Original Article

Awareness and knowledge of colon cancer risk factors and preventive behaviors: A cross-sectional study

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Abstract

Introduction: Colon cancer is a global health issue of importance and ranking among the top causes of cancer-related deaths. The purpose of this study is to evaluate colon cancer awareness and understanding of the risk factors and effects of daily habits on colon health among a sample of participants in the West Bank, Palestine. **Materials and Methods:** The study was cross-sectional in nature, conducted between May and August 2024, with an online questionnaire being distributed via social media to the selected 600 participants of 18 and above—the questionnaire assessed: demographics, colon cancer awareness, symptoms awareness, and attitude toward prevention. Statistical analysis involved descriptive statistics, means, and nonparametric tests to assess differences. **Results:** This study assessed the knowledge and awareness of colon cancer among 600 participants in the West Bank, of whom 84.1% were female and 46.8% aged 20–29. Findings revealed that 73.7% correctly identified the colon as part of the large intestine, while 62.3% recognized colon cancer as the second leading cause of cancer-related deaths. Notably, 70.2% acknowledged that colon cancer could develop without symptoms, and 91% mentioned the fecal occult blood test. Most participants (87%) recognized smoking as a risk factor, with 98% aware of a sedentary lifestyle; however, knowledge of diabetes and hereditary factors was lower, at 88% and 83%, respectively. Demographic comparisons indicated that females outperformed males in all knowledge categories ($P < 0.05$). Age-related scores were the highest in the 30–39 age group for daily habits (72.5) and 40–49 for colon cancer knowledge (80.3), but these differences were not statistically significant. Participants from camps had the highest scores across categories, though again, differences were not significant ($P > 0.05$). Education level influenced results, with Master's degree holders scoring the highest in daily habits (82.3) and total scores (77.0). Overall, the study highlights critical gaps in knowledge about colon cancer, emphasizing the need for targeted educational interventions. **Conclusion:** Although participants demonstrated considerable understanding toward colon cancer and risk factors, gaps remain for understanding: screening methods and diabetes. The findings indicate a need for public health intervention campaigns directed to create awareness toward early detection and encourage healthier lifestyles.

Keywords: Awareness, colon cancer, preventive behaviors, public health, risk factors, screening methods, west bank

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Introduction

Background

Cancer results from genetic alterations disrupting the balance of cell proliferation and apoptosis, leading to abnormal growth, tissue invasion, and metastasis, which, if untreated, cause significant morbidity and mortality over decades. Colon cancer, a malignant tumor of the large intestine, is highly variable in incidence and mortality worldwide, with most cases occurring after age 50 (WHO). Symptoms include diarrhea, constipation, and hematochezia.[1]

Globally, colon cancer ranks as the third most diagnosed cancer in males and second in females, with higher incidence and mortality in males. In Palestine, it is the second leading cause of cancer deaths after lung cancer. Despite advances in prevention, detection, and treatment, challenges in Palestine include overcrowding, occupation, and humanitarian crises.[2]

Family history significantly influences colon cancer risk, doubling the likelihood for individuals with one affected first-degree relative and increasing with multiple relatives.[3] Diet also plays a crucial role, with red and processed meat increasing risk.[4] Hile fruits, vegetables, and dietary fiber offer protective effects.[5] Lifestyle factors, including alcohol use and smoking, further contribute to risk.[4-6]

Body weight and physical activity also affect colon cancer risk, with BMI linked to higher risk in men.[7] Conditions like diabetes and inflammatory bowel disease are associated with increased colon cancer risk, though metformin may have protective effects.[8]

In Palestine, colon cancer research is limited, despite its rising burden. While colon cancer rates among Arab patients historically have been low, trends indicate increasing incidence in westernized populations.[9] Age remains a major risk factor, with 90% of cases occurring after age 50 and those over 65 at significantly higher risk.[10]

This study explores the complex interaction of genetic, environmental, and social factors in colon cancer, with a specific focus on Palestine. It emphasizes the importance of family history, diet, lifestyle, and healthcare accessibility in understanding colon cancer risk. The findings are valuable for health practitioners and patients, offering information that can guide the development of prevention strategies and treatment plans. Improved health literacy, particularly regarding early detection and intervention, can help reduce the incidence and mortality of colon cancer. These insights contribute to a broader understanding of factors influencing colon cancer and can inform public health interventions, especially in regions facing competing healthcare challenges.

Materials and Methods

Study design

A cross-sectional study is planned to investigate knowledge and awareness of colon cancer located in Palestine. The study is scheduled to be conducted between May and August 2024.

Study population

A total of 600 consecutive participants were recruited from the general population of the West Bank of Palestine during the period of May to August and met all inclusion criteria and none of the exclusion criteria.

Sample selection criteria

1. **Inclusion criteria:** Individuals aged 18 years or older who reside in the West Bank and have electronic access to email and public social media platforms such as Facebook and WhatsApp and can complete the online survey.
2. **Exclusion criteria:** Exclusion criteria included individuals who declined to participate, lacked access to social media or a phone, and those under the age of 18.

Data collection and tool

This study, conducted in the West Bank of Palestine, surveyed both healthy individuals and colon cancer patients to assess their awareness and knowledge of the disease. An online questionnaire, designed in a self-administered format after reviewing relevant literature, was used to gather data. The survey, presented in Arabic, consisted of 40 questions divided into four sections: sociodemographics and daily practices, risk factors for colon cancer, awareness of symptoms, and knowledge and attitudes toward colon cancer. This comprehensive approach aimed to evaluate current public understanding of colon cancer and its associated factors. The study was conducted in Palestinian west bank. The research involved a survey of healthy people and colon cancer patients in Palestinian west bank. We started by conducting an online questionnaire to determine people's awareness and knowledge of colon cancer.

The questionnaire was designed in a self-administered manner after reviewing a number of articles and aims to assess the current knowledge about people's awareness and knowledge about colon cancer. The questionnaire was presented in Arabic and consists of 40 questions in 4 sections.

The first section includes questions about sociodemographics and daily practices. The second section addresses risk factors for colon cancer. The third section includes questions about awareness of symptoms, and the fourth section includes questions about knowledge and attitude toward colon cancer. Notably, the Cronbach's Alpha value for the third and fourth sections is 0.77, indicating good internal consistency, with a total of 29 items included in the scale.

Data analysis

Statistical analysis of the data collected from participants was entered and analyzed using Statistical Product and Service Solutions (SPSS) (version 25). The qualitative data that include demographic factors and knowledge of colon cancer data were analyzed using means, standard deviations, and frequencies. For categorical data, the parametric test, Kruskal–Wallis test, and Mann–Whitney U test were used to estimate the statistical

differences. For results to be statistically significant, we considered the confidence interval (CI) as 95% and a *P* value < 0.05.

Results

Table 1 demnostrates that the study included predominantly female participants (84.1%), with nearly half (46.8%) aged 20–29. Most participants resided in villages (60.2%) and were single (61.7%). Education levels were high, with 75.2% holding a university degree.

Table 1: Demographic data and daily habits of participants

Parameter	Variable	No. of participants	Percentage
Gender	Female	406	84.1
	Male	77	15.9
Age group	<20 years	147	30.4
	20-29 years	226	46.8
	30-39 years	60	12.4
	40-49 years	37	7.7
	50-59 years	13	2.7
Residency	Village	291	60.2
	City	179	37.1
	Camp	13	2.7
Marital status	Single	298	61.7
	Married	176	36.4
	Divorce	7	1.4
	Widodo	2	0.4
Education level	Elementary	2	0.4
	High School	101	20.9
	University	363	75.2
	Master	17	3.5
Weight	45-55 Kg	126	26.1
	55-65 Kg	125	25.9
	65-75 Kg	108	22.4
	75-85 Kg	66	13.7
	85-95 Kg	38	7.9
	>95 Kg	20	4.1
Do exercise	No	158	32.7
	Yes	80	16.6
	Sometimes	245	50.7
Smoking	No	403	83.4
	Yes	80	16.6
Eat fast food on daily basis	No	356	73.7
	Yes	37	7.7
	Might	90	18.6
Eat vegetables and fruits regularly	No	144	29.8
	Yes	154	31.9
	Sometimes	185	38.3
Sugar in take on daily basis	No	403	83.4
	Yes	80	16.6
Alcohol intake	No	479	99.2
	Yes	4	0.8
Eat fats and red meat on daily basis	No	278	57.6
	Yes	41	8.5
	Sometimes	164	34.0
Eat processed meat on daily basis	No	467	96.7
	Yes	16	3.3
Diabetes mellitus	No	467	96.7
	Yes	16	3.3

Regarding lifestyle habits, 50.7% exercised occasionally, while 32.7% did not exercise. Most participants were nonsmokers (83.4%) and did not consume alcohol (99.2%). Daily fast food and processed meat consumption were rare (73.7% and 96.7%, respectively), while 57.6% avoided fats and red meat daily. Fruit and vegetable intake was moderate, with 38.3% consuming them occasionally. Diabetes mellitus prevalence was low (3.3%).

Table 2 provides a comprehensive overview of participants' awareness and perceptions regarding colon cancer. The study revealed important insights into participants' awareness and perceptions of colon cancer. Most participants (73.7%) correctly identified the colon as part of the large intestine, and 62.3% recognized colon cancer as the second leading cause of cancer-related deaths. While 71.2% acknowledged that colon cancer could develop without symptoms, awareness of screening methods remained limited, with only 39.1% familiar with the fecal occult blood test and a mere 0.9% having undergone it. Similarly, 54.9% knew what a colonoscopy was, but only 4.8% had undergone the procedure. On the other hand, 88.6% believed that endoscopy could aid in early detection, and 95.4% agreed that colon cancer could be controlled if detected early. Participants demonstrated a strong understanding of risk factors, with 77.2% identifying age over 50 and 87% recognizing smoking as contributors. However, misconceptions persisted as 47.2% believed hemorrhoids could lead to colon cancer. Notably, 10.6% reported a family history of colon cancer, and 50.3% believed the disease affects both genders equally. Despite these gaps, most participants (90.1%) supported annual screenings for individuals over 50, highlighting the need for targeted educational campaigns to enhance knowledge about screening and preventive measures.

Figure 1 outlines the participants' perspectives on the most common symptoms of colon cancer. The results indicate that participants demonstrated greater awareness of digestive and abdominal symptoms of colon cancer, with the most recognized being changes in stool color and shape (19.6%), followed by severe abdominal pain (18.9%). Constipation or diarrhea and weight loss were each identified by 15.9%, while bloating was noted by 15.7%. Less commonly recognized symptoms included

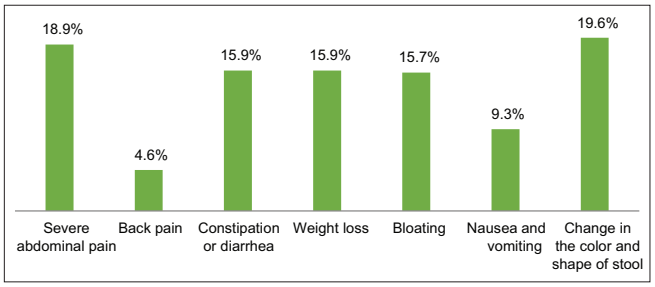

Figure 1: Most symptoms of colon cancer (participant point of view)

Table 2: Awareness of colon cancer

Parameter	Variable	No. of participants	Percentage
What is colon	Part of the small intestine	127	26.3
	Part of the large intestine	356	73.7
Ranking of colon cancer death	First	56	11.6
	Second	301	62.3
	Third	126	26.1
Do search about colon cancer	No	344	71.2
	Yes	139	28.8
Previous family history colon cancer	No	432	89.4
	Yes	51	10.6
Can the disease develop without symptoms?	No	139	28.8
	Yes	344	71.2
Do you think genetics play a role?	No	82	17.0
	Yes	401	83.0
Do you think there are diseases that may cause colon cancer?	No	27	5.6
	Yes	261	54.0
	Don knows	195	40.4
Rist factors			
People over the age of 50 are more susceptible to colon cancer?	No	110	22.8
	Yes	373	77.2
Do you think smoking is a risk factor?	No	63	13.0
	Yes	420	87.0
Do you think hemorrhoids can turn into colon cancer?	No	255	52.8
	Yes	228	47.2
Do you think that a change in stool color (presence of blood) is an indicator of colon cancer?	No	92	19.0
	Yes	391	81.0
Have you ever heard of the fecal occult blood test?	No	294	60.9
	Yes	189	39.1
Have you ever done it? (only yes)	No	172	0.9
Can inflammatory bowel disease be linked to colon cancer?	No	59	12.2
	Yes	164	34.0
	Maybe	260	53.8
Do you think that the frequent use of laxatives and laxatives without a prescription is related to colon cancer?	No	61	12.6
	Yes	150	31.1
	Maybe	272	56.3
Do you think anxiety and psychological pressure affect colon cancer patients?	No	35	7.2
	Yes	448	92.8
Colonoscopy	Yes	17	0.1
Do you know what a colonoscopy is?	No	218	45.1
	Yes	265	54.9
Do you think colonoscopy is shameful or embarrassing?	No	371	76.8
	Yes	112	23.2
Have you ever had a colonoscopy?	No	460	95.2
	Yes	23	4.8
Do you think that endoscopy contributes to early detection of colon cancer?	No	55	11.4
	Yes	428	88.6
Preventive and treatment		53	11.0
Can colon cancer be treated surgically?	No	162	33.5
	Yes	268	55.5
	Sometimes		
Can colon cancer be controlled in the early stage?	No	22	4.6
	Yes	461	95.4
Do you think that people over 50 years of age should have an annual screening or swab test?	No	48	9.9
	Yes	435	90.1
Do you think there is a relationship between taking aspirin (a blood thinner) and preventing colon cancer?	No	268	55.5
	Yes	215	44.5
Do you think the prevalence of colon cancer varies by gender?	Female higher than male	92	19.0
	Male higher than female	148	30.6
	Both	243	50.3

nausea and vomiting (9.3%) and back pain, which was the least identified symptom (4.6%). These findings highlight gaps in awareness of nonabdominal symptoms such as back pain.

Figure 2 presents data on the reasons participants believe people might neglect colon cancer treatment. The most frequently cited reason for neglecting colon cancer treatment, as identified by 60.7% of participants, is insufficient awareness about the disease's seriousness and the importance of early detection. Other reasons include loss of hope or poor psychological state (14.1%), high examination costs or lack of insurance coverage (9.9%), fear of complications from endoscopy or surgery (9.7%), and fear of societal reactions (5.6%).

Table 3 highlights participants' responses concerning their knowledge of colon cancer and the daily habits that may affect the colon, focusing on two key aspects.

Participants demonstrated a good overall understanding of colon cancer and its preventive measures, alongside relatively positive daily habits related to colon health. The mean score for daily habits was 3.91 (±0.37), reflecting a high self-assessment of healthy practices with moderate variability. Knowledge of colon cancer had a slightly lower mean score of 3.79 (±0.31), indicating a generally good level of awareness with less variability. The combined total score, encompassing both aspects, was 3.82 (±0.28), suggesting a solid overall understanding and practice of behaviors related to colon health [Figure 3].

Figure 4 reveals the participants' views on daily habits and their impact on colon cancer. A significant majority, 98%, agreed that exercise is essential for preventing colon cancer. Additionally, 87% acknowledged that smoking is a risk factor for colon cancer. However, only 48% agreed that diabetes is a risk factor, while 66% recognized that consuming large amounts of fat could lead to colon cancer.

Figure 5 highlights the participants' knowledge of colon cancer. A vast majority, 93%, correctly identified the colon as part of the large intestine. Additionally, 93% agreed that prior knowledge and general awareness about symptoms and causes can help protect against colon cancer. However, only 32% of participants believed that taking blood thinners, like aspirin, reduces the risk of colon cancer, and 40% agreed that colon cancer is spread equally among men and women.

Table 4 presents the differences in knowledge about colon cancer. Key findings reveal significant gender-based differences, with females scoring higher than males in daily habits (65.50 vs 42.28, $P = 0.011$), colon cancer knowledge (65.65 vs 41.22, $P = 0.015$), and total score (66.23 vs 37.31, $P = 0.003$).

Although the highest scores for daily habits (72.5) and colon cancer knowledge (80.3) were observed in the 30–39 and 40–49 age groups, respectively, these differences were not statistically significant ($P > 0.05$). Similarly, participants from camps and those with a Master's degree achieved the highest scores across various categories, but these differences lacked statistical significance ($P > 0.05$).

Figure 3 illustrates the distribution of participants' scores on daily habits and colon cancer knowledge using box plots. The median score for daily habits was 3.89 (3.67 – 4.11). In contrast, the median score for colon cancer knowledge was slightly lower at 3.80 (3.58 – 4.00).

Table 3: Colon cancer knowledge (*n*=124)

Aspect	Mean	SD±
Daily habits	3.91	0.37
Colon cancer knowledge	3.79	0.31
Total	3.82	0.28

Discussion

This study highlights important demographic patterns in knowledge and awareness regarding colon cancer, revealing significant gaps in public understanding. While the data show generally good knowledge of the disease, its risk factors, and daily habits influencing colon health, it also uncovers misconceptions that can guide future public health

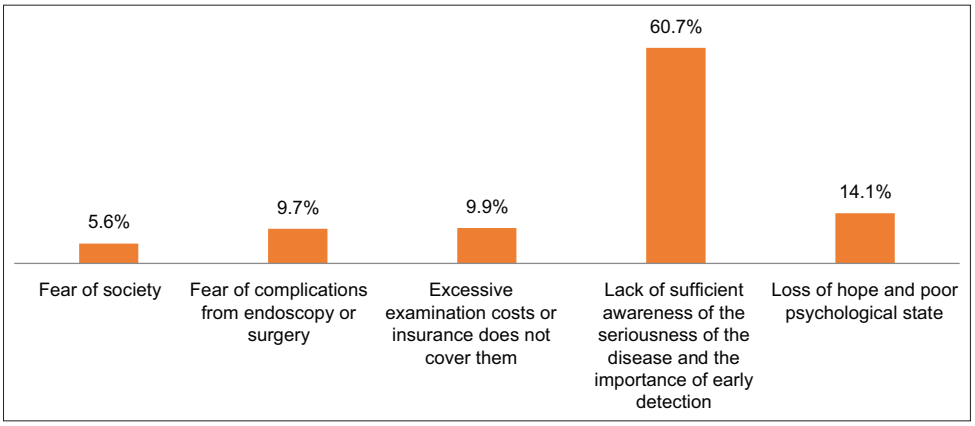

Figure 2: Reasons participants believe people might neglect colon cancer treatment

interventions. Female participants scored higher in colon cancer knowledge and daily habits, reflecting broader trends in health surveys that suggest women are more proactive in health-related practices.[11-13]

The study also highlights a large proportion of younger participants (20–29 years), which reflects their greater accessibility through virtual platforms. However, the study found lower awareness among those over 40, a group at higher risk for colon cancer. Similarly, a notably low level of awareness and understanding of colorectal cancer was identified among health and allied students in another study,[14] indicating a need for more targeted awareness campaigns for older populations.

Despite a majority of participants having healthy BMI levels, physical inactivity remains a concern, with 32.7% of participants not engaging in any physical activity. This contrasts with findings from other studies showing a strong link between physical inactivity and increased colon cancer risk.[15,16] Diet also remains a risk factor as many participants consume insufficient fruits and vegetables, despite knowing the benefits of such foods.[17-19]

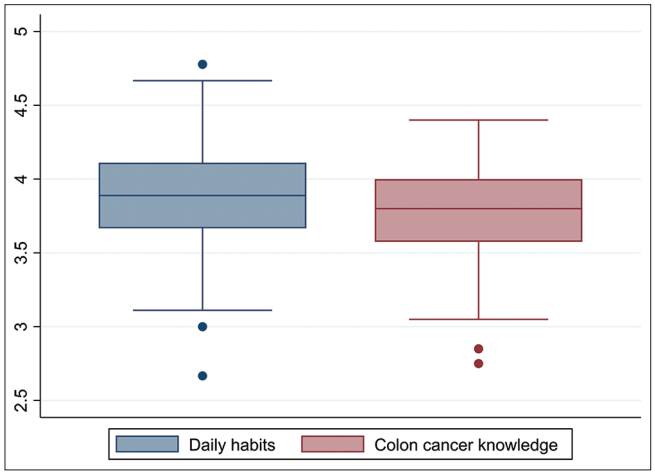

Figure 3: Box plot for daily habits and colon cancer knowledge

The awareness data on colon cancer are promising but highlight areas requiring improvement. A large majority of participants correctly identified the colon as part of the large intestine (73.7%) and recognized genetic and environmental risk factors, with 83% acknowledging genetics and 87% identifying smoking as a risk factor. These findings align with a previous survey among 825 health school students in Saudi Arabia, where 65-85.6% were aware of tobacco-related risks, although only 35.3-40.5% knew about tobacco-related diseases.[20] Similarly, a study of Hispanic/Latino individuals found that while 67.1% had an education level of eighth grade or lower, only 18.4% could correctly identify the colon, and 19.2% knew about polyps.[21] Despite this, a significant portion of participants (71.2%) had never actively sought information about colon cancer. This lack of proactive health-seeking behavior is concerning as such behavior is linked to improved health outcomes.[22,23]

Additionally, although 90% of participants support regular screenings for individuals over 45, only 4.8% had ever undergone a colonoscopy, likely due to psychological barriers such as fear or embarrassment, pointing to a need for public health campaigns to reduce stigma around such screenings.[24,25]

Conclusion

The study successfully assessed participants' knowledge of colon cancer and the impact of daily habits on colon health. While the findings indicate that participants generally possess a reasonable understanding of colon cancer and the associated risk factors, there are areas where awareness and behavior can be improved. The recognition of genetic factors, diet, smoking, alcohol use,

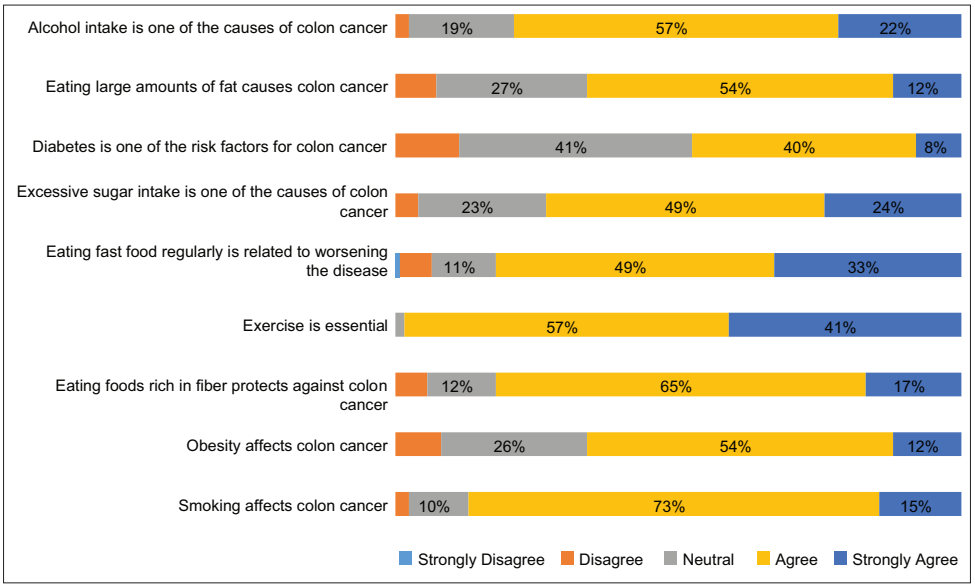

Figure 4: Knowledge of participants regarding to daily habits effect on colon (n = 124)

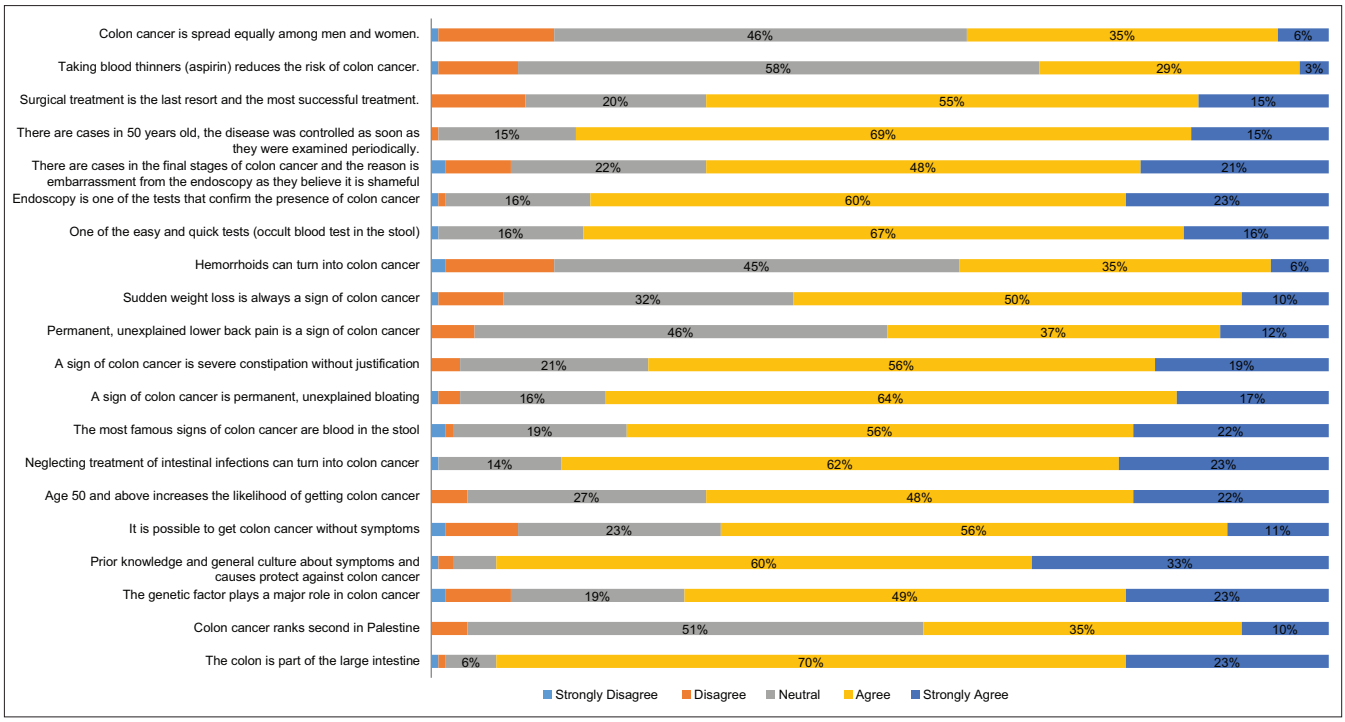

Figure 5: Knowledge of participants regarding to colon cancer (n = 124)

Table 4: Differences of knowledge colon cancer (n=124)

Parameter	Daily habits	Colon cancer	Total
Gender			
Female	65.50	65.65	66.23
Male	42.28	41.22	37.31
P	0.011	0.015	0.003
Age group			
<20 years	65.9	62.0	63.7
20-29 years	55.3	54.9	55.5
30-39 years	72.5	69.2	71.0
40-49 years	32.4	80.3	61.9
50-59 years	45.3	62.8	40.8
P	0.095	0.549	0.689
Residency			
Village	65.3	56.0	58.6
City	60.3	65.5	64.0
Camp	116.0	103.0	112.0
P	0.246	0.201	0.279
Education level			
Elementary	54.8	53.7	51.9
High school	1.0	117.5	60.0
University	63.6	63.6	63.9
Master	82.3	66.3	77.0
P	0.118	0.286	0.398

and exercise as influential in colon cancer aligns with existing research. However, the lower acknowledgment of diabetes as a risk factor suggests a gap in knowledge that needs to be addressed. Overall, the study highlights the need for continued education and awareness efforts to enhance understanding and promote healthier practices related to colon health.

Strengths and limitations

1. **Strengths:** The study's large sample size (483 participants) and demographic diversity in age, gender, and residence provide a broad perspective on colon cancer-related habits and knowledge. It identifies major community misconceptions, offering valuable insights for targeted educational campaigns. Additionally, the inclusion of multiple lifestyle variables (diet, exercise, smoking) allows for a comprehensive analysis of factors influencing colon cancer awareness and prevention.
2. **Limitations:** The overrepresentation of female respondents may bias findings related to gender-specific knowledge and habits. Reliance on self-reported data introduces potential social desirability bias. The cross-sectional design lacks longitudinal follow-up, limiting the ability to track changes over time. Moreover, the high proportion of university-educated participants restricts the generalizability of the results to the broader population.

Ethics approval and consent to participate

Ethical approval for this study was obtained from the Institutional Review Board (IRB) at An-Najah University, West Bank – Palestine. Participants were informed about the purpose, technique, risks, and benefits of the study, and consent was obtained from all participants prior to their involvement. Confidentiality and privacy of participants and their data was strictly maintained throughout the study as only the researchers and supervisors are able to access them.

Availability of data and material

The data sets supporting the current research results are available from the corresponding authors upon request.

Financial support and sponsorship

Not applicable, there is no organization supporting this research.

Conflict of interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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