBS can coexist, with symptoms overlapping with infection, viral disease, or underlying analogue medical conditions such as inflammatory bowel disorder (IBD) [7]. A relative risk of 5.8 for colorectal cancer is identified, with diagnostic criteria encompassing IBS symptoms after age 45 and positive familial predispositions, in addition to concerning signs such as abdominal pain, rectal bleeding, unexplained weight loss, nocturnal symptoms, and iron deficiency anaemia [8]. The Fair Go Bowel Cancer screening program in Australia has been successful in detecting colorectal cancer in patients with both inflammatory bowel diseases, IBS and IBD [9].

Irritable bowel syndrome (IBS) and inflammatory bowel disease (IBD) are two distinct conditions affecting the gastrointestinal tract. IBS, affecting mostly the large intestine, causes symptoms like belly pain, cramping, bloating, and diarrhea. IBD, affecting mostly the small intestine and colon. Both are associated with an increased risk of colon cancer [10]. Understanding the link between these conditions is crucial for understanding their impact on the gastrointestinal system. So, the objective of this study was to determine whether there was a significant association between the confirmed diagnosis of IBS and the incidence of colorectal cancer (CRC) or polyps in the gastrointestinal complaints of Jordanian patients seen at our Gastroenterology Unit at King Hussein Medical Centre.

2. Methods

Individuals in Jordan with gastrointestinal issues have received diagnoses for polyps, irritable bowel syndrome (IBS), and colorectal cancer (CRC). The purpose of this retrospective study is to investigate possible connections between these issues. The research project focused on adult participants who underwent colonoscopy and obtained definitive results between January 2023 and October 2023. We conducted a chi-square test to determine the statistical significance of these relationships. We used the conventional method of bowel preparation to compile the demographic information. We used the Chi Square Test to compare the group of participants without colorectal cancer (CRC) or polyps to the group with CRC or polyps. We primarily focused on categorical binary variables and used the odds ratio, a mathematical representation of estimated risk, to quantify unadjusted effects. The standard reference for daily activities, equivalent to thirty to sixty minutes of exercise three times a week, determined that the lack of regular exercise was the root cause of the problem. We categorised the status of obesity by evaluating the body mass index, which was either greater than or less than 30 kg/m2. We employed a subjective method to assess the quantity of fruits and vegetables incorporated into the diet. Therefore, we subjectively described the diet's lower ratio of fibre to fat by comparing the estimated monthly consumption rates of full-fat milk and meat to the consumption rates of fruits and vegetables. We conducted this analysis to ascertain the diet's comprehensive nutritional profile. We used SPSS version 25 to analyse the data. We deemed the data statistically significant if the p value was less than 0.05.

3. Results

Approximately 20.61% (61 /296) of the tested patients who underwent colonoscopic procedures had negative results, leading to their classification as members of Group I. Conversely, Group II classified approximately 79.39% (235/296) of the tested patients who had positive findings of either polyps or colorectal cancer. The p-value for the distribution of patient ages across Groups I–II was found to be 0.120, which indicates that the distribution was statistically insignificant.

There was a statistically significant difference in the gender distribution rates between the group that did not have a CRC or polyps (Group I) and the group that did have a CRC or polyps (Group II). **Group I** had 29 females (47.5% of the total) and 32 males (52.5% of the total), while **Group II** had 78 females (33.2% of the total) and 157 males (66.8% of the total). While the odds ratio for gender distribution between Group I and Group II was 1.824 (95% confidence interval: 1.030–3.229), the p-value for this comparison was 0.038. According to our investigation's findings, the variables we examined do not have a statistically significant relationship with the likelihood of having a positive CRC/Polyps test result. The odds ratio is 1.345, and the p-value is 0.313. The confidence interval for this statistic ranges from 0.755 to 2.396. Researchers found a statistically significant correlation between inflammatory bowel diseases and the presence of colorectal cancer or polyps beyond colonoscopy procedures. The odds ratio for this correlation was 2.169 (95% confidence interval: 1.225–3.841), and the p-value was 0.007. This is in contrast to the situation with irritable bowel syndrome. Despite variations in other factors that were tested, such as a lack of physical activity, a low intake of fruits and vegetables, and a lower ratio of fibre to fat, all of these variables showed distribution rates that were statistically insignificant across Groups I–II.

4. Discussion

Irritable bowel syndrome (IBS) is a prevalent functional gastrointestinal disorder affecting over 9% of the global population [11]. Chronic or recurrent abdominal pain, discomfort, bloating, and alterations in bowel patterns distinguish it. Distinguishing IBS from colorectal cancer (CRC), the third most prevalent malignancy globally and the cause of approximately 700,000 deaths annually, is of utmost significance due to the similarity of its symptoms to those of several organic gastrointestinal disorders [12].

Several factors contribute to the aetiology of IBS, including aberrations in metabolic processes, perturbations in immunological activation, alterations in gut bacterial composition, and disturbances in the neuroendocrine system [13]. Growing evidence indicates a potential correlation between inflammation and tumour development; furthermore, there may be commonalities in the aetiology of irritable bowel syndrome (IBS) and colorectal cancer (CRC) [14].

Table 1 Analyses results of the tested variables across the two investigated groups

	Non-CRC/Polyps Group 61 (20.61%)		**CRC/Polyps Group 235 (79.39%)**	**Total 296**	**Odd ratio**	**Sig**
Gender	Female	29 (47.5%)	78 (33.2%)	107 (36.1%)	1.824 (95% CI; 1.030-3.229)	0.038*
	Male	32 52.5%)	157 (66.8%)	189 (63.9%)		
Age	<40	11 (18.0%)	63 (26.8%)	74 (25.0%)	NA	0.120
	40-49	10 (16.4%)	37 (15.7%)	47 (15.9%)		
	50-59	8 (13.1%)	45 (19.1%)	53 (17.9%)		
	60-69	17 (27.9%)	45 (19.1%)	62 (20.9%)		
	70-79	8 (13.1%)	35 (14.9%)	43 (14.5%)		
	>=80	7 (11.5%)	10 (4.3%)	17 (5.7%)		
IBS	No	25 (41.0%)	80 (34.0%)	105 (35.5%)	1.345 (95% CI; 0.755-2.396)	0.313
	Yes	36 (59.0%)	155 (66.0%)	191 (64.5%)		
IBD	No	35 (57.4%)	90 (38.3%)	125 (42.2%)	2.169 (95% CI; 1.225-3.841)	0.007*
	Yes	26 (42.6%)	145 (61.7%)	171 (57.8%)		
Lack rEx	No	40 (65.6%)	157 (66.8%)	197 (66.6%)	0.946 (95% CI; 0.523-1.714)	0.855
	Yes	21 (34.4%)	78 (33.2%)	99 (33.4%)		
Low FVC	No	37 (60.7%)	137 (58.3%)	174 (58.8%)	1.103 (95% CI; 0.620-1.961)	0.739
	Yes	24 (39.3%)	98 (41.7%)	122 (41.2%)		
Low FFR	No	27 (44.3%)	97 (41.3%)	124 (41.9%)	1.130 (95% CI; 0.640-1.994)	0.674
	Yes	34 (55.7%)	138 (58.7%)	172 (58.1%)		
Obesity	No	38 (62.3%)	155 (66.0%)	193 (65.2%)	0.853 (95% CI; 0.476-1.529)	0.593
	Yes	23 (37.7%)	80 (34.0%)	103 (34.8%)		
Smoking	No	34 (55.7%)	136 (57.9%)	170 (57.4%)	0.917 (95% CI; 0.520-1.617)	0.764
	Yes	27 (44.3%)	99 (42.1%)	126 (42.6%)		

The tested variables were compared across the Non-CRC/Polyps Group and the CRC/Polyps Group via Chi Square Test. The results were presented as Numbers (Percentages) with their corresponding Odd Ratios; IBS: Irritable bowel syndrome.; rEx: Regular exercise.; CRC: Colorectal cancer; FVC: Fruit and vegetable content in daily diet; FFR: Fiber to fat ratio in daily diet.

Population-based research examining the association between IBS and the subsequent risk of CRC has yielded contradictory results [15]. The conducted meta-analysis that aimed to investigate the relationship between IBS and the risk of developing colorectal cancer (CRC). After a diagnosis of irritable bowel syndrome (IBS), there was a 52% greater

probability of identifying colorectal cancer (CRC), according to a meta-analysis involving more than one million individuals [16]. However, considering the duration of follow-up, we found that the increased risk of colorectal cancer (CRC) was present solely in the first year following the diagnosis of irritable bowel syndrome (IBS), and it disappeared one year later [17]. IBS patients who were younger than 50 years old demonstrated a higher relative risk in comparison to their older counterparts [18]. The association between IBS and CRC remained gender-neutral [19].

The current published results provide additional evidence for the incorrect diagnosis of colorectal cancer (CRC), as the symptoms of IBS and CRC are comparable, especially during mild disease activity [20]. According to the Rome IV criteria, individuals with irritable bowel syndrome (IBS) should reserve colonoscopy for the evaluation of organic bowel diseases only in the presence of alarm symptoms [21]. Lowering the recommended age for screening IBS patients or adopting a lower screening threshold for patients under 50 years old could improve early detection of CRC [22]. A Danish population study identified individuals who underwent flexible sigmoidoscopy or colonoscopy within three months prior to or following their initial documented diagnosis of irritable bowel syndrome (IBS) as having a decreased long-term risk of developing colorectal cancer (CRC) [23].

However, our study is susceptible to a number of limitations, including a retrospective, observational, and single-center design, ambiguity regarding the temporal association between irritable bowel syndrome (IBS) and colorectal cancer (CRC) as measured by diagnosis rather than onset time, the potential for confounding variables, and the lack of data regarding the correlation between distinct subtypes of IBS and colon or rectal cancers.

5. Conclusion

In this study, we revealed a significance association for the inflammatory bowel diseases (IBD) but not the irritable bowel syndrome (IBS) for colorectal cancer and/or polyps' incidence for the attended Jordanian symptomatic tested patients. It is advisable to follow more frequently the inflammatory disease affected patients for colorectal cancer and/or polyp's risk

Compliance with ethical standards

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Disclosure of conflict of interest

There is no conflict of interest in this manuscript.

Statement of ethical approval

There is no animal subject involvement in this manuscript. This study received approval from the institutional review board during the committee meeting on March 11, 2025 and was assigned the registration number 15_4/2025. The second and final approval for publication was obtained from our institutional directorate of technical and development at 5 April 2025. Due to the retrospective design of this study, the informed consent form from paediatric parents was waived, and the study was strictly adhered to the standards established in the Helsinki ethical research protocols.

Statement of informed consent

Owing to the retrospective design of this study, the informed consent form was waived.

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