

# Public Awareness of Colorectal Cancer in Saudi Arabia: A Survey of 1070 Participants in Riyadh

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## ABSTRACT

**Background/Aims:** The aim of this study was to investigate colorectal cancer (CRC) awareness in healthy individuals in Saudi Arabia in order to identify segments of the population that would most benefit from targeted education programs. **Setting and Design:** Survey/questionnaire. **Patients and Methods:** Random, healthy individuals from Riyadh, Saudi Arabia, were approached to participate in a 10-question multiple choice survey about CRC. Data were analyzed by demographic criteria, including age, gender, marital status, and level of education, to determine if members of these groups displayed differential knowledge. **Statistical Analysis:** Differences in responses by demographic data were analyzed using Pearson's Chi-square test. A  $P < 0.05$  was considered statistically significant. **Results:** In total, 1070 participants completed the survey. Most respondents believe that screening for colon cancer should begin at symptom onset (42.9%). Less than 20% of all respondents believe that polyps are a risk factor for CRC, which varied significantly according to level of education; however, even the most educated answered correctly less than 50% of the time. Similarly, only 34.8% of all respondents knew that a family history of CRC imparted a personal risk for CRC. **Conclusions:** Although older individuals and those with higher education tended to answer questions correctly more often, there were some misconceptions regarding universally accepted screening protocols, symptoms, and general understanding of CRC in Saudi Arabia. A national education/screening program in Saudi Arabia is recommended to improve CRC knowledge.

**Key Words:** Colorectal cancer, knowledge, Saudi Arabia, screening, symptoms, survey

Received: 27-09-2014, Accepted: 02-01-2015

**How to cite this article:** 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.

Colorectal cancer (CRC) is the third most common malignancy in the world<sup>[1]</sup> and the second leading cause of cancer-related death in the United States.<sup>[2]</sup> There is a significant global variation in CRC incidence, with the lowest rates reported in Asia, Africa, and South America.<sup>[3]</sup> The highest CRC rates are observed in North America, Oceania, and Europe where CRC risk factors (obesity, diabetes, poor diet, physical inactivity, and smoking) are associated with Western culture.<sup>[4]</sup>

Despite the relatively low incidence, CRC is the second most common cancer in Saudi Arabia, ranking first among

men (10.6%) and third among women (8.9%).<sup>[5]</sup> In 2004, the World Health Organization (WHO) reported the death rate from CRC in Saudi Arabia at 8.3%.<sup>[6]</sup> Furthermore, data from the Saudi Cancer Registry (SCR; <http://www.scr.org.sa/>) indicate an increase in CRC incidence between 2001 and 2006, and almost doubled between 1994 and 2003.<sup>[7]</sup> Moreover, Saudi patients are more likely to present at a more advanced stage<sup>[8]</sup> and at a younger age compared with Western countries.<sup>[9,10]</sup>

CRC survival is closely related to the clinical and pathological stage at diagnosis, and numerous reports suggest that CRC occurring at a young age is associated with more severe disease and higher mortality, which is of particular relevance to the Saudi Arabian population;<sup>[9,10]</sup> the overall survival of Saudi CRC patients is 44.6%, which is considerably lower than US patients (approximately 60%).<sup>[5]</sup> The increasing incidence and the fact that precancerous polyps and early-stage CRC are frequently present without symptoms emphasizes the importance of a preventive screening

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	DOI: 10.4103/1319-3767.153819

program in the Kingdom of Saudi Arabia. However, despite the initiation of screening programs in other countries, participation rates are low compared with breast or cervical cancer screening programs.<sup>[11]</sup> Moreover, it has been shown that knowledge of a disease is directly related to screening program participation;<sup>[12]</sup> thus, the aim of the study was to evaluate the CRC knowledge in the general Saudi population and to assess awareness of CRC incidence, risk factors, symptoms, screening, and treatment according to various demographic characteristics. This information will assist in determining whether there is a specific area subset of the population that might benefit from a targeted campaign, with the overall goal of increasing participation in a future screening program.

## PATIENTS AND METHODS

The questionnaire, consent forms, and information leaflet were developed in the Arabic language following a standard format.<sup>[13,14]</sup> A pilot study was then carried out using 20 volunteers from clinics in Riyadh and questions were modified accordingly for comprehension and clarity. Next, residents of Riyadh were invited to participate in the survey by approaching them in public shopping malls. Inclusion criteria included 18 years of age or older and no prior history of CRC or inflammatory bowel disease. All participants were supervised during the survey, and if they were unable to read, the questions were read to them. The survey consisted of 10 questions pertaining to the function of the colon and rectum, and the incidence, risk factors, symptoms, screening, treatment, and prognosis of CRC; all questions were in multiple choice format, and multiple answers per question were permitted where appropriate (Appendix 1). The information sheet provided with the questionnaire detailed the purpose of the study and instructions on how to complete the survey. Anonymous personal data (age, gender, marital status, and education level) from disease-free individuals between the ages of 18 and 80 from March 2010 to May 2010 were collected. For analyses, education level was grouped as follows: Illiterate and primary school; intermediate school; secondary school; university; and post-graduate school. Age was stratified by decade as follows: 10–19 years; 20–29 years; 30–39 years; 40–49 years; 50–59 years; and 60 + years. Gender and marital status were also analyzed.

The study protocol was approved by the ethical review board of King Saud University, Riyadh.

### Statistical analysis

Categorical values were compared by Pearson's Chi-square test using the software Statistical Package for Social Sciences (SPSS) version 13 (SPSS Inc., Chicago, IL, USA). To simplify the analysis, even though a respondent could

select multiple options for questions related to symptoms and risk factors, all options were evaluated individually. A *P* value of < 0.05 was considered statistically significant.

## RESULTS

Demographic characteristics of the respondents, including age, marital status, level of education, and gender, are presented in Figure 1. In total, 1070 participants completed the survey. The majority of respondents were married (64.1%), 20–29 years old (30.9%), had postsecondary education (54.8%), and were female (63.6%).

Overall, the most common answer to when CRC screening should commence was at symptom onset (42.9%), whereas only a quarter believe that preemptive screenings should take place at the age of 50 years. Furthermore, most people knew that abdominal pain is a symptom of CRC, but not a change in bowel habits, blood in the stool, or that CRC can be asymptomatic. Similarly, most respondents did not know that colon polyps or a family history of CRC are risk factors for CRC. Significant differences in responses according to demographic (level of education, age, marital status, and gender) are shown in Table 1.

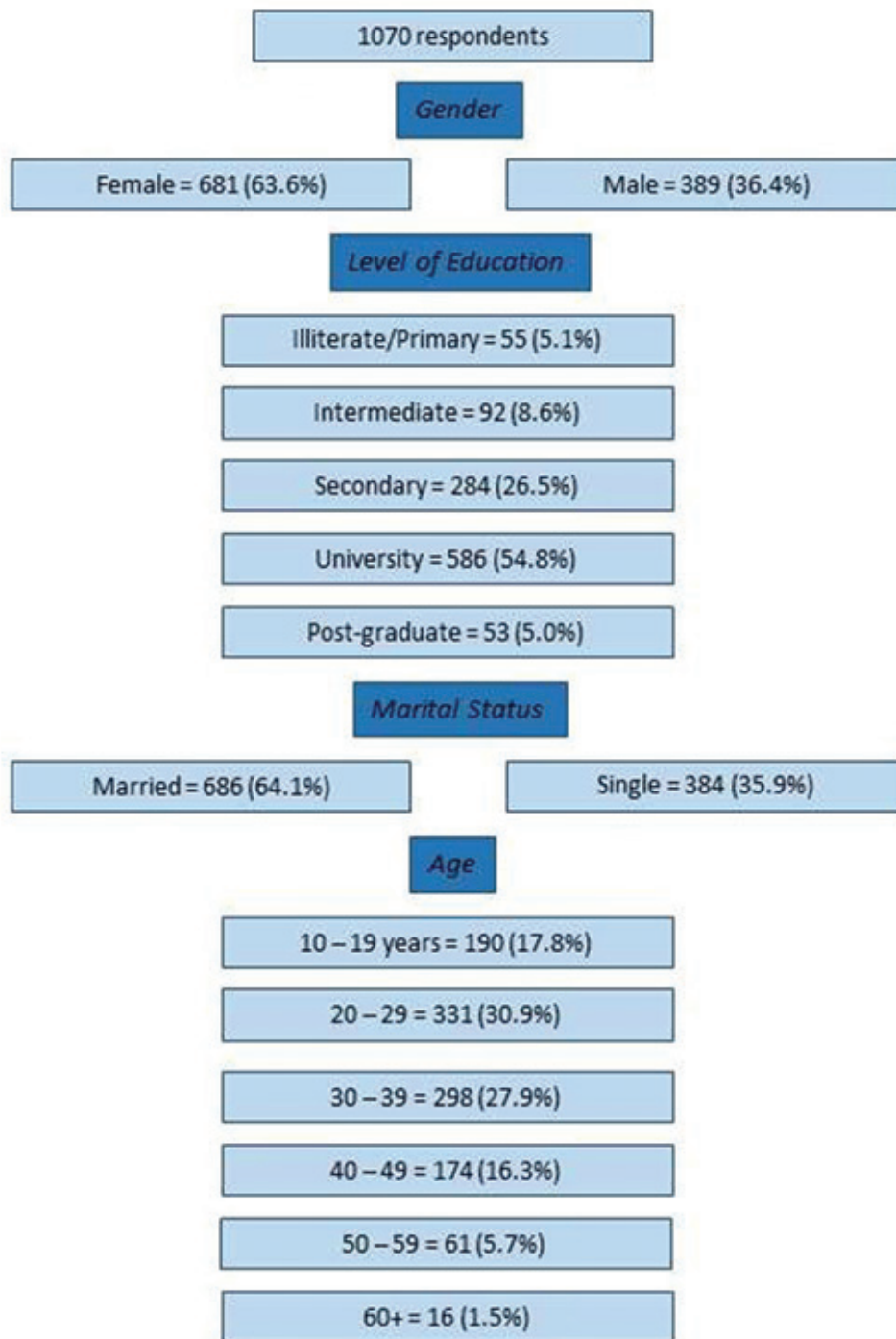
### Level of education

There was a significant difference with respect to knowing what the colon is according to level of education; postdoctorates selected the correct answer most often (77.4%), whereas those with secondary education selected it least frequently (53.9%; *P* = 0.002). Overall, respondents were fairly knowledgeable on what the colon is, as over 60% of respondents answered that it was part of the large intestine.

When it comes to knowing what the rectum is, the majority of all respondents knew that it was the last part of the large intestine (53.3%). However, there was a significant difference according to the level of education (*P* = 0.019); 71.1% of postgraduates answered correctly, whereas only 38.2% of people who were illiterate/only have primary education answered correctly.

Most respondents believe that you should screen for colon cancer at symptom onset (42.9%), but the response to this question differed significantly according to education level (*P* < 0.000); 43.4% of postgraduates believe that you should screen at 50 years of age, whereas only 25.5% of the respondents who are illiterate/only have primary education believe that screening should start at 50 years of age, which was similar to that believed by respondents from all other education levels.

With respect to risk factors for CRC, the knowledge that either inflammatory bowel syndrome and polyps imparted greater risk, differed according to level of education (*P* = 0.006 and < 0.000, respectively). For both,



**Figure 1:** Demographics of the survey participants

postgraduates were more likely to answer “YES” than those that are illiterate/only have primary education.

**Gender**

In general, females were more knowledgeable than males when it comes to CRC, and there were many significant differences in the survey responses according to gender. For

instance, more females than males knew that a change in bowel habits and abdominal pain are CRC symptoms (59.9% and 52.3% vs 47.3% and 38.7%, respectively; both  $P < 0.05$ ). With respect to when to screen, both genders answered at symptom onset more frequently than any other answer. Similarly, most respondents of both genders did not know that a family history of CRC was a risk factor for CRC.

**Table 1: Differences in colorectal cancer knowledge in the general Saudi population according to level of education, age, gender, and marital status**

Question	Level of education	Age	Gender	Marital status
Colon is...	0.002*	0.002*	0.024*	0.022*
Rectum is...	0.019*	0.34	0.000*	0.022*
Colon function is...	0.099	0.004*	0.564	0.000*
Incidence of colon cancer is...	0.012*	0.168	0.006*	0.133
When do you screen?	0.000*	0.001*	0.000*	0.308
Possible to cure?	0.778	0.515	0.178	0.248
Relationship between IBS and colon cancer?	0.181	0.188	0.625	0.847
<b>Symptoms</b>				
Abdominal pain	0.25	0.695	0.016*	0.56
Change in bowel habits	0.191	0.088	0.006*	0.649
Nausea and vomiting	0.7	0.594	0.704	0.233
Yellow discoloring of eyes and skin	0.122	0.000*	0.08*	0.052
Presence of blood in stool	0.1	0.001*	0.138	0.129
No symptoms	0.226	0.218	0.000*	0.66
I don't know		0.582	0.126	0.953
<b>Risk factors</b>				
Smoking	0.603	0.359	0.015*	0.336
IBS	0.006*	0.819	0.01*	0.032*
Family history of colon cancer	0.061	0.017*	0.134	0.462
Fatty foods	0.608	0.486	0.2	0.501
Colon polyps	0.000*	0.003*	0.221	0.218
I don't know		0.069	0.204	0.041
<b>Screening</b>				
Microscopic examination of stool	0.45	0.576	0.24	0.326
X-ray	0.04*	0.022*	0.681	0.638
Colonoscopy	0.42	0.275	0.063	0.57
Barium study	0.011*	0.000*	0.153	0.263
Ultrasound	0.526	0.165	0.403	0.786
I don't know		0.001*	0.013*	0.101

Numbers are Pearson Chi-square values. \* $P < 0.05$ . IBS: Inflammatory bowel syndrome

### Marital status

In general, married respondents answered more survey questions correctly than single respondents. For instance, married individuals correctly responded that the colon was part of the large intestine (63.4% of the time), that, whereas single individuals only responded correctly 56.7% of the time ( $P = 0.022$ ). With respect to colon function, single respondents more frequently answered that it has no function (8.3% vs 3.6%, respectively;  $P < 0.000$ ).

### Age group

There were many significant differences in responses when participants were stratified by decade. For instance, respondents 50–59 years of age correctly answered that the colon is part of the large intestine (75.4%), more than any

other age group; the lowest correct answer was in people aged 20–29 years (51.5%;  $P = 0.002$ ). With respect to colon function, only 12.5% of those 60+ years of age responded to reabsorption of water compared with 32.8% of those 50–59 years of age ( $P = 0.004$ ).

Generally, the older the participant, the more likely they were to respond that you should screen for CRC at 50 years of age (60+ years = 43.8%, 10–19 years = 21.1%); however, the vast majority answered that screening should start at symptom onset ( $P = 0.001$ ).

With respect to CRC risk factors, correctly selecting family history differed significantly by decade ( $P = 0.017$ ); however, only the 50–59 years age group responded “YES” more often than “NO” (55.7%; overall average “YES” = 44.8%). Moreover, most respondents did not know that polyps increase your risk of CRC (“NO” = 80.6%), which varied significantly by age group ( $P = 0.003$ ).

## DISCUSSION

In this study, we attempted to evaluate knowledge of CRC, including prevalence, risk factors, detection, and symptoms, in the Saudi population, and to correlate these findings with age, gender, level of education, and marital status.

Generally, most survey respondents were knowledgeable on the location of the colon and rectum, and to some degree their respective functions, but there existed large knowledge gaps when it came to CRC screening, symptoms, risk factors, and detection. Overall, however, females, older respondents, and more educated respondents had (statistically significant) more knowledge of CRC. For instance, almost all cases of CRC can be prevented with early detection and removal of polyps<sup>[15]</sup> and postgraduates and those between the age of 50–59 years responded correctly more frequently than other demographic groups. Moreover, females were more knowledgeable of CRC symptoms (abdominal pain and change in bowel movements) and when to screen. However, in Saudi Arabia and globally, men are at a greater risk of developing CRC.<sup>[16]</sup> Married individuals in this study, on the other hand, were more knowledgeable than single individuals. Moreover, there were fewer significant differences in their answers compared with male and female differences, suggesting that females are imparting some of their knowledge on the men when they get married. Thus, educational programs should be aimed at both males and females, as this is likely the most effective strategy to improve knowledge for those most at risk.

The three main risk factors for developing CRC include a family history of CRC, inflammatory bowel disease, and polyps. In the present study, older survey participants (age

50–59 years) answered that they knew that CRC family history was a risk factor for CRC more often than other demographics ( $P = 0.017$ ). Similarly, the 50–59 years age group answered correctly that inflammatory bowel disease was associated with CRC. With respect to level of education, only those with postgraduate education answered this question correctly more than half the time (69.8%), which was statistically significant ( $P = 0.006$ ).

Although the present survey indicated a highly variable degree of knowledge of CRC across all groups (with females, older participants, and higher education faring significantly better), this is not uncommon from a global perspective. For instance, limited knowledge and awareness of colorectal cancers was found in a study evaluating barriers to flexible sigmoidoscopy in ethnic UK minorities.<sup>[17]</sup> This lack of knowledge was ubiquitous across groups, and was mostly attributed to fear of diagnosis, invasiveness, and failure to consider religious sensitivities. Public awareness of CRC in Ireland is also low, which has spurred the development of a national CRC screening program.<sup>[18]</sup> Similarly, in Croatia, there was low awareness of CRC relative to breast cancer, despite the fact that the former is the second leading cause of cancer mortality in the country.<sup>[19]</sup> In 2007, Croatia implemented a national screening program in order to overcome and fill these knowledge gaps. Similarly, in the Czech Republic, organized screening was implemented in 2000, and there has been a general trend of earlier CRC detection.<sup>[20]</sup> Thus, an organized screening program should be considered for Saudi Arabia.

In line with studies from other regions, the most educated populace and those in the age group most likely to develop CRC typically knew more about CRC risks and screening methods; however, specific and important knowledge, such as knowing that polyps and a family history of CRC are risk factors and that screening should be initiated at 50 years of age, was lacking. Thus, educational programs should be aimed at all populations and demographics in the Kingdom of Saudi Arabia.

Many methods to increase CRC knowledge have been proposed, including using health fairs to promote CRC screening practices.<sup>[21]</sup> Workplace screening has also been shown to effectively increase CRC awareness and promote screening, which is applicable to the Saudi population, who are lacking in both.<sup>[22]</sup> A very creative way of increasing knowledge of CRC in the young population was recently proposed and tested by a group in New Mexico, which showed very positive results: Students and faculty of New Mexico University walked through an inflatable colon and reported increased CRC knowledge.<sup>[23,24]</sup> Another option might be to approach young people at a soccer stadium with

promotional material in order to increase CRC awareness. Based on the widespread lack of knowledge of CRC in Saudi Arabia, a national screening program should be considered.

This study is not without limitations. For instance, the sample was biased toward younger participants and it should be noted that this cohort is at a much lesser risk of developing CRC. However, it is important to gauge the knowledge of all age groups, as these younger participants may be responsible for informing their elderly grandparents, for instance, of the risks and treatment options for CRC. Moreover, the economic and the rural versus urban distribution of the participants was not determined. Future studies should focus on these aspects in order to more precisely identify the populations that require additional, targeted educational programs. Third, as the sample was taken from a shopping mall in Riyadh, and was thus not a true random sampling method, not all groups may have been equally represented; in fact, the sample was skewed to females and younger individuals, which may not be representative of the entire population of Saudi Arabia. However, these problems may also arise from randomly sampled populations. Moreover, the goal of this study was to identify patients with limited knowledge of CRC to target with educational programs, and this was successfully accomplished. Finally, larger surveys encompassing a greater percentage of the population from different regions are necessary to be able to further generalize the results of this study to a larger cohort of the Saudi population.

In conclusion, the demographic that presented with the most limited knowledge of CRC in Saudi Arabia included young, single males of low education. However, Saudis generally had misconceptions regarding the timing of CRC and risk factors for developing CRC, which is not unique to this country, but rather a global phenomenon. Therefore, education and screening programs should target all residents of Saudi Arabia.

## ACKNOWLEDGMENTS

Medical writing assistance was provided by Dr. Patrick Logan.

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**Source of Support:** This study was funded by the College of Medicine Research Center; Vice Deanship for Scientific Affairs, College of Medicine, King Saud University, Riyadh, Kingdom of Saudi Arabia, **Conflict of Interest:** None declared.

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