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Article

Awareness towards Colorectal Cancer Screening and the Association of Knowledge and Sociodemographics among Syrian Population in six different Governorates: A Cross-Sectional Study

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Abstract: Colorectal cancer (CRC) is a weighty cause of mortality worldwide, with growing incidence in the Middle East. Understanding the level of awareness about CRC screening among the Syrian population is crucial public health interventions. A cross-sectional study was conducted from September 22, 2023, to October 15, 2023, involving 928 participants from six major governorates in Syria. An online questionnaire containing socio-demographic, knowledge, and attitude sections was used to collect data. Descriptive statistics and chi-square tests were employed for data analysis using (SPSS) v28.0. The survey revealed a lack of awareness regarding CRC screening among the Syrian population, with only 499(53%) of the proportion demonstrating adequate knowledge about the disease and its screening methods. Significant associations were observed between the level of knowledge and socio-demographic factors including gender, work status, and economic status ($p < 0.05$). The findings emphasize the need for public health initiatives to enhance awareness and knowledge about CRC and its early screening methods in Syria. Education is essential for improving early detection and reducing the burden of colorectal cancer in the region. Efforts to increase public understanding of CRC screening are critical for reducing the incidence and mortality

Keywords: colorectal cancer; colonoscopy; coloncancer; awareness; knowledge; practice; attitude; rectal cancer; health education; cancer prevention

1. Introduction

Colorectal cancer (CRC) is defined as a proliferation of abnormal cells in the colon and rectum that can spread and metastasize to other organs [1]. CRC is the second cancer-related cause of death worldwide [2]. The incidence of colorectal cancer (CRC) reached the highest prevalence in Western nations. However, there has been a reported increase in the Middle East particularly in the nations along the Eastern Mediterranean coast [2]. Many factors can contribute to the risk of developing CRC such as age, lifestyle, genetic abnormalities, chronic ulcerating colitis, and Crohn's disease. Moreover, elevated body mass index (BMI), smoking, consuming of red meat, lack of physical exercise, diminished consumption of vegetables, and low consumption of fruit could also be potential contributing factors [1,3,4]. In Syria, according to a retrospective study, males, aged over 50 years old, and occupation without physical activity are the risk factors related to CRC there with an annual rate incidence of 8.2% [6]. However, early colorectal cancer has a better prognosis compared to advanced and metastatic colorectal cancer [8]. A person's awareness of CRC screening determines whether or not they choose to participate in it. Awareness affected opinions about CRC screening methods, cancer evaluations, and screening motivation. Public education targets factors that mediate awareness [9]. CRC screening is different between countries but most of them recommend

colonoscopy, fecal immunochemical test (FIT), computed tomography (CT) colonography, FIT-fecal DNA, and flexible sigmoidoscopy [10–12]. The objective of CRC screening is to discover cancerous and precancerous lesions in obviously healthful people, to decrease both the occurrence and death rate of CRC [13].

In this cross-sectional study, we aim to examine the level of awareness towards colorectal cancer screening among the Syrian population from six different Syrian governments.

2. Materials and Methods

Data Collection and Ethical Considerations

An ethical approval from The Scientific Research Ethics Committee of Damascus University was obtained (approval ID number: MD-160124-168)

During the period from September 22, 2023, to October 15, 2023, we conducted a cross-sectional study to investigate the level of awareness regarding early screening for colorectal cancer in Syria. To collect the necessary information, we obtained responses to an online questionnaire from participants residing in six major governorates of Syria: Damascus, Homs, Aleppo, Latakia, Hama, and Tartous. It was communicated to all participants that their responses would be used exclusively for scientific research purposes and Informed consent was obtained from all participants who enrolled in the study. The questionnaire was distributed via social media and all the participants in-rolling the study by self-selection method.

Inclusion and Exclusion Criteria

Eligibility criteria for our study included Syrian participants aged 30 and above, however, individuals under 30 and those who declined participation were excluded.

Sample Size

The sample size for this study was determined via a well-established statistical method by AI tools [14,15]. Specifically, we estimated the sample size (N) using the formula:

$$N = \frac{Z^2 \times P \times (1-P)}{e^2}$$

Where Z represents the z-score and is set equal to 1.96 at a 95% level of significance, P represents the population proportion and was set equal to 0.5 in this study, and e is the margin of error which was set equal to 0.05 or 5%. The calculated sample size was N=384. Nevertheless, we received responses from 928 individuals who completed the questionnaire, including the socio-demographic section as well as the sections on knowledge and information about colorectal cancer.

Survey Design

the questionnaire consisted of 24 questions, divided into three parts. The first section was socio-demographic, requesting limited options to determine the characteristics of the participants. The second section focused on knowledge and practice related to colorectal cancer and its screening and required polar responses (yes/no). Finally, the third section aimed to assess participants' attitudes toward early screening of colorectal cancer using a Likert scale (strongly agree, agree, neutral, disagree, and strongly disagree). Additionally, a question regarding the source of their information was provided with limited options, The survey was designed in Arabic after considering the Syrian society's cultural habits and performing a literature review. we used The questionnaire a previously published study [5]. The Cronbach's alpha coefficient for the knowledge items in the modified instrument was 0.88.

Sampling Methods

Eligibility criteria for our study included Syrian participants aged 30 and above, while individuals under 30 and those who declined participation were excluded.

Data Analysis

we employed the Statistical Package for Social Sciences (SPSS) v28.0. Descriptive statistics were calculated. To assess the level of knowledge among participants, the median frequency of yes answers was calculated and responses were separated into two groups according to whether they were above the median (sufficient level of knowledge or information) or less than the median (insufficient level of knowledge or information). chi-square tests were utilized to determine the association between the level of knowledge and socio-demographic factors. P-values less than 0.05 were considered statistically significant ($P < 0.05$).

3. Results

Results:

A total of 928 participants starting from the age of 30 were included in this study. The predominant age group was 30-35 (54.6%). Most participants were females (61.2%), had bachelor's degrees (50.4%), and workers (58.9%). Married represent most of the included respondents (61.4%). (42.7%) of the participants had a median economic status. More details can be seen in **Table 1**.

Table 1. Socio-demographic characteristics of participants.

Variable		N	%
Knowledge	Sufficient	499	53.8%
	Insufficient	429	46.2%
Gender	Male	359	38.7%
	Female	569	61.2%
Familial history	Positive	95	10.2%
	Negative	833	89.8%
Educational level	Elementary	223	24%
	Middle school	76	8.2%
	High school	161	17.3%
	University	468	50.4%
Age categories	30-35	507	54.6%
	36-40	118	12.7%
	41-45	121	13%
	46-50	103	11.1%
	51-55	79	8.5%
Work status	Worker	547	58.9%
	Non- worker	381	41.1%
Marital status	Single	250	26.9%
	Engaged	53	5.7%
	In relationship	19	2%
	Married	570	61.4%
	Widower	36	3.9%
Economic status	Bad	76	8.2%
	Median	396	42.7%
	Good	386	41.6%
	Excellent	70	7.5%

Among the participants, 488(52.6%) mentioned that they had heard of early cancer screening tests. Only 237(25.5%) know that colon cancer can be prevented but more than half of the participants 538(58%) reported that they think colon cancer is fatal. Most of the participants 791(85.2) know that Colon cancer recovery rates are increased when detected in the early stages. Furthermore, regarding methods of early detection of colon cancer, the majority of participants 754 (81.2%) reported Colonoscopy, followed by 491 (53%) who reported blood detection in the stool sample. For risk

factors for colon cancer, 658 (70.9%) answered with “yes” to the statement (Men and women are susceptible to colon cancer), moreover, more than half of the participants 516 (55.6%) agreed that High Fat Low Fiber Diet is a risk factor for colon cancer, while only 174 (18.7%) knows that Physical inactivity is a risk factor.

For colon cancer symptoms, firstly was the presence of blood in the stool 668 (71.9%), followed by Sudden weight loss 552 (59.4%), then Sudden change in number of bowel motions and Diarrhea 522 (56.2%), the least chosen symptom was feeling that the rectum was not fully emptied with defecation 295 (31.7%). Only 8% of participants have done early checkups for colon cancer. this is illustrated in **Table 2**. In our study, Figure 2 illustrates that 53% of respondents demonstrated a sufficient knowledge level based on our criteria. However, 47% fell short and exhibited insufficient knowledge.

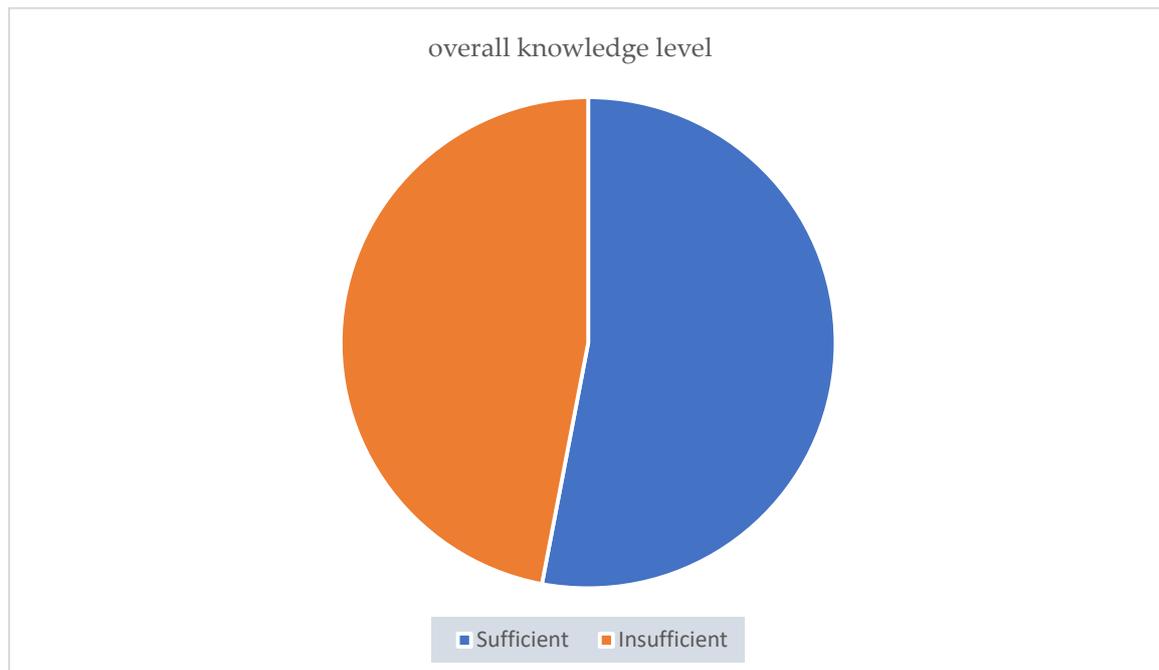


Figure 2. illustrate that 499(53%) of respondents had a sufficient knowledge level based on our study criteria.

Table 2. knowledge and practice towards colorectal cancer and its screening (N=928).

Variable	Frequency of yes	Percentage *
Knowledge		
Have you ever heard of early cancer screening tests?	488	52.6%
Colon cancer can be prevented	237	25.5%
I think colon cancer is fatal	538	58%
Colon cancer recovery rates are increased when detected in early stages	791	85.2%
Methods of early detection of colon cancer	Frequency of yes	Percentage
Colonoscopy	754	81.2%
PR speculum	473	51%
Blood detection in the stool sample	491	53%
Barium dye for large intestine	340	37%
Blood tests	333	36%
Abdominal CT scan	227	24%
Clinical examination of the rectum	341	37%
Other	44	5%

Risk factors for colon cancer	Frequency of yes	Percentage
Men and women are susceptible to colon cancer	658	70.9%
Physical inactivity	174	18.7%
Overweight	338	36.4%
High Fat Low Fiber Diet	516	55.6%
The presence of polyps in the lining of the colon and rectum	473	50.9%
Increasing age	405	43.6%
Smoking	316	34%
Symptoms of colon cancer	Frequency of yes	Percentage
The presence of blood in the stool	668	71.9%
Sudden weight loss	552	59.4%
Increase mucus secretions in the stool	443	47.7%
Feeling that the rectum was not fully emptied with defecation	295	31.7%
Pain and cramps in the stomach	502	54%
Sudden change in the number of bowel motions and Diarrhea	522	56.2%
Practice	Frequency of yes	Percentage
Have you done early checkups for colon cancer?	74	8%
Have you ever thought about undergoing a screening for early detection of colon cancer?	306	33%

*Percentage is based on the overall sample.

According to **Table 3**, only 44 (4.7%) of participants strongly agreed with the statement “I think I’m susceptible to colon cancer”, while around half of the participants 429 (46.2%) strongly agreed with undergoing early screening for colon if advised by a doctor, and only 15 (1.6%) disagreed.

Table 3. Attitude toward early screening of colorectal cancer.

Attitude	Strongly agree n(%)	Agree n(%)	Neutral n(%)	Disagree n(%)	Strongly disagree n(%)
I think I’m susceptible to colon cancer	44(4.7)	224(24.2)	417(44.9)	216(23.3)	27(2.9)
I will undergo early screening for colon cancer if my doctor advises me to do so	429(46.2)	387(41.7)	91(9.8)	15(1.6)	6(0.6)
I think I have adequate information	37(4)	200(21.6)	312(33.6)	333(35.9)	46(5)

Figure 2. shows the sources of information about early screening for colorectal cancer. Doctors are the most common source, followed by the Ministry of Health and friends. These sources play a crucial role in raising awareness and promoting early detection, which is key to effective treatment.

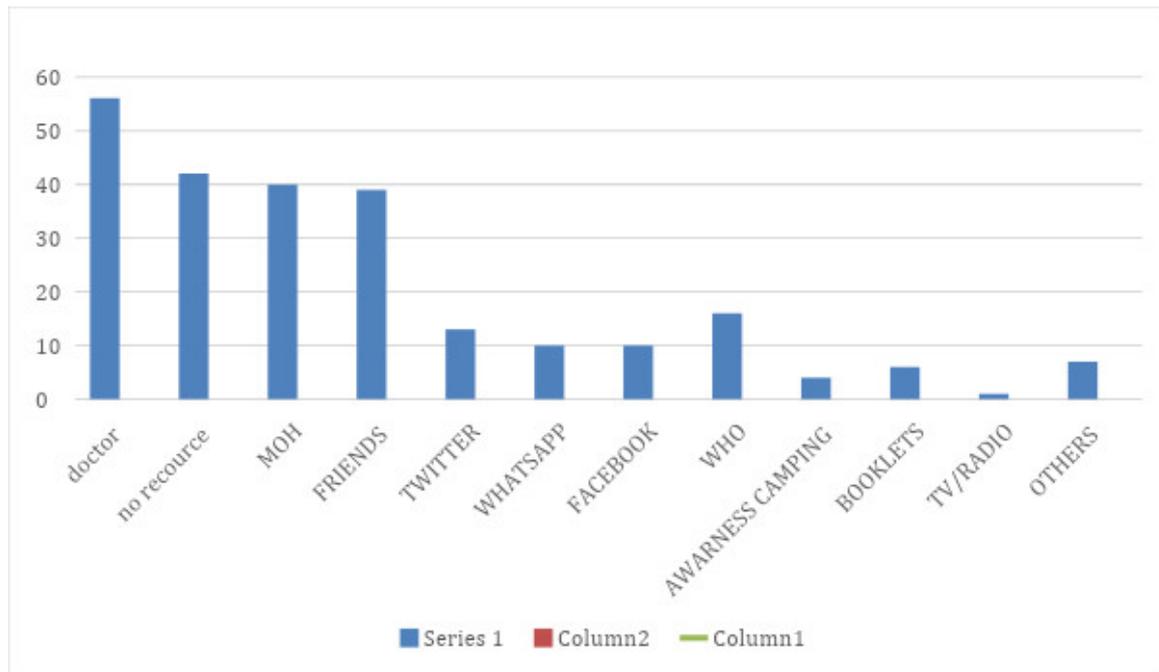


Figure 2. Sources of information of the participants about early screening of colorectal cancer.

Table 6. delineates the percentages of respondents who identified specific sources of information regarding early colorectal cancer screening, with medical practitioners emerging as the preeminent source.

Table 6. Sources of information of the participants about early screening of colorectal cancer.

Source	%
doctor	56
no resource	42
MOH	40
FRIENDS	39
TWITTER	13
WHATSAPP	96
FACEBOOK	10
WHO	16
AWARENESS CAMPING	4
BOOKLETS	6
TV/RADIO	1

Knowledge and socio-demographic cross tabs are displayed in Table 4. There was a significant relation between Gender and Knowledge ($p = 0.001$, $p < 0.05$), work and knowledge ($p = 0.001$, $p < 0.05$), economic-status and knowledge ($p = 0.001$, $p < 0.05$).

Table 4. knowledge and socio-demographic cross tabs.

Gender*knowledge		Knowledge		Chi-square test
		Sufficient	Insufficient	p-value
Gender	Male	220	139	359 0.001
	Female	279	290	
Familial history*knowledge		Knowledge		Chi-square test

		Sufficient	Insufficient			p-value
Familial history	Positive	50	45			0.81
	Negative	449	384			
Education*knowledge		Knowledge			Chi-square test	
		Sufficient	Insufficient			p-value
Education	Elementary	125	98	223	0.84	
	Middle school	42	34	76		
	High school	84	77	161		
	University	248	220	468		
Work*knowledge		Knowledge			Chi-square test	
		Sufficient	Insufficient			p-value
Work-status	Worker	324	223	547	.001	
	Non-worker	175	206	381		
Age*knowledge		Knowledge			Chi-square test	
Age		Sufficient	Insufficient			p-value
					0.4	
		30-35	277	230	507	
		36-40	57	61	118	
		41-45	60	61	121	
		46-50	69	43	103	
		51-55	45	34	79	
E-status*knowledge		Knowledge			Chi-square test	
E-status		Sufficient	Insufficient			p-value
					0.001	
		Bad	32	44	76	
		Median	183	213	396	
		Good	237	149	386	
		Excellent	47	23	70	
Relationship*knowledge		Knowledge			Chi-square test	
Relationship		Sufficient	Insufficient			p-value
					0.08	
		Single	131	119	250	
		Engaged	37	16	53	
		In relationship	13	6	19	
		Married	301	269	570	
		Widower	19	17	36	

4. Discussion

In this study, we assess the awareness of the early screening of CRC in Syria, a developing country in the Middle East. Only 25.6% of the study participants think they have adequate information about CRC early screening. This low number corresponds with the findings of other studies conducted in the region [16–18] 52.6% answered that they had heard of early CRC screening tests. When asked to specify the screening methods, Colonoscopy was the most common choice 81.2%. Blood detection in the stool sample was chosen by a smaller percentage of people 53%, while other methods were less known. This pattern was noticed in a Saudi study [16]. Some people are hesitant to undergo screening by colonoscopy because of expected pain, discomfort, or embarrassment from the procedure. In these cases, other methods of screening such as Fecal occult blood testing (FOBT) might be more acceptable [17]. Therefore, the screening rate is expected to improve by increasing people's knowledge of its various methods.

When asked to specify the sources of their information on CRC early screening, 56% of the respondents chose their physician, and 40% didn't specify any source. TV/Radio and social media websites were mentioned by small percentages of responders which indicates their underutilization to inform the public about CRC screening tests. In contrast, the Saudi study found that the top choices were awareness campaigns, booklets, TV/Radio, and newspapers which might indicate a more coordinated effort to educate the public. Syria had public awareness campaigns and advertisements about breast cancer screening and the effects of Tobacco on health. However, knowledge of Colorectal cancer detection and prevention is not promoted on a similar magnitude.

The age group of the participants didn't correlate with better awareness of screening. This is concerning because the risk of developing CRC increases with age, and screening is recommended at the age of 45 years old by the American Cancer Society [19]. In our study, 19.7% of the study participants are older than 45 which is the age when screening is recommended and 8% of responders have done early checkups for colon cancer and 33% thought about it. This means that less than half of the people eligible for screening tests in our sample took them. This low result is similar to the one found in a Saudi study [16]. However, 87.9% of our participants said they were willing to undergo early screening if their doctor advised them to do so.

There was a statistically significant correlation between gender and awareness with females being less aware. This finding is similar to studies in Saudi Arabia [16] but studies in Lebanon [17], Jordan [18], and Britain [20] found no correlation. The level of education had no significant impact on awareness in our study and others in Lebanon [17] and Saudi Arabia [16], in contrast to other studies in Jordan [18] and Portugal [21]. Teaching the benefits of cancer screening in schools could have a beneficial impact in this regard.

When assessing the awareness of CRC risk factors, only 34% chose tobacco, in other studies in the region, the majority were aware of the connection between tobacco and CRC [16,17,22]. a minority of responders considered physical inactivity and obesity as risk factors in our study and other studies. It is estimated that about half of colorectal cancer cases could be attributed to diet and lifestyle [7]. Awareness campaigns should put more emphasis on prevention since it is the most cost-effective method

One limitation is the relatively young age of the participants. 80.3% of the study participants are younger than 45 years old, the age at which screening should begin. And since the risk of CRC increases with age it is important to examine the knowledge and health practices of this at-risk population.

Another limitation is that our study doesn't adequately represent all the citizens of Syria. it was limited to specific regions in the country and didn't cover some regions with a different socioeconomic profile.

5. Conclusions

The findings underscore the imperative for targeted public health interventions aimed at augmenting awareness and knowledge regarding colorectal cancer (CRC) and its early screening modalities in Syria. Education plays a pivotal role in enhancing early detection and alleviating the burden of colorectal cancer within the region. Strategic efforts to enhance public comprehension of CRC screening hold significant promise for mitigating both incidence and mortality rates

Author Contributions: Conceptualization and methodology, Ammer alabed.; software, Raghad Samha.; validation, Raghad Samha.; formal analysis, Ammer alabed.; investigation, Raghad Samha.; resources, Sami Droubi.; data curation, Shahad Almansour; writing—original draft preparation, Sami Droubi.; writing—review and editing, Shahad Almansour, Majed Alkhalil.; visualization, Majed Alkhalil.; supervision, Youssef Latifeh.; project administration, Ammer alabed.; funding acquisition, Y.Y. All authors have read and agreed to the published version of the manuscript.

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Institutional Review Board Statement: The study was conducted in accordance with the Declaration of Helsinki, and approved by the Scientific Research Ethics Committee of Damascus University (protocol code MD-160124-168 and 16-8-2023).

Informed Consent Statement: Informed consent was obtained from all subjects involved in the study.

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Conflicts of Interest: The authors declare no conflicts of interest

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