RESEARCH ARTICLE

Knowledge and Awareness of Colorectal Cancer among Undergraduate Students at King Abdulaziz University, Jeddah, Saudi Arabia: a Survey-Based Study

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Abstract

Background: This study explored the knowledge and awareness about colorectal cancer (CRC) among undergraduate students of one of the leading universities in Saudi Arabia, along with the mode of information access. Materials and Methods: The present cross-sectional study was conducted at the King Abdulaziz University, Jeddah, Saudi Arabia, among students of different faculties. The study questionnaire, containing 28 items, was adapted from surveys identified in the relevant literature. The CRC awareness questionnaire consisted of an awareness section (early CRC signs and symptoms, and risk factors) and a knowledge section. The data were analyzed using the SPSS version 21.0. Results: A total of 525 undergraduate students participated in the study. The majority were females (63.0%) and approximately half (56.8%) were medical students. The majority of the students (82.3%) were aware of CRC, and 68% thought that CRC is a preventable disease. Regarding colorectal cancer screening tests, only one-third of students (33%) had actual knowledge, while the majority of the students (77.0%) thought that there are tests which help in early detection. Only 4% of the participants had a family history of CRC. The majority of the participants (84%) thought that CRC is a disease that can be cured. Almost 50-60% participants had good awareness level regarding risk factors, and signs and symptoms. Regarding knowledge, participant responses varied for family history (52%), age (59%), chronic infection of the colon (72%), obesity and lack of exercise (66%). More than one-third of the students had received information material regarding CRC from their curriculum followed by social media (20.4%), and nearly 40% from other sources such as TV, hospital and mass media. Female participants had significantly better awareness in a few questions regarding CRC awareness as compared to their male counterparts. There was a significant difference observed between medical and non-medical students ($p<0.001$) in overall score of awareness and knowledge about CRC while no significant difference found in gender-wise comparison. Conclusions: Knowledge and awareness of students about CRC were not up to the mark. Medical students and female students had better knowledge in a few areas, but the overall situation is dismal.

Keywords: Colorectal cancer - students perception - knowledge - awareness - Saudi Arabia

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Introduction

The rate of mortality in Saudi Arabia, due to cancer, has increased during the last decade. According to statistics, colorectal cancer (CRC) ranked first among male population and third among the female population. In 2009, a total of 1109 cases of cancer were diagnosed and registered; among them, 617 (55.6%) males and 492 (44.4%) females. The median age at diagnosis was 56 years for females and 60 years for males (Mosli and Al-Ahwal, 2012). The CRC is considered as one of the leading causes of death worldwide. In the United States, it is considered the second leading cause of death. In the United States, there were about 132,700 new cases of CRC and 49,700 deaths due to cancer of colon and rectum (American Cancer Society, 2013; Siegel et al., 2015).

The development of CRC is multifactorial, but it is considered as one of the preventable diseases. There is a strong correlation between use of certain diets and development of CRC, and the disease can be prevented by changing the dietary habits (Cooper, 2011).

The community has a crucial role in increasing the awareness of the risk factors and warning signs of common diseases such as CRC. This process will provide

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adequate knowledge about the disease, and may lead general population to involve in the cancer screening (Su et al., 2013). The CRC is one of the preventable diseases. There are different ways of prevention such as lifestyle modification and regular cancer screening, and these ways contribute in reducing the incidence of CRC (AICR, 2007; Edwards et al., 2010).

Different studies have shown that certain factors e.g. sedentary lifestyle, obesity, excessive alcohol intake, smoking and low fiber diet are correlated with higher chances to develop CRC, while inverse is true for persons who live a healthy and protective life with use of fruits and vegetable, low fat intake, regular exercise and high fiber diet, etc. (Kirkegaard et al., 2010; Odegaard et al., 2013). The most of the risk factors, correlated with colorectal cancer, are avoidable such as sedentary lifestyle (lack of physical activity, obesity, excessive smoking and excessive alcohol), nutrition deficiency (low dietary fiber, high saturated fat intake), and infections (McCaffery et al., 2003). But certain risk factors, such as family history and age, cannot be modified (Sandler, 1996). The CRC may cause one symptom or more such as a chronic change in bowel habits, rectal bleeding, chronic abdominal pain, weakness and fatigue, fever, and unexplained weight loss. There are some conditions which can be confused with CRC such as irritable bowel syndrome, inflammatory bowel disease, infection, or hemorrhoids (Keeney et al., 2011).

Health literacy rate of public correlates with knowledge about diseases, especially cancers, and screening program; lower the literacy rate lower is the knowledge about a screening test (Stegeman, 2013). In a population-based study in Saudi Arabia, it was found that people were less knowledgeable about screening program, alarming symptoms and risk factors of CRC; however, educated persons and females had more knowledge (Almadi et al., 2015).

Despite the increase in the incidence, the Ministry of Health (MOH) does not emphasize the role of health education about CRC as compared to other cancers such as breast and lung cancer, and at present, there is no national screening program for CRC. Therefore, it is vital to activate the role of health promotion and enhance the level of awareness of CRC in the Saudi population. Hence, this study aimed to assess the level of knowledge and awareness of CRC among students from different faculties at King Abdulaziz University, Saudi Arabia.

Table 1. Demographic Characteristics (n=513)

Description	N (%)
Gender	
Males	194 (37.0)
Females	331 (63.0)
Faculty	
Medical	316 (56.8)
Non-medical	209 (43.2)
Level of Education	
1st year	62 (11.8)
2nd year	147 (28.0)
3rd year	106 (20.2)
4th year	84 (16.0)
5th year	60 (11.4)
6th year	66 (12.6)

Materials and Methods

The present cross-sectional study was conducted at the King Abdulaziz University - Jeddah - Saudi Arabia, among students of different faculties between February-March 2014. The faculties were randomly selected, and convenience sampling method was used in the recruitment of participants (students). Informed consent was taken before filling the questionnaire. In the study, we included undergraduate medical and non-medical students of King Abdulaziz University, Jeddah. All the undergraduate

Table 2. Knowledge and Awareness Regarding CRC among All Participants

Questions	Responses		
	Yes N(%)	No N(%)	DK N(%)
Awareness			
Have you ever heard about CRC	432 (82.3)	93 (17.7)	
Do you think that colon cancer is a preventable disease	358 (68.2)	167 (31.8)	
Have you ever heard about any tests or examination that used in the detection of colon cancer	173 (33)	352 (67)	
Do you have family history of colon cancer	23 (4.4)	502 (95.6)	
Do you think that there are tests to help in detecting colon cancer early	404 (77)	31 (5.9)	89 (17)
Do you think that colon cancer can be cured if detected at an early stage	441 (84)	22 (4.2)	62 (11.8)
Do you think that chronic abdominal pain is one of the symptoms related to colon cancer?	279 (53.1)	112 (21.3)	134 (25.5)
Do you think that fever and weight loss one of the symptoms that related with colon cancer	311 (59.2)	62 (11.8)	152 (29)
Do you think that blood in stool is one of the symptoms related to colon cancer?	315 (60)	65 (12.4)	145 (27.6)
Knowledge			
Do you think that colon cancer commonly found in Saudi Arabia	245 (46.7)	109 (20.8)	171 (32.6)
Do you think that chronic infection of the colon considered as risk factor for colon cancer	381 (72.6)	73 (13.9)	71 (13.5)
Do you think that family history influences the incidence of colon cancer?	273 (52)	135 (25.7)	117 (22.3)
Do you think that aging is one of the risk factors for colon cancer?	312 (59.4)	140 (26.7)	73 (13.9)
Do you think that obesity and lack of exercise are considered as a risk for colon cancer?	349 (66.5)	94 (17.9)	82 (15.6)

CRC= colorectal cancer, DK=Don't know

students, having age between 18-25 years, were included in the study. The ethical approval was obtained from the Research Ethics Committee, Rabigh Medical College, King Abdulaziz University.

The study questionnaire, containing 28 items, was adapted from surveys identified in the relevant literature. The CRC awareness questionnaire consisted of awareness section (early CRC signs and symptoms, and risk factors) and knowledge section.

The results are expressed in frequencies and percentages for qualitative variables. Results are expressed in mean ±standard deviation, and independent t-test was conducted to compare the awareness and knowledge scores between male & females participants, and medical and non-medical students.

The data was analyzed using the SPSS version 21.0. Descriptive statistics (e.g. mean and standard deviation) were used to describe continuous variables while categorical variables were presented in frequencies and percentages. Independent sample t-test was used to determine the mean score differences of the awareness, knowledge sections between genders and medical and non-medical faculties. Statistical significance was determined at $p < 0.05$.

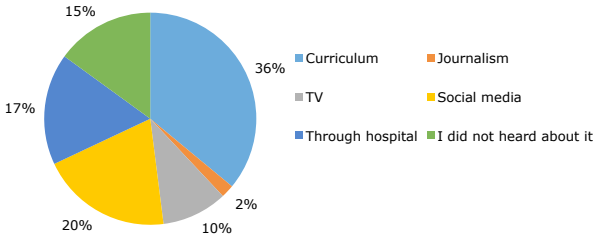

Figure 1. Source of Information About Colorectal Cancer

Results

A total of 525 undergraduate students answered the questionnaire. The students were within the age range of 18-25 years (mean age of 21.49±2.47 years). The majority of the participants were females (63.0%) and approximately half (56.8%) of the participants were medical students. The participants belonged to all academic years from first to 6th years (Table1).

The awareness about risk factors contained items on modifiable risk factors (diet, body weight management and lifestyle) and non-modifiable risk factors (age and family history). The majority of the students (82.3%) were aware of the CRC, and 68% think that CRC is a preventable disease.

Regarding CRC screening tests, only one third student (33%) had awareness on CRC screening tests, while the

Table 3. Comparison of Knowledge and Awareness Regarding CRC among Male & Female and Medical and Non-Medical Students

Questions	Male	Female	p-value	Medical students	Non-medical students	P-value
	Mean (SD)	Mean (SD)		Mean (SD)	Mean (SD)	
Awareness						
Have you ever heard about CRC?	1.12 (0.330)	1.21 (0.407)	0.014*	1.13 (0.340)	1.24 (0.431)	0.001*
Do you think that colon cancer is a preventable disease	1.25 (0.436)	1.36 (0.480)	0.014*	1.32 (0.467)	1.32 (0.466)	0.927
Have you ever heard about any tests or examination that used in the detection of colon cancer	1.61 (0.488)	1.70 (0.457)	0.033*	1.62 (0.485)	1.74 (0.439)	0.005*
Do you have family history of colon cancer	1.97 (0.174)	1.95 (0.221)	0.27	1.97 (0.175)	1.94 (0.242)	0.094
Do you think that there are tests to help in detecting colon cancer early	1.37 (0.768)	1.41 (0.759)	0.554	1.32 (0.712)	1.51 (0.821)	0.006*
Do you think that colon cancer can be cured if detected at an early stage	1.27 (0.670)	1.28 (0.658)	0.897	1.22 (0.600)	1.37 (0.737)	0.010*
Do you think that chronic abdominal pain is one of the symptoms related to colon cancer?	1.79 (0.857)	1.68 (0.834)	0.834	1.71 (0.820)	1.75 (0.880)	0.546
Do you think that fever and weight loss one of the symptoms that related with colon cancer	1.73 (0.895)	1.68 (0.888)	0.559	1.59 (0.859)	1.86 (0.912)	0.001*
Do you think that blood in stool is one of the symptoms related to colon cancer?	1.59 (0.855)	1.73 (0.890)	77	1.59 (0.847)	1.80 (0.913)	0.010*
Who are commonly affected by colon cancer	1.70 (0.824)	1.82 (0.816)	0.106	1.68 (0.802)	1.91 (0.830)	0.002*
Knowledge						
Do you think that colon cancer commonly found in Saudi Arabia	1.88 (0.896)	1.85 (0.871)	0.731	1.76 (0.870)	2.01 (0.874)	0.001*
Do you think that chronic infection of the colon considered as risk factor for colon cancer	1.37 (0.717)	1.43 (0.716)	0.348	1.36 (0.682)	1.49 (0.760)	0.041*
Do you think that family history influences the incidence of colon cancer?	1.66 (0.805)	1.73 (0.813)	0.412	1.57 (0.776)	1.91 (0.818)	<0.001*
Do you think that aging is one of the risk factors for colon cancer?	1.51 (0.714)	1.57 (0.733)	0.339	1.45 (0.686)	1.69 (0.761)	<0.001*
Do you think that obesity and lack of exercise are considered as a risk for colon cancer?	1.46 (0.756)	1.51 (0.748)	0.446	1.43 (0.712)	1.58 (0.799)	0.030*

p<0.5 is significant, CRC= colorectal cancer, Results are expressed in mean ±standard deviation

Table 4. Comparison of Overall Knowledge and Awareness Scores among Male and Female and Medical and Non-Medical Students

Variable	Male	Female	P-value	Medical students	Non-medical students	P-value
	(N= 194)	(N=331)		(N= 316)	(N= 209)	
Awareness	15.59 ±3.57	15.85±3.64	0.43	15.23+3.41	16.55+3.77	<0.001
Knowledge	9.57±2.91	9.90±2.85	0.22	9.24+2.70	10.59+2.94	<0.001

Results are expressed in mean ±standard deviation

majority of the students (77.0%) thought that there are tests which help in early detection of CRC. Only 4% of the participants had the family history of CRC. The majority of the participants (84%) thought that CRC is a disease that can be cured. Almost 50-60% participants had good awareness level regarding risk factors and sign symptoms (Table 2).

The knowledge section consisted of several items those were assessing the level of knowledge regarding CRC. The questions about risk factors of CRC, participants responses were family history (52%), aging (59%), chronic infection of the colon (72%), and obesity and lack of exercise (66%) (Table 2).

More than one-third of the students had received information material regarding CRC from their curriculum followed by social media (20.4%), nearly 40% from other sources such as TV, hospital and mass media (Figure 1).

Females participants had significantly better awareness in few questions regarding CRC awareness (P=0.014), regarding CRC is a preventable disease (P=0.014), regarding test or examinations that used to detect CRC (P=.033) as compared to their male counterparts. In all other awareness and knowledge questions, no significant difference was observed (Table 3). There was a significant difference observed between medical and non-medical students (p<0.001) in an overall score of awareness & knowledge about CRC while no significant difference found in gender -wise comparison (Table 4).

Discussion

Our study discloses the lack of adequate knowledge among students about CRC, and level of awareness is also inadequate. The students from medical faculty were more knowledgeable, and their level of awareness was better than non-medical students. The gender-wise comparison showed that females had better knowledge and level of awareness in certain questions. In a Malaysian study, 64.9% of university students had low knowledge about CRC and level of awareness was even worse with 94.5% had a low level of awareness, but science students and females had significantly higher level of knowledge and awareness as compared to their counterparts (Loo et al., 2013). The score differences between genders, in some questions, may be because females are more involved in cancer detection actions, particularly because cancer prevention campaigns have focused mainly on breast and cervical cancers which involve only females (Simon et al., 2010).

The increasing incidence of CRC in Saudi Arabia needs more initiatives from the MOH and implementation of the proper screening program, which are in practice for breast and cervical cancers, and others.

The majority of the students (68.2%), in our study, had positive attitudes toward prevention of CRC. In a study from Malaysia, the majority of participants had a positive attitude toward cancer (Tan et al., 2010). Recommended age to start screening, in average-risk population (50-60 years), was recognized by only 6.5% of the participants. This percentage seems disappointing, as in a similar study 83% participants were able to identify the recommended age (Papanikolaou et al., 2012). Regarding CRC screening tests, there was poor awareness about the tests, and only 33.6% participants had an awareness of screening tests; the results of our study congruent with the results of a Greek study (Papanikolaou et al., 2012).

In a recent survey from Saudi Arabia, including the general population, it was noted that knowledge and awareness about CRC were not adequate. However, again, female population had better knowledge and awareness as compared to males. Further, people of older age group and more educated persons had better knowledge and awareness about CRC (Zubaidi et al., 2015). In one of the studies, the inflatable colon (IC) was used as an innovative method to increase the awareness and knowledge of students and staff of a university, and the results were promising. Inflatable Colon Assessment Survey was conducted both before and after IC-tour (Sanchez et al., 2014). The same instrument can be used across the country to increase awareness about CRC. Skill labs of different universities might be helpful for these programs. In another innovative way, people were informed about the screening of CRC through a movie, and it was found to be an effective way to increase the knowledge of people with positive change in their behavior (Cueva et al., 2013).

Although more than half of the participants knew about modifiable and non-modifiable factors causing CRC in our study population, knowledge, still, was not sufficient; the group had better education level as compared to general community, and about 50% of the participants were from medical faculty. More than 45% of the participants could not recognize the warning signs, and only 50% could identify the symptoms of colorectal cancer.

In a community-based survey, it was found that majority of people in Oman were not aware of modifiable risk factors about cancer; although educated people had better knowledge than their counterparts (Al-Azri et al., 2013). In another survey, it was found that, on an average, about 60% of people were not aware of warning signs and symptoms of cancer (Al-Azri et al., 2015). It is evident from the literature that screening of CRC has important implications in the health sector, and many factors, including social factors and health care system, are involved in the success of screening programs. Certain

interventions, for instance, one-to-one information delivery, group discussion, and motivation of people by some incentives were proved to have a positive impact on screening programs and awareness of people (Gimeno Garcia et al., 2014).

About half of the students, in our study, heard about CRC through the curriculum, while the role of media and public health were insufficient in raising awareness of the population. In the era of strong media, one can understand its role in the enhancement of knowledge and awareness about important diseases. In a Malaysian study, it was established that majority of participants (97%) listened about a particular disease, an outbreak of acute respiratory syndrome, via television (Hazreen et al., 2005).

There are certain limitations of this study, firstly, half of the participants were medical students who might influence the results. Secondly, all responses are self-reported, and we don't have any tool to assess the validity of the answers.

In conclusion, Knowledge and awareness of students about CRC are not up to the mark. The medical students had better knowledge and female students had better knowledge in certain areas, but the overall situation is dismal. The role of media in this regard is not promising too. There is need of campaigns and educational programs, from health care authorities, for general public and students. Certain programs, already in practice, can be used in this regard.

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