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KNOWLEDGE AND AWARENESS LEVEL REGARDING COLORECTAL CANCER AND ITS SCREENING TEST AMONG THE GENERAL POPULATION IN SAUDI ARABIA

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Abstract

Colorectal cancer (CRC) is a significant global health issue, including in Saudi Arabia, where its incidence and related mortality have shown a concerning increase over the past decade. This research aimed to evaluate the level of knowledge and awareness regarding CRC and its screening procedures among the general population in Saudi Arabia. By identifying knowledge gaps and assessing public awareness levels, this study seeks to contribute to the development of effective public health policies to combat CRC in the country. A cross-sectional questionnaire survey design was employed, utilizing a structured questionnaire developed by the researchers. The survey targeted the general adult population aged 18 years and above in Saudi Arabia, encompassing both males and females. The survey consisted of 28 questions, evaluating knowledge levels based on a scoring system categorized as poor, moderate, or high. As regard knowledge and attitude score about colorectal cancer, there were (53.2%) out of 509 respondents exhibited a poor level of knowledge about this prevalent form of cancer. Additionally, (28.3%) of the participants demonstrated a high level of knowledge. However, the moderately high percentage (18.5%) of individuals revealed a moderate level of knowledge. Additionally, (41.8%) correctly identify the recommended age of 50 years for colorectal cancer screening.The findings revealed that a significant proportion of respondents exhibited a poor level of knowledge about CRC, while a smaller percentage demonstrated a high level of knowledge. Furthermore, many participants were unaware of the symptoms of colon cancer. Despite the recommended age for CRC screening being 50 years, a significant proportion of participants believe screening should only occur when symptoms manifest, highlighting misconceptions that must be addressed.

Keywords: colorectal cancer, screening procedures, knowledge, awareness, general population, Saudi Arabia.

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Introduction:

The abnormal cancerous division of cells in the colon or rectum is a characteristic of colorectal cancer (CRC) [1]. A polyp, a non-cancerous development in the inner mucosa lining of the colon or rectum, is typically how CRC initially manifests [2]. Approximately 10% of non-cancerous polyps progressed into invasive cancer spreading to the colon or rectum's wall, infiltrating the lymph nodes and lymphatic veins nearby. Later stages can cause it to migrate to other organs such as the peritoneum, liver, and lungs [3]. Estimates from the Kingdom of Saudi Arabia show that colorectal cancer is the second most common type of cancer, with an estimated prevalence of 9.9% in men and 6.4% in women. It is also the most common malignancy in men and the third most common cancer in women in Saudi [4]. The second greatest cause of cancer-related fatalities worldwide is colorectal cancer (CRC), which is the third most frequently diagnosed malignancy [5]. CRC occurrence among men and women with cancer is 14.2% and 9.3%, accordingly; thus making it the second most prevalent cancer in the Saudi population following breast cancer [6]. According to reports, the average age at which CRC develops in the Saudi population is 60 years of age for males and 55 years of age for females [7]. Compared to other countries, Saudi Arabia has a low incidence rate of colorectal cancer, yet during the past 10 years, both the incidence rate and cancer-related deaths have risen dramatically [8].

T. Hassan and C. Kalevaru performed a cross-sectional survey in the province of Qassim in 2023 to emphasize the popular acceptability of CRC screening and identify potential obstacles. According to the results of this study's multivariate analysis, men were much more likely than women to accept screenings [9]. Based on the knowledge, insufficient understanding has an impact on participants' attitudes when participating in CRC screening [10]. In 2022 the newest study showed only 21.6% of 97 participants in the Makkah province who had relations with CRC had Knowledge of CRC screening [11]. Cross-sectional research published in 2022 found that public patients in Riyadh City had a lower degree of awareness regarding CRC screening than predicted [12]. According to a descriptive cross-sectional study done in 2020, the Aseer region's public knowledge of CRC was insufficient [13]. There is a severe lack of knowledge of CRC symptoms, risk factors, and screening among the majority of the determined population in the Asir region, according to a cross-sectional study done in 2018 [14].

The Saudi public's degree of knowledge concerning colorectal cancer is yet unclear. The community can play a vital role in raising knowledge of colorectal cancer risk factors and warning symptoms. This procedure will provide appropriate information about the disease and may encourage the general public to participate in cancer screening [15].

The purpose of the study is to ascertain the general public's degree of knowledge and awareness in Saudi Arabia regarding colon cancer and related screening procedures. The following are some major reasons why this study is important; Public Health Importance: Colon cancer affects millions of people worldwide, including Saudi Arabia. It ranks as the second biggest cause of cancer-related deaths globally and the third most prevalent cancer. This study can shed light on the knowledge gaps that exist and aid in developing efficient public health policies to fight colon cancer by evaluating the general population's knowledge and awareness levels in Saudi Arabia. Our study aims to assess the knowledge and awareness level regarding colorectal cancer (CRC) and its screening tests among the general population in Saudi Arabia.

Materials and Methods:

Study design: This study was a cross-sectional questionnaire survey, based on a structured questionnaire that was developed by the authors. Participants, recruitment, and sampling procedure: The study was conducted within the general adult population in Saudi Arabia.

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Inclusion and Exclusion criteria:
All of the Saudi Arabian population of both genders aged 18 years and above were included in this study.

Sample size:
Raosoft calculator an online sample size calculator, was used to determine a minimum sample size of 384 with a 95% confidence level and a 5% margin of error.

Method for data collection and instrument (Data collection Technique and tools):
The questionnaire consisted of three sections, the first of which included sociodemographic data (age, gender, education level, occupation, and marital status). The second part included items that assessed the participants' knowledge and awareness of colorectal cancer, Items were used to assess participants' attitudes towards CRC screening methods in the third part.

Scoring system:
The questionnaire consisted 28 questions, 23 of them was Knowledge questions. The original Bloom's cut-off points, 80.0%-100.0%, 60.0%-79.0%, and ≤59.0% have been adapted from KAP study conducted toward compliance with abattoir laws among the abattoir workers in Malaysia. They have been used to classify KAP into three levels. The scores for knowledge varied from 0 to 23 points and have been labeled into three stages as follows: 1. high level: 18–23 scores; 2. moderate level: 15-17 scores; and 3. low level: 0–14 score.

Analyzes and entry method:
Collected data was entered on computer using Google Form software. Data then was transferred to the statistical package of science software (SPSS) to be statistically analyzed.

Results:

Table (1) displays various demographic parameters of a group of people with a total number of (509). The provided data offers a comprehensive overview of the sociodemographic characteristics of the participants in this study. The sample size of 509 individuals suggests a robust dataset, and the detailed breakdowns across various parameters provide valuable insights into the demographic composition of the study population. The age distribution indicates a relatively balanced representation, with the largest group being those under 23 years old, followed by the 23-30, 31-45, and over 45 age groups. The gender distribution skews heavily towards females, with 73.5% of the participants being women. This is an important consideration when interpreting the study's findings, as gender-specific factors may influence the observed outcomes. The nationality distribution shows that most participants (96.9%) are Saudi, with a small proportion (3.1%) being non-Saudi. This is likely reflective of the study's geographic scope and the target population. The educational level of the participants is also diverse, ranging from primary school to doctoral degrees, with the largest group holding bachelor's degrees. The regional distribution reveals that most participants (61.5%) are from the Western region, followed by the Central (24.2%), Eastern (9.6%), Southern (3.7%), and Northern (1.0%) regions. This uneven distribution may need to be considered when generalizing the study's findings to the broader population. The household income data shows that nearly half (46.4%) of the participants have a monthly household income of less than 5,000 SAR, while the remaining groups are distributed across the higher income brackets. This indicates

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a varied socioeconomic background among the participants, which may be a relevant factor in the interpretation of the study's results. Finally, the occupational and marital status distributions provide additional insights into the participants' social and professional characteristics. The largest occupational group is students (35.8%), followed by the education sector (21.8%), healthcare professionals (11.4%), and the unemployed (13.9%). The marital status distribution shows that half of the participants are single, with the remaining being married, divorced, or widowed. Overall, the detailed sociodemographic data presented in this table offers a comprehensive understanding of the study population, which is essential for contextualizing the study's findings and informing the generalizability of the results to the broader population.

Table (1): Sociodemographic characteristics of participants (n=509)

Parameter		***No.***	***Percent (%)***
Age	Less than 23	140	27.5
	23 to 30	129	25.3
	31 to 45	131	25.7
	More than 45	109	21.4
Gender	Female	374	73.5
	Male	135	26.5
Nationality	Saudi	493	96.9
	Non-Saudi	16	3.1
Education level	Primary school	2	.4
	Intermediate school	12	2.4
	Secondary school	111	21.8
	Diploma	33	6.5
	Bachelor’s degree	321	63.1
	Master’s degree	19	3.7
	PHD	7	1.4
	Illiterate	4	.8
Region	Northern region	5	1.0
	Southern region	19	3.7
	Central region	123	24.2
	Eastern region	49	9.6
	Western region	313	61.5
Monthly Household income (in SAR)	Less than 5000	236	46.4
	5000 to 10000	114	22.4
	11000 to 15000	84	16.5
	More than 15000	75	14.7
Occupation	Student	182	35.8
	Healthcare professional	58	11.4
	Education sector	111	21.8
	Private sector	1	.2
	Unemployed	71	13.9
	Others	86	16.9
Marital status	Single	257	50.5

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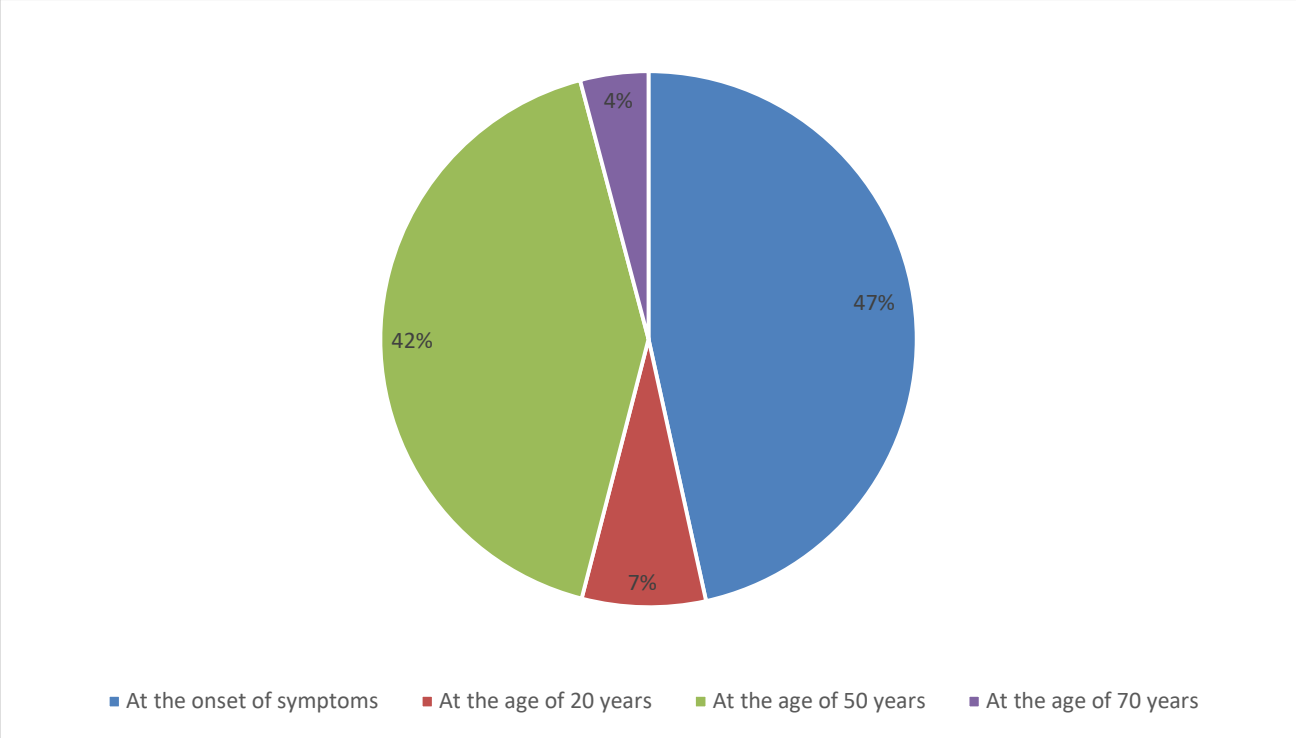
	Married	223	43.8
	Divorced	26	5.1
	Widowed	3	.6

As shown in figure 1, Colorectal cancer is a significant public health concern, and early detection is crucial for effective management and improved patient outcomes. The data presented in the figure provides valuable insights into the screening practices and recommendations for colorectal cancer detection. According to the information provided, most respondents (213 out of the total) indicate that screening should commence at the age of 50 years, which aligns with the current guidelines and recommendations of many healthcare organizations. This age-based approach aims to detect colorectal cancer in its earlier stages, when the disease is more treatable, and the chances of successful intervention are higher. However, the figure also reveals that a substantial number of respondents (237) believe that screening should be initiated at the onset of symptoms, which may not be the most optimal approach, as some individuals may develop colorectal cancer without exhibiting obvious symptoms in the early stages. Additionally, a smaller proportion of respondents (38 and 21) suggest screening at the ages of 20 and 70 years, respectively, which may not be in line with the standard recommendations. These variations in perceptions and practices underscore the importance of continuous education and awareness campaigns to ensure that healthcare providers and the public are well-informed about the appropriate timing and frequency of colorectal cancer screening. By promoting a unified understanding of the recommended screening guidelines, we can enhance early detection, improve treatment outcomes, and ultimately reduce the burden of this preventable disease.

Figure (1): Illustrates the timing of screening of colorectal cancer among participants.



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As illustrated in table (2), The data presented in the table provides valuable insights into the level of knowledge about colon anatomy and colorectal cancer among the participants. The responses demonstrate a generally good understanding of the basic anatomical features, such as the colon being the large intestine and the rectum being the last part of the large intestine. However, there are some areas where knowledge appears to be less comprehensive. For instance, a significant portion of the participants (15.7%) are unsure about the specific functions of the colon, and a similar percentage (21.8%) are unaware of the symptoms of colon cancer. This suggests that there may be a need for more targeted educational efforts to improve the public's understanding of the gastrointestinal system and the signs and symptoms associated with colorectal cancer. The data also reveals some gaps in knowledge regarding screening recommendations and risk factors. While most participants (41.8%) correctly identify the recommended age of 50 years for colorectal cancer screening, a substantial number (46.6%) believe that screening should only be done at the onset of symptoms, which is not in line with current guidelines. Additionally, while most participants recognize family history as a risk factor, a significant proportion (19.2%) are unsure about the other risk factors, such as inflammatory bowel disease, fatty diet, and colon polyps. Interestingly, the data suggests a relatively high level of awareness about the potential for colorectal cancer to be cured, with two-thirds of participants (66.8%) believing that it is possible. However, there is less certainty about the relationship between colorectal cancer and irritable bowel syndrome, with over half of the respondents (52.7%) unsure about any potential connection. Overall, the data highlights the need for continued efforts to educate the public about the importance of regular colorectal cancer screening, the risk factors associated with the disease, and the signs and symptoms that may indicate the need for medical attention. By addressing these knowledge gaps, healthcare providers and public health organizations can empower individuals to take a more proactive approach to their colorectal health and, ultimately, improve early detection and treatment outcomes.

Table (2): Parameters related to knowledge about colon anatomy and colorectal cancer (n=509).

Parameter		***No.***	***Percent (%)***
The Colon is	The large intestine	380	74.7
	The small intestine	44	8.6
	The stomach	13	2.6
	Stomach and small intestine	46	9.0
	I don’t know	26	5.1
The rectum is:	The last part of the stomach	28	5.5
	The last part of the small intestine	61	12.0
	The last part of the large intestine	388	76.2
	I don’t know	32	6.3
Colon function is:	Digestion of food	69	13.6
	Waste storage	179	35.2
	Water reabsorption	170	33.4
	Does not have a function	11	2.2
	I don’t know	80	15.7
The incidence of colon cancer is:	High	126	24.8
	Average	311	61.1
	Rare	72	14.1

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When do you screen for colorectal cancer?	At the onset of symptoms	237	46.6
	At the age of 20 years	38	7.5
	At the age of 50 years	213	41.8
	At the age of 70 years	21	4.1
What are the symptoms of colon cancer? *	Abdominal pain	259	50.9
	Change in the bowel habits	301	59.1
	Nausea and vomiting	164	32.2
	Yellow discoloration of the eyes and skin	64	12.5
	Presence of blood in stool	311	61.1
	Does not have any symptoms	10	1.9
	I don't know	111	21.8
What are the risk factors for colon cancer? *	Smoking	216	42.4
	Inflammatory bowel disease	236	46.3
	Family history of colon cancer	342	67.2
	Fatty food	143	28.1
	Colon polyps	166	32.6
	I don't know	98	19.2
Is it possible to be cured from colorectal cancer?	• Yes	340	66.8
	• No	18	3.5
	• I don't know	151	29.7
Is there a relationship between colon cancer and irritable bowel syndrome?	• Yes	157	30.8
	• No	84	16.5
	• I don't know	268	52.7
What is the group most at risk of developing colorectal cancer?	Male	169	33.2
	Female	33	6.5
	Both genders	205	40.3
	I don't know	102	20.0

*Results may overlap

As shown in figure (2), the findings indicate a clear trend that colon cancer patients experience significantly improved healing rates when the disease is detected and diagnosed in its early stages. The overwhelmingly positive response, with 397 respondents (71% agreement) either agreeing or strongly agreeing with the statement, underscores the critical importance of early detection for this form of cancer. Conversely, the relatively low percentages of those who disagree or are undecided further emphasize the consensus among medical professionals and the general public regarding the benefits of prompt diagnosis. This data provides a compelling argument for the continued investment in public health initiatives, improved screening methods, and broader awareness campaigns to ensure that colon cancer is identified and addressed as early as possible, ultimately enhancing patient outcomes and survival rates. The findings presented in this figure serve as a valuable resource to inform healthcare policy, resource allocation, and patient education efforts aimed at addressing this significant public health concern.

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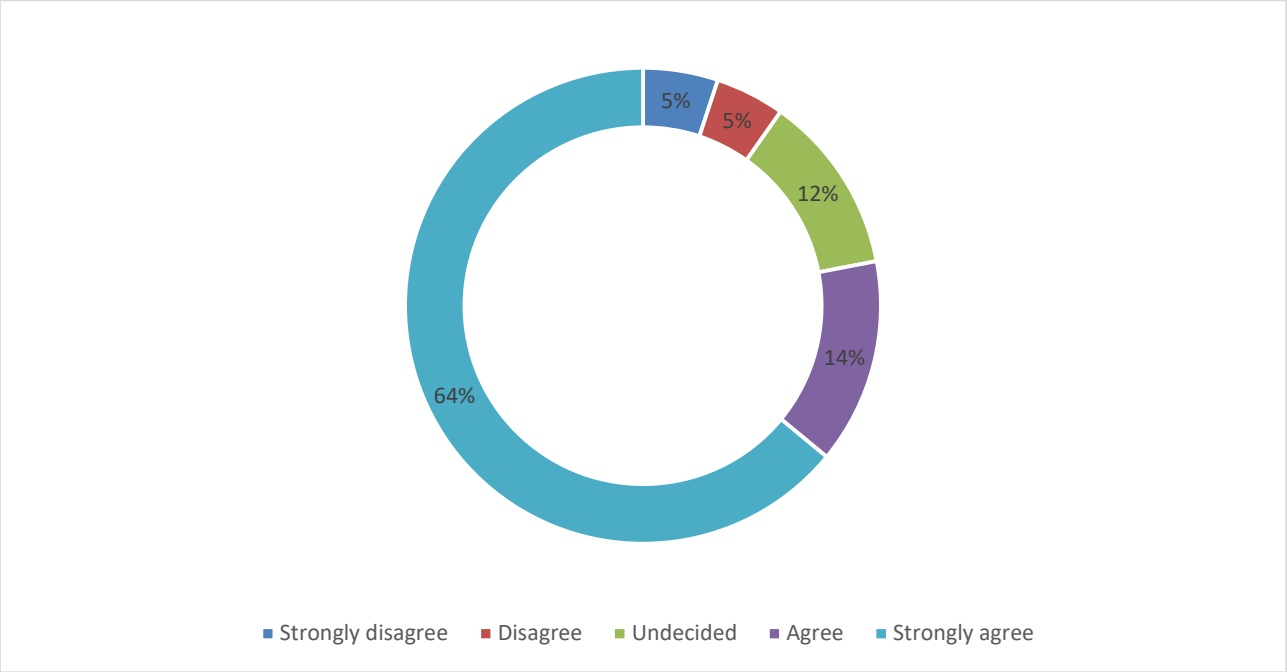
Figure (2): Illustrates if participants think that healing rates for colon cancer increase when detected in the early stages.



The data presented in Table 3 provides valuable insights into the participants' attitudes and knowledge regarding colorectal cancer. The findings suggest a mixed level of understanding and awareness among the respondents. Notably, a significant proportion of participants (49.7%) strongly disagreed that they are prone to colon cancer, while only a small percentage (7% in total) agreed or strongly agreed with this notion. This suggests a potential lack of perceived personal risk, which could hinder proactive screening and prevention measures. On a more positive note, most respondents (62.9% in total) agreed or strongly agreed that colon cancer is preventable, indicating a general understanding of the importance of preventive measures. However, a substantial proportion (24.8%) remained undecided on this matter, highlighting the need for more comprehensive public education campaigns to address this gap. Regarding the perceived fatality of colon cancer, the responses were more varied, with 41.1% of participants being undecided. This uncertainty may stem from a lack of understanding about the importance of early detection and the improved survival rates associated with timely intervention. Encouragingly, most respondents (77.9% in total) agreed or strongly agreed that early detection of colon cancer significantly improves healing rates. This suggests a recognition of the benefits of early screening and diagnosis, which is a crucial step in promoting preventive healthcare practices. Similarly, a significant proportion of participants (81.9% in total) expressed a willingness to undergo colon cancer screening if recommended by their healthcare provider. This positive attitude towards screening, when coupled with appropriate healthcare access and resources, could contribute to enhanced early detection and improved patient outcomes. The data also reveals that a substantial number of respondents (38.1%) strongly agreed that older individuals are more susceptible to colon cancer, indicating a general understanding of age-related risk factors. However, the relatively high proportion of undecided responses (29.9%) suggests a need for further educational efforts to strengthen this knowledge. Overall,

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the findings demonstrate a mix of positive and concerning trends in the participants' attitudes and knowledge regarding colorectal cancer. While there is a general awareness of the preventable nature of the disease and the benefits of early detection, gaps in personal risk perception, uncertainty about fatality rates, and limited knowledge about screening methods highlight the need for more comprehensive public health interventions. Addressing these areas through targeted educational campaigns, improved healthcare access, and promotion of screening guidelines could potentially lead to enhanced early detection, prevention, and management of colorectal cancer within the studied population.

Table (3): participants attitude and knowledge regarding colorectal cancer (n=509).

Parameter		***No.***	***Percent (%)***
I think I'm prone to colon cancer	Strongly disagree	253	49.7
	Disagree	97	19.1
	Undecided	123	24.2
	Agree	19	3.7
	Strongly agree	17	3.3
Colon cancer is preventable	Strongly disagree	32	6.3
	Disagree	31	6.1
	Undecided	126	24.8
	Agree	91	17.9
	Strongly agree	229	45.0
I think having colon cancer is fatal	Strongly disagree	59	11.6
	Disagree	80	15.7
	Undecided	209	41.1
	Agree	72	14.1
	Strongly agree	89	17.5
Healing rates for colon cancer increase when detected in the early stages	Strongly disagree	26	5.1
	Disagree	24	4.7
	Undecided	62	12.2
	Agree	71	13.9
	Strongly agree	326	64.0
If my doctor advises me to do colon cancer screening, I'll do it	Strongly disagree	24	4.7
	Disagree	17	3.3
	Undecided	51	10.0
	Agree	51	10.0
	Strongly agree	366	71.9
Older people are more susceptible to colon cancer	Strongly disagree	36	7.1
	Disagree	18	3.5
	Undecided	152	29.9
	Agree	109	21.4
	Strongly agree	194	38.1
Do you think it is possible to detect colorectal cancer before symptoms appear?	No	60	11.8
	Yes	274	53.8
	I don’t know	175	34.4

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Have you heard about early tests for colon cancer	No	254	49.9
	Yes	255	50.1
Methods of Early Detection of Colon Cancer *	Colonoscopy	302	59.3
	Rectal binoculars and anal cannula	261	51.2
	Blood test in the eye stool	233	45.7
	Radiate it with barium dye for the large intestine	184	36.1
	Blood tests	113	22.2
	Clinical examination of the rectum	129	25.3
	CT abdominal radiation	154	30.2
	Other diagnostic methods	36	7.1
Have relatives diagnosed with colorectal cancer	No	358	70.3
	Yes	90	17.7
	I don't know	61	12.0
Done early detection of colorectal cancer	No	479	94.1
	Yes	30	5.9
Ready to get early screening for colorectal cancer even without symptoms	No	252	49.5
	Yes	257	50.5
Source of information on colon and colorectal cancer *	Health practitioner (doctor, nurse, etc.)	119	23.3
	School/university	118	23.1
	Social networking sites	192	37.7
	Other	172	33.7

*Results may overlap

The data presented in Table 4 provides valuable insights into the knowledge and attitude of the surveyed population regarding colorectal cancer. The findings indicate that a significant proportion (53.2%) of the respondents exhibited a poor level of knowledge about this prevalent form of cancer. This is concerning, as adequate understanding of the risk factors, symptoms, and prevention strategies for colorectal cancer is crucial for early detection and effective management. On a more positive note, a sizable portion (28.3%) of the participants demonstrated a high level of knowledge, suggesting that educational efforts and public awareness campaigns have been moderately successful in disseminating important information. However, the moderately high percentage (18.5%) of individuals with a moderate level of knowledge underscores the need for continued and targeted interventions to improve overall comprehension and raise the level of awareness among the broader population. These results highlight the importance of implementing comprehensive educational programs and strengthening outreach initiatives to ensure that the public is well-informed about colorectal cancer. By addressing the knowledge gaps identified in this study, healthcare providers and policymakers can empower individuals to take proactive measures in maintaining their colorectal health, leading to earlier diagnosis, improved treatment outcomes, and ultimately, a reduction in the burden of this significant public health concern.

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Table (4): Shows knowledge and attitude about colorectal cancer score results.

	Frequency	**Percent**
High level of knowledge	144	28.3
Moderate level of knowledge	94	18.5
Poor level of knowledge	271	53.2
Total	509	100.0

Table (5) shows that the knowledge level regarding colorectal cancer and its screening has statistically significant relation to gender (p value=0.001), age (p value=0.0001) and monthly household income (p value=0.0001). It also shows statistically insignificant relation to nationality.

Table (5): Relation between knowledge level regarding colorectal cancer and sociodemographic characteristics.

Parameters		***Knowledge level***		***Total (N=509)***	***P value****
		High or moderate	**Poor level**		
Gender	Female	159	215	374	0.001
		66.8%	79.3%	73.5%	
	Male	79	56	135	
		33.2%	20.7%	26.5%	
Age	Less than 23	85	55	140	0.0001
		35.7%	20.3%	27.5%	
	23 to 30	74	55	129	
		31.1%	20.3%	25.3%	
	31 to 45	46	85	131	
		19.3%	31.4%	25.7%	
	More than 45	33	76	109	
		13.9%	28.0%	21.4%	
Nationality	Saudi	231	262	493	0.806
		97.1%	96.7%	96.9%	
	Non-Saudi	7	9	16	
		2.9%	3.3%	3.1%	
Education level	Primary school	0	2	2	N/A
		0.0%	0.7%	0.4%	
	Middle school	4	8	12	
		1.7%	3.0%	2.4%	
	High school	57	54	111	
		23.9%	19.9%	21.8%	
	Diploma	16	17	33	
		6.7%	6.3%	6.5%	
	Bachelor’s degree	153	168	321	
		64.3%	62.0%	63.1%	
	Master’s degree	4	15	19	

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		1.7%	5.5%	3.7%	
	PHD	4	3	7	
		1.7%	1.1%	1.4%	
	Uneducated	0	4	4	
		0.0%	1.5%	0.8%	
Region of residence	Northern region	0	5	5	N/A
		0.0%	1.8%	1.0%	
	Southern region	8	11	19	
		3.4%	4.1%	3.7%	
	Central region	43	80	123	
		18.1%	29.5%	24.2%	
	Eastern region	29	20	49	
		12.2%	7.4%	9.6%	
	Western region	158	155	313	
		66.4%	57.2%	61.5%	
Monthly Household income	Less than 5000	134	102	236	0.0001
		56.3%	37.6%	46.4%	
	5000 to 10000	38	76	114	
		16.0%	28.0%	22.4%	
	11000 to 15000	34	50	84	
		14.3%	18.5%	16.5%	
	More than 15000	32	43	75	
		13.4%	15.9%	14.7%	
Occupation	Student	122	60	182	N/A
		51.3%	22.1%	35.8%	
	Healthcare professional	36	22	58	
		15.1%	8.1%	11.4%	
	Education sector	36	75	111	
		15.1%	27.7%	21.8%	
	Private sector	1	0	1	
		0.4%	0.0%	0.2%	
	Unemployed	18	53	71	
		7.6%	19.6%	13.9%	
	Others	25	61	86	
		10.5%	22.5%	16.9%	
Marital status	Single	152	105	257	N/A
		63.9%	38.7%	50.5%	
	Married	81	142	223	
		34.0%	52.4%	43.8%	
	Divorced	5	21	26	
		2.1%	7.7%	5.1%	
	Widowed	0	3	3	
		0.0%	1.1%	0.6%	

P value was considered significant if ≤ 0.05.

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Discussion:

Colorectal cancer (CRC) is among the top three most prevalent malignancies worldwide, and it is the second cancer leading to death worldwide [16]. CRC is by far the most frequent form of cancer in Saudi Arabia's male population, while in Saudi females it is the third most common cancer. Overall, the incidence rate of CRC has increased in the Saudi population [17]. Though CRC is more common in older patients, it has increased significantly in those under 50 over the past twenty years [18]. Screening for CRC is required and recommended for all people over 50. However, people with a positive family history of CRC should start screening at 40. According to Saudi guidelines, the best screening method for CRC is colonoscopy followed by flexible sigmoidoscopy. In addition, it is recommended to perform a flexible sigmoidoscopy in combination with an annual guaiac occult blood test or fecal immunochemical test every five years if colonoscopy is not an accessible screening option [19]. Thus, we aimed in this study to assess the knowledge and awareness level regarding colorectal cancer (CRC) and its screening tests among the general population in Saudi Arabia.

As regard knowledge and attitude score about colorectal cancer, we have found that (53.2%) out of 509 respondents exhibited a poor level of knowledge about this prevalent form of cancer. Additionally, (28.3%) of the participants demonstrated a high level of knowledge. However, the moderately high percentage (18.5%) of individuals revealed a moderate level of knowledge. Moreover, (21.8%) were unaware of the symptoms of colon cancer. While most participants (41.8%) correctly identify the recommended age of 50 years for colorectal cancer screening, a substantial number (46.6%) believe that screening should only be done at the onset of symptoms, which is not in line with current guidelines. Additionally, while most participants recognize family history as a risk factor, a significant proportion (19.2%) are unsure about the other risk factors, such as inflammatory bowel disease, fatty diet, smoking, and colon polyps. In line with our results, Alaqel et al. [20] and Galal et al. studies in Saudi Arabia, revealed that family history was reported by more than 40% of participants as a risk factor for CRC [21]. IBS was viewed as a risk factor by a significant percentage of respondents (40.6%) in the study by Ahmed and Alrashidi [22]. Poor diet was cited as a risk factor for CRC most frequently (54.2%), followed by IBD (50.8%), family history (37.6%), and smoking (35.3%), according to a study done in Riyadh, Saudi Arabia [23]. Once more, a reported family history of CRC (77.59%) was regarded as a risk factor for CRC in the western area of Saudi Arabia. Additionally, food and smoking were mentioned as risk factors by approximately 61%, while 45% mentioned IBD [24]. On the other hand, Alotaibi et al. conducted another national survey in Saudi Arabia and found that of the 521 participants, around half had a low level of awareness of the symptoms and risk factors associated with CRC which is relatively higher than our results [25]. Furthermore, a similar national survey indicated that more than 50% of the respondents were knowledgeable of CRC [26]. According to the study by Alshaer et al., Saudi Arabian participants had insufficient knowledge and poor awareness of CRC [27]. Additionally, Alsayed et al. in Al-Madinah Al-Monawarrah, Saudi Arabia, indicated that 35.5%, 62.2%, and 57.1% of respondents reported that family history, smoking, and colon polyp are risk factors for CRC, respectively [28]. However, Zubaidi *et al*., in a study on general population in Saudi Arabia, reported that awareness and knowledge about CRC were inadequate [29]

Regarding the best time for CRC screening as reported by our participants, (41.8%) correctly identify the recommended age of 50 years for colorectal cancer screening. Similarly, Almadi et al. in Saudi Arabia discovered that the age range of 40-49 years was cited as the best time for screening by 35.1% of respondents [30]. Moreover, a study was done in the Riyadh region, where knowledge and awareness of CRC were low [31]. Another survey on CRC knowledge among the Omani adult population reported insufficient knowledge of CRC [32]. This finding suggests that individuals are not knowledgeable enough about cancer risk factors, indicating a need for awareness programs about CRC.

Conclusion:
In conclusion, the study underscores a concerning lack of knowledge and awareness among the general population in Saudi Arabia regarding colorectal cancer (CRC) and its screening procedures. With 53.2% of respondents demonstrating a poor level of knowledge about CRC, and only 28.3% showing a high level of awareness, there is a clear need for improved education and outreach initiatives. Despite the recommended age for CRC screening being 50 years, a significant proportion of participants believe screening should only occur when symptoms manifest, highlighting misconceptions that must be addressed. The study's findings indicate a pressing need for targeted public health campaigns to enhance understanding of CRC risk factors, symptoms, and the importance of timely screening, ultimately aiming to reduce the burden of CRC in Saudi Arabia.

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Ethical approval

An informed consent was obtained from each participant after explaining the study in full and clarifying that participation is voluntary. Data collected were securely saved and used for research purposes only.

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Conflict of interests

The authors declare that there are no conflicts of interest.

Informed consent:

Written informed consent was obtained from all individual participants included in the study.

Data and materials availability

All data associated with this study are present in the paper.

References:

1. Alsaigh S, Almuhaimeed FA, Alsaqabi NA, et al. Awareness of the Adult Population Toward Colorectal Cancer in Qassim Region, Saudi Arabia. Cureus 2023; 15: 1–7.
2. Corley DA, Jensen CD, Marks AR, et al. Variation of Adenoma Prevalence by Age, Sex, Race, and Colon Location in a Large Population: Implications for Screening and Quality Programs. Clin Gastroenterol Hepatol 2013; 11: 172–180.
3. Tauriello DVF, Calon A, Lonardo E, et al. Determinants of metastatic competency in colorectal cancer. Mol Oncol 2017; 11: 97–119.
4. Alshaer O, Binobaid A, Alqahtani M, et al. Colorectal Awareness in Saudi Arabia: A Systematic Review of Cross-Sectional Studies. J Healthc Sci 2021; 01: 66–76.
5. Alhemiddi AN, Alharbi A. Level of Awareness of Colorectal Cancer Among Patients Attending Primary Care in Single Center: A Cross-Sectional Study in Saudi Arabia. J Med Res Heal Sci JMRHS 2021; 4: 1350–1356.

ISSN:1624-1940
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6. Alaqel MA, Alshammari SA, Alahmari SM, et al. Community knowledge and awareness of colorectal cancer and screening tools: Community-based survey of 1,912 residents of Riyadh. Ann Med Surg 2021; 72: 103046.
7. Aga S, Khan M, Alsulimani E, et al. Knowledge & Awareness regarding colorectal cancer among health and allied students of King Saud Bin Abdulaziz University for Health Sciences, Jeddah. J Fam Med Prim Care 2021; 10: 2284.
8. Sciences H. Level of Awareness of Colorectal Cancer Among Patients Attending Primary Care in Single Center : A Cross-Sectional Study in Saudi Arabia. 4.
9. Hassan TST Al, Kalevaru CS. Awareness about Colorectal Cancer (CRC) among the primary health care attendees in Qassim province. Med Sci 2023; 27: 1–10.
10. Toleutayeva D, Shalgumbayeva GM, Toleutayev TA, et al. Knowledge, Attitudes, and Barriers (KABs) of Regarding Colorectal Cancer Screening among the Population of the Republic of Kazakhstan. Asian Pacific J Cancer Prev 2022; 23: 2057–2063.
11. Alghamdi AG, Almuhanna ZJA, Bu Hulayqah ZHM, et al. Public Awareness of Colorectal Cancer Screening in the Al-Baha Region, Saudi Arabia, 2022. Cureus; 14. Epub ahead of print 2022. DOI: 10.7759/cureus.32386.
12. Almadani M, Alquaymi O, Alshams A, et al. General public attitude and knowledge toward colorectal cancer screening: a cross-sectional study in Riyadh City. Int J Med Dev Ctries 2022; 6: 1408–1412.
13. Alzahrani MA, Alshehri MAA, Alzahrani AAB, et al. Awareness of Colorectal Cancer and Attitude Toward Screening Among the Public in the Aseer region, Saudi Arabia. Middle East J Intern Med; 13. Epub ahead of print 2020. DOI: 10.5742/mejim2020.93786.
14. Chowdhury S, Chakraborty P pratim. Universal health coverage - There is more to it than meets the eye. J Fam Med Prim Care 2017; 6: 169–170.
15. Alsaedi MG, Alqurashi SM. Level and Factors Associated with Knowledge of Colorectal Cancer Risk Factors and Screening among Adults Attending AL-Zaher Primary Health Care Center in Makkah AL- Mokarramah (Cross- Sectional Study), 2022 . 5.
16. 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. May;71(3):209–49. doi: 10.3322/caac.21660 [PubMed] [CrossRef] [Google Scholar]
17. Almatroudi A. The incidence rate of colorectal cancer in Saudi Arabia: an observational descriptive epidemiological analysis. Int J Gen Med 2020; 13:977. doi: 10.2147/IJGM.S277272 [PMC free article] [PubMed] [CrossRef] [Google Scholar]
18. Patel SG, Ahnen DJ. Colorectal Cancer in the Young. Curr Gastroenterol Rep. 2018. Mar;20(4):15. doi: 10.1007/s11894-018-0618-9 [PubMed] [CrossRef] [Google Scholar]
19. Almadi M, Alghamdi F. The gap between knowledge and undergoing colorectal cancer screening using the Health Belief Model: A national survey. *Saudi J Gastroenterol*. 2019;25(1):27–39. doi: 10.4103/sjg.SJG_455_18 [PMC free article] [PubMed] [CrossRef] [Google Scholar]
20. Community knowledge and awareness of colorectal cancer and screening tools: community-based survey of 1,912 residents of Riyadh. Alaqel MA, Alshammari SA, Alahmari SM, et al. Ann Med Surg (Lond) 2021;72:103046. [PMC free article] [PubMed] [Google Scholar]
21. Colon cancer among older Saudis: awareness of risk factors and early signs, and perceived barriers to screening. Galal YS, Amin TT, Alarfaj AK, Almulhim AA, Aljughaiman AA,

Almulla AK, Abdelhai RA. Asian Pac J Cancer Prev. 2016;17:1837–1846. [PubMed] [Google Scholar]
22. Saudi public awareness regarding colon cancer. Ahmed NJ, Alrashidi M. J Pharm Res Int. 2020;32:23–28. [Google Scholar]
23. Effect of public knowledge, attitudes, and behavior on willingness to undergo colorectal cancer screening using the health belief model. Almadi MA, Mosli MH, Bohlega MS, et al. Saudi J Gastroenterol. 2015;21:71–77. [PMC free article] [PubMed] [Google Scholar]
24. Knowledge, attitude, and perceived barriers regarding colorectal cancer screening practices and risk factors among medical students in Saudi Arabia. Althobaiti A, Jradi H. *BMC Med Educ.* 2019;19:421. [PMC free article] [PubMed] [Google Scholar]
25. Knowledge, attitudes and awareness about colorectal cancer in the Kingdom of Saudi Arabia: a cross sectional study. Alotaibi NM, Mujtaba MA, Alshammari NM. J Young Pharm. 2020;12:266–270. [Google Scholar]
26. Saudi patients' knowledge, behavior, beliefs, self-efficacy and barriers regarding colorectal cancer screening. Alhuzaim W, Alosaimi M, Almesfer AM, et al. https://ijpras.com/storage/models/article/AeftA31iT6czt8PTCqZSdAnYOOF2jHv9dr1wOzy6NiyC7qHgbFnqZmQwuz5J/saudi-patients-knowledge-behavior-beliefs-self-efficacy-and-barriers-regarding-colorectal-cancer-s.pdf Int J Pharm Res Allied Sci. 2020;9:14–20. [Google Scholar]
27. Colorectal awareness in Saudi Arabia: a systematic review of cross-sectional studies. Alshaer O, Binobaid A, Alqahtani M, et al. Journal of Healthcare Sciences. 2021;1:66–76. [Google Scholar]
28. Public awareness of colon cancer symptoms, risk factor, and screening at Madinah-KSA. Alsayed MA, Surrati AM, Altaifi JA, Alharbi AH, Alfouti RO, Alremaithi SM. https://ijpras.com/article/public-awareness-of-colon-cancer-symptoms-risk-factor-and-screening-at-madinah-ks Int J Pharm Res Allied Sci. 2019;8:184–197. [Google Scholar][Ref list]
29. Zubaidi AM, AlSubaie NM, AlHumaid AA, Shaik SA, AlKhayal KA, AlObeed OA. Public awareness of colorectal cancer in Saudi Arabia: A survey of 1070 participants in Riyadh. Saudi J Gastroenterol. 2015;21:78–83. doi: 10.4103/1319-3767.153819. [DOI] [PMC free article] [PubMed] [Google Scholar][Ref list]
30. Effect of public knowledge, attitudes, and behavior on willingness to undergo colorectal cancer screening using the health belief model. Almadi MA, Mosli MH, Bohlega MS, et al. *Saudi J Gastroenterol.* 2015;21:71–77. [PMC free article] [PubMed] [Google Scholar]
31. Almutairi KM, Alonazi WB, Alodhayani A, Vinluan JM, Ahmad M, Alhurishi SA, et al. A Cross-Sectional Assessment of Literacy and Awareness, Attitudes, and Beliefs About Colorectal Cancer and Its Screening in Riyadh Region. J Cancer Educ. 2018. Jun;33(3):660–667. doi: 10.1007/s13187-016-1129-8 [DOI] [PubMed] [Google Scholar]
32. Al-Azri M, Al-Khatri S, Murthi Panchatcharam S. Attitudes toward and Knowledge of Colorectal Cancer Screening among an Omani Adult Population Attending a Teaching Hospital. Asian Pac J Cancer Prev. 2020. Oct 1;21(10):3061–3068. doi: 10.31557/APJCP.2020.21.10.3061 [DOI] [PMC free article] [PubMed] [Google Scholar]

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