

ORIGINAL ARTICLE

# The Awareness of colorectal cancer and its risk factors in Madinah, Saudi Arabia: a cross-sectional study

Waleed E. Almalki<sup>1\*</sup>, Hazim A. Alzhoufui<sup>1</sup>, Moath A. Altwaijry<sup>1</sup>,  
Abdulrahman M. Dad<sup>1</sup>, Owais K. Khoshhal<sup>1</sup>

## ABSTRACT

**Background:** Colorectal Cancer (CRC) is the third most common malignancy in males and the second most common malignancy in females worldwide. This study aims at planning targeted educational programs to raise the awareness of CRC and its risk factors, through assessing the knowledge about CRC and its risk factors in the population of Madinah, Saudi Arabia.

**Methodology:** A cross-sectional study was carried out in Madinah, Saudi Arabia involving study subjects approached by a 25 multiple-choice question-survey about CRC. The results were analyzed according to demographic data to determine the different levels of knowledge and associated risk factors.

**Results:** Among the total of 385 study participants, more than half of them were males, 18–29 years old subjects constituted 44.2% and undergraduates constituted 54%. Regarding the knowledge score, the highest score by the participants was 8, and 53.4% of them were with a score of 2–3. At least 64.3% of the participant had two or three risk factors for CRC. The most common risk factor found was eating red meat with 61.5%.

**Conclusion:** Overall, the knowledge about CRC in Madinah was found poor. The higher the education level and income, the higher was the knowledge regarding CRC among the study subjects. With the increase in financial income and education level, there was a decrease in the number of CRC risk factors, the opposite was found in relation to age.

**Keywords:** Colorectal cancer, awareness, risk factors, Madinah.

## Introduction

Colorectal Cancer (CRC) is the third most common malignancy in males and the second most common malignancy in females worldwide [1]. In Saudi Arabia, CRC is the second most common malignancy, which is considered as the most common type of cancer in males 10.6% of the Saudi population, and the third in females by 8.9% [2]. CRC is associated with several risk factors such as age above 40, family history of CRC or colorectal polyps, physical inactivity, smoking, and alcohol consumption [3]. A previous study about risk factors of CRC in Saudi Arabia showed that a positive family history of CRC and physical inactivity were the most common risk factors associated with CRC [4]. There are no previous studies that have investigated the awareness and the risk factors of CRC in the population of Madinah. This study aims to assess the CRC awareness, prevalence of risk factors in the population of Madinah. The results of this study will help in creating more targeted educational programs to raise the awareness of CRC and

its risk factors which will be reflected by a decrease in the incidence of CRC in Madinah.

## Subjects and Methods

A cross-sectional study was conducted in Madinah, Saudi Arabia during the period from November 2017 to August 2018. Madinah has a population of 2,080,436 (the year 2016), of which 15.5% are above the age of 50 years [5]. The calculated sample of this study was 384 participants following the parameters of the 95% confidence level, 50% expected frequency, and design effect 1.0. The study subjects were interviewed in various Primary Health

**Correspondence to:** Waleed E. Almalki

\*Taibah University, College of Medicine, Madinah, Saudi Arabia.

**Email:** wm1416@gmail.com

*Full list of author information is available at the end of the article.*

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Care centers in Madinah. The inclusion criteria for this study included subjects aged above 18 and living in Madinah. The individuals who have been diagnosed with CRC living outside of Madinah were excluded from the study. The collection of the sample was done using a multi-stage sampling technique. Data collected through interview questionnaires consisting of 25 multiple-choice questions written in the Arabic language in a standard format. Of these, four questions were obtained from a survey of Zubaidi et al. [6]. All questions were validated according to the Cancer Awareness Measure. Statistical analysis performed using Statistical Package for the Social Sciences (SPSS) version 24, data were presented as numbers, percentages, tables, and figures. Informed consent was obtained from every participant. Data were considered confidential, ethical approval has been obtained from the Ethical Committee at Taibah University and General Directorate of Health Affairs in Madinah.

**Results**

The sample of the study comprised of 385 participants, out of 420 invited to participate, giving a response rate of 91.7%. Among them, 35 were excluded as they were not living in Madinah ( $n = 16$ ) or didn't complete the questionnaire ( $n = 19$ ). The general characteristics of the respondents are shown in Table 1. They were 56% ( $n = 214$ ) males and 44% ( $n = 171$ ) females. Most

of the respondents were 18–29 years old—44.2%, undergraduate or above—54%, and married—67.3%. The knowledge was assessed by 9 questions containing 28 items that covered certain aspects of CRC, including awareness, risk factors, signs, and symptoms; 22 of these items were true, the others were either wrong answers or “I Don't Know” (Table 2). The maximum score to get was 22 and the lowest was zero. The highest score by the participants was 8, while the lowest was 1. Over half of the participants (53.4%) got a score of 2 or 3 (Table 3). According to the participants perception of their knowledge about CRC and risk factors, the results showed that 44.4% ( $n = 171$ ) poor, 35.6% ( $n = 137$ ) low, 19.2% ( $n = 74$ ) good, and 0.8% ( $n = 3$ ) excellent. Among participants with “undergraduate or above” level of education, 84.1% ( $n = 175$ ) had heard about CRC compared to 70.7% ( $n = 99$ ) among those with high school education ( $p = 0.002$ ). According to the financial income, people whose income was > 20,000 SR 100% ( $n = 13$ ) heard about CRC while those with an income < 5,000 SR 74.0% ( $n = 111$ ) did not hear of it ( $p = 0.036$ ). The majority of participants (78.5%) didn't know that CRC is the second most common cancer in Saudi Arabia. The undergraduate or above participants (75%) ( $n = 156$ ) didn't answer correctly, the same was observed for the subjects with an elementary level of education (94.5%) ( $n = 17$ ). Regarding the financial income, 53.9% ( $n = 7$ ) of whom their income > 20,000 SR didn't get the right answer was 84.7% ( $n = 127$ ) of whom their income < 5,000 SR didn't get the right answer ( $p = 0.014$ ). Most of the sample 71% ( $n = 276$ ) didn't know that CRC is more common in males. The majority of males and females didn't know that CRC is more common in males 80.4% ( $n = 172$ ), 60.8% ( $n = 104$ ), respectively ( $p = 0.000$ ). People whose income was > 20,000 SR knew that CRC was found more in males 61.5% ( $n = 8$ ) was 18.7% ( $n = 28$ ) of whom their income < 5,000 SR didn't get the right answer ( $p = 0.001$ ). The risk factors were assessed by eight questions (Table 4), we considered sex as a risk factor. The maximum score the participant can get is eight. The highest score was 5. 64.3% ( $n = 248$ ) of the participants has at least two or three risk factors for CRC. The risk factors score and its items are listed in Tables 4 and 5. In people who are aged 50 years or more, 55.2% ( $n = 16$ ) have three or more risk factors compared to who are aged from 18 to 29 years 44.1% ( $n = 75$ ), the same for male 50.7% ( $n = 108$ ) compared to female 38% ( $n = 65$ ) ( $p = 0.000$ ). According to the education level, 41.5% ( $n = 86$ ) of participants who were undergraduates or above had three or more risk factors, compared to 55.6% ( $n = 10$ ) of those with elementary education. Also, the same regarding the financial income, people who had an income of > 20,000 SR 30.8% ( $n = 4$ ) compared to who had income <5,000 SR 51.3% ( $n = 77$ ). The most common risk factors found in the sample was eating red meat daily 61.5% ( $n = 237$ ), not doing regular physical activity 50.6% ( $n = 195$ ), not eating fruit and vegetable regularly 49.3% ( $n = 190$ ). Concerning physical activity, 45.3% ( $n = 77$ ) of participants aged from 18 to 29 didn't practice regular physical activity, also there is 72.4%

**Table 1.** Demographic characteristics of the respondents.

Characteristic	No. (N = 385)	Percent
<b>Age</b>		
18–29	170	44.2%
39–30	124	32.2%
40–49	62	16.1%
>50	29	7.5%
<b>Sex</b>		
Male	214	55.6%
Female	171	44.4%
<b>Marital status</b>		
Single	109	28.3%
Married	259	67.3%
Divorced / Widowed	17	4.4%
<b>Education</b>		
Elementary	18	4.7%
Intermediate	19	4.9%
High school	140	36.4%
Undergraduate and above	208	54.0%
<b>Financial situation</b>		
<5,000 SR	150	39.0%
5,000–10,000 SR	151	39.2%
10,000–20,000 SR	71	18.4%
>20,000 SR	13	3.4%

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**Table 2.** Participants knowledge on CRC.

Questions		Sex				p Value
		Male		Female		
		Number	Percent	Number	Percent	
Have you ever heard about CRC?	No	48	22.4%	32	18.7%	0.373
	Yes	166	77.6%	139	81.3%	
How widespread is CRC in Saudi Arabia?	The most widespread	17	7.9%	12	7.0%	0.298
	The second most widespread	47	22.0%	35	20.5%	
	The third most widespread	35	16.4%	18	10.5%	
	I don't know	115	53.7%	106	62.0%	
CRC is more in:	Men	42	19.6%	67	39.2%	0.000
	Women	27	12.6%	8	4.7%	
	Equal in Men and Women	58	27.1%	31	18.1%	
	I don't know	87	40.7%	65	38.0%	
CRC considered to be:	Inherited	14	6.5%	15	8.8%	0.230
	Acquired	56	26.2%	54	31.6%	
	Inherited and Acquired	72	33.6%	42	24.6%	
	I don't know	72	33.6%	60	35.1%	
CRC signs and symptoms						
Bleeding from Rectum	Chose	103	48.1%	61	35.7%	0.014
Blood in Stool	Chose	110	51.4%	67	39.2%	0.017
Change in Bowel Habits	Chose	88	41.1%	46	26.9%	0.004
Continuous Abdominal Pain	Chose	112	52.3%	90	52.6%	0.954
Unreasonable Weight Loss	Chose	77	36.0%	50	29.2%	0.162
Feeling Bloating	Chose	72	33.6%	41	24.0%	0.038
Feeling of Incomplete Defecation	Chose	39	18.2%	16	9.4%	0.013
Has No Symptoms	Chose	0	0.0%	3	1.8%	0.052
I Don't Know						
CRC Risk Factors						
Older Age	Chose	40	18.7%	43	25.1%	0.126
Personal or Family History of CRC	Chose	84	39.3%	51	29.8%	0.054
IBD	Chose	95	44.4%	60	35.1%	0.064
Obesity	Chose	45	21.0%	26	15.2%	0.143
Smoking	Chose	87	40.7%	64	37.4%	0.519
Eating Red Meat	Chose	38	17.8%	20	11.7%	0.099
Low Physical Activity	Chose	50	23.4%	40	23.4%	0.995
I Do Not Know any CRC Risk Factors	Chose	52	24.3%	58	33.9%	0.038
Have you ever heard of CRC screening?	No	149	69.6%	117	68.4%	0.799
	Yes	65	30.4%	54	31.6%	
At what age is CRC screening performed?	At the age of 30 years	34	15.9%	19	11.1%	0.344
	At the age of 40 years	27	12.6%	21	12.3%	
	At the age of 50 years	14	6.5%	20	11.7%	
	At the presence of symptoms	38	17.8%	29	17.0%	
	I don't know	101	47.2%	82	48.0%	
CRC screening						
FOBT	Chose	41	19.2%	36	21.1%	0.644
X-Ray	Chose	15	7.0%	9	5.3%	0.481
CT-Scan	Chose	29	13.6%	9	5.3%	0.007
Colonoscopy	Chose	89	41.6%	89	52.0%	0.041
I Do Not Know	Chose	98	45.8%	70	40.9%	0.340

( $n = 21$ ) at the age of 50 years or more didn't practice regular physical activity ( $p = 0.021$ ). The same difference was presented regarding the education level, people with an educational level of undergraduate or above and didn't practice physical activity were 42.8% ( $n = 89$ ), were 84.2% ( $n = 16$ ) of intermediate level of education didn't practice physical activity ( $p = 0.000$ ). People aged 50 years or more and eating red meat daily were 69% ( $n = 20$ ). The majority of the participants who eat red meat daily were male (70.1%;  $n = 150$ ,  $p = 0.002$ ).

**Discussion**

According to the Saudi Cancer Registry in 2014, the number of cases of CRC was 1,347, which was considered as 11.5% of all newly diagnosed cases among the Saudi

population. Madinah was the sixth-highest region in the number of CRC cases in Saudi Arabia. The Age-Standardized Incidence Rate among Saudi males (per 100,000) was 10.0 / 100,000 and among Saudi females was 6.6 / 100,000[7]. As the highest knowledge score by the participants was 8 / 22, only half of the participants got 2 or 3, which means that there is a significant defect of knowledge about CRC which can be explained by the responses on their perception of knowledge about it. For instance, limited knowledge and awareness of CRC was found in Ireland [8], Croatia [9]and between ethnic minority in the UK [10]. According to this, in 2007 Croatia created a national screening program to fill the gap of knowledge and screening awareness [9]. The majority of the participants didn't know that CRC is the second most common malignancy in Saudi Arabia. Depending on the education level and its effect on the level of knowledge, there was a significant difference that people with a high level of education have a better knowledge of CRC as they had heard about CRC and knew that it is the second most common malignancy in Saudi Arabia. Overall, participants with more education had a better knowledge of CRC. The same relation in the previous points appeared regarding the financial status as people with high incomes have better knowledge than those with low incomes. As the majority of people found not knowing that CRC is more common in males, there was a significant difference between males and females as females were more knowledgeable that CRC is more common in males. Moreover, females were more knowledgeable about CRC which is not

**Table 3.** Knowledge score.

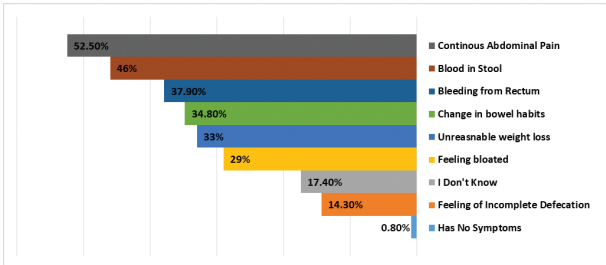
Knowledge score		
Score	Number	Percent
1	49	12.7%
2	103	26.7%
3	103	26.7%
4	68	17.6%
5	41	10.6%
6	13	3.5%
7	5	1.4%
8	3	.9%

**Table 4.** Participants risk factors.

Questions		Sex						p value
		Overall		Male		Female		
		Number	Percent	Number	Percent	Number	Percent	
Are you currently smoking?	No	314	81.77%	149	69.6%	165	96.5%	0.000
	Yes	71	18.49%	65	30.4%	6	3.5%	
Do you practice regular physical activity 30 min / 5 days a week?	No	195	50.78%	107	50.0%	88	51.5%	0.776
	Yes	190	49.48%	107	50.0%	83	48.5%	
Does your daily diet contain red meat?	No	148	38.54%	97	45.3%	51	29.8%	0.002
	Yes	237	61.72%	117	54.7%	120	70.2%	
How many times do you eat fruit or vegetables per week?	Daily	79	20.57%	46	21.5%	33	19.3%	0.283
	3-5 times / week	116	30.21%	69	32.2%	47	27.5%	
	1-2 times / week	108	28.13%	61	28.5%	47	27.5%	
	I rarely eat it weekly	82	21.35%	38	17.8%	44	25.7%	
Are you currently have inflammatory bowel disease or you have history of it?	No	364	94.79%	201	93.9%	163	95.3%	0.549
	Yes	21	5.47%	13	6.1%	8	4.7%	
Are you currently have CRC or you have history of it?	No	385	100.26%	214	100.0%	171	100.0%	
	Yes	0	0%	0	0%	0	0%	
Is your father/mother, brothers/sisters, children has/ have history of CRC?	No	378	98.44%	208	97.2%	170	99.4%	0.105
	Yes	7	1.82%	6	2.8%	1	.6%	

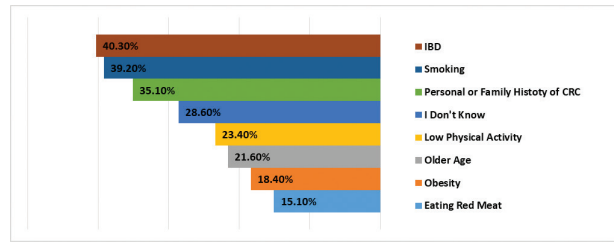
**Table 5.** Number of risk factors.

Number of Risk Factors		
Number of risk factors	No.	%
0	9	2.3%
1	71	18.4%
2	132	34.2%
3	116	30.1%
4	54	14.0%
5	3	.8%



**Figure 1.** Knowledge of CRC signs and symptoms.

uncommon from the global perspective [7]. Regarding the knowledge about signs and symptoms, less than half of the participants knew other CRC signs and symptoms other than continuous abdominal pain (Figure 1). In another study, females were more knowledgeable about CRC symptoms [7]. As the main risk factors for CRC include smoking, physical inactivity and eating processed meat [12], most of the sample thought that Inflammatory Bowel Disease (IBD) is considered a risk factor of CRC. People aged 50 years or more showed the same association [7], while most of them didn't think that eating red meat is one of them (Figure 2), which correlates with the fact that daily eating red meat is the most common risk factor among Madinah population. More than half of the people aged 50 years or more are at this risk. On the same relation with financial income, those with high incomes are consuming red meat more than with a lower income. Other studies showed that older participants aged 50 years and more knew that CRC family history considered a risk factor of CRC [7]. On the other hand, a family or relative history of CRC was the lowest risk factor found in the sample. Regarding consuming a sufficient amount of fruits and vegetables, we found that there was a significant relationship between increasing age and having this healthy habit. In our study, we chose eight items of CRC risk factors to be measured. More than half of the participants had two or three risk factors. A few of them got the highest number of risk factors which was 5. That means that there is a different distribution of risk factors in the Madinah population. We found that there is an increase in the number of risk factors with the increasing age. People with high incomes have fewer risk factors compared to those with less income.



**Figure 2.** Participants knowledge of CRC risk factors.

The same relation appeared in the education level, participants with a high educational level have fewer risk factors compared to those with a lower educational level. In the meta-analysis of 21 studies, there was a significant reduction of CRC risk with regular physical activity [11]. In addition, there was an obvious relation between decreasing regular physical activity and increasing age. On the other hand, people who had a high education level are practicing regular physical activity.

**Conclusion**

There was a significant defect of knowledge regarding CRC among the population of Madinah. Most of the population of Madinah had at least two or three risk factors for CRC. The most common risk factor for CRC in Madinah was eating red meat, and the lowest was a family or relative history of CRC. As there is an increase in education level and financial income, there is a decrease in the number of CRC risk factors and the opposite is true in regards to age. We recommend creating an educational program for CRC that targets all the population and demographics in Madinah.

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**List of Abbreviations**

- CRC Colorectal Cancer
- IBD Inflammatory Bowel Disease

**Conflict of interest**

The authors declare that there is no conflict of interest regarding the publication of this article.

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None.

**Consent for publication**

Informed consent was obtained from all the participants.

### Ethical approval

Ethical approval has been obtained from the Ethical Committee at Taibah University and the General Directorate of Health Affairs in Madinah.

### Author details

Waleed E. Almalki<sup>1</sup>, Hazim A. Alzhoufui<sup>1</sup>, Moath A. Altwaijry<sup>1</sup>, Abdulrahman M. Dad<sup>1</sup>, Owais K. Khoshhal<sup>1</sup>

1. Taibah University, College of Medicine, Madinah, Saudi Arabia

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