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Colorectal cancer awareness and its predictors among adults aged 50–74 years attending primary healthcare in the State of Qatar: a cross-sectional study

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ABSTRACT

Objective The current study aimed to assess the awareness of colorectal cancer (CRC) symptoms and risk factors among the at-risk population visiting the primary healthcare (PHC) centres in Qatar. The secondary objective was to assess the differences in awareness among population subgroups.

Design A cross-sectional study design was employed.

Setting The study was conducted across six PHC centres in Qatar.

Participants Patients, or their accompanying people, aged 50–74 years and Arabic or English speakers, were recruited from the main waiting areas of the selected PHC centres.

Data collection and analysis Participants were interviewed using the validated Bowel/Colorectal Cancer Awareness Measure questionnaire. A non-probability convenient sampling technique was applied to recruit participants. Descriptive and analytic statistics were used when appropriate. A multivariate linear regression model was constructed to identify the independent predictors of CRC awareness.

Results The study includes 448 participants (response rate=87%). The mean age of the participants was 58.48 years (SD ±6.37). The mean awareness score among the participants was 3.63/9 (SD ±2.7) for CRC symptoms and 5.43/11 (SD ±3.3) for CRC risk factors. The overall mean awareness score was 9.03/20 (SD ±5.5). Multivariate linear regression identified the female gender (2.52 (95% CI 1.15 to 3.88)), non-Qatari Arab (2.91 (95% CI 1.64 to 4.18)) or non-Arab nationalities (1.76 (95% CI 0.28 to 3.24)), and tertiary education (4.10 (95% CI 2.55 to 5.66)) as independent predictors of higher CRC awareness.

Conclusion In general, the awareness of CRC symptoms and risk factors was low among the at-risk population in Qatar. Specifically, the regression analysis showed men, Qataris, and those with no formal education had low awareness of CRC symptoms and risk factors. Such results emphasise the importance of tailoring future educational campaigns that are relevant, specific and appealing to such cohort.

Strengths and limitations of this study

- This was the first cross-sectional study to evaluate colorectal cancer awareness and its predictors among the population at risk in Qatar.
- The use of a validated questionnaire to collect data from the target population strengthened the validity of the study.
- The interviews were conducted using a structured face-to-face interview by trained data collectors.
- The non-probability sampling method used in the study may affect the generalisability of the results.
- Despite not being a population-based study, the current research recruited participants from primary healthcare centres and offers a good representation of the different ethnic, cultural and social backgrounds in Qatar.

INTRODUCTION

Colorectal cancer (CRC) is the third most commonly diagnosed cancer and the second leading cause of cancer-related deaths worldwide. CRC accounted for almost 1.8 million new cases and 860 000 deaths during 2018. By 2030, the global burden of CRC is expected to increase by 60% and results in more than 2.2 million new cases and 1.1 million deaths.[1] In addition, there has been a rapid rise of CRC incidence and mortality across several middle-income to high-income countries in Asia, Eastern Europe and South America.[2] On the other hand, a decline in CRC-related mortality has been witnessed among western countries; partly attributed to their effective national screening programmes.[3]

Like other non-communicable diseases, CRC has modifiable risk factors such as obesity, low-fibre diet, low fruit and vegetable intake, consumption of red or processed meat, excessive alcohol intake and smoking. Moreover,

detectable symptoms of CRC include a persistent change of the normal bowel habits, bleeding through the back passage, feeling a lump in the abdomen and unexplained extreme tiredness.[4]

The incidence of CRC can be reduced through a comprehensive approach that entails dietary modifications, regular physical activity and family-based or community-based interventions for cancer prevention.[5] For instance, it has been estimated that more than a quarter (27%) of CRC cases could have been prevented through increasing the intake of fibre and decreasing the consumption of red or processed meat. In addition, almost one-seventh (14%) and one-fifth (12%) of CRC cases could have been avoided through the proper management of excess weight.[6] Thus, the awareness about these modifiable risk factors is crucial for any public health strategies aimed at the reduction or prevention of CRC.

Several studies have shown that the awareness of CRC symptoms and risk factors is positively linked to the uptake of CRC screening.[7–9] Despite growing evidence on the association between lifestyle factors and CRC, the awareness of such risk factors among the population at risk (aged 50–74 years) remains low.[10]

Qatar is a country located in Western Asia on the Arabian Peninsula. The population in Qatar is largely diverse and comprised of many ethnicities; Arabs, Asians, Africans and westerns. The majority of the country's workforce are expatriates with different cultural and educational backgrounds.[11]

In Qatar, the latest data show that CRC is the second most commonly diagnosed cancer (11.71%) among men and the third most commonly diagnosed cancer (8.63%) among women. Moreover, more than two-thirds (68%) of the relevant cases were diagnosed at an advanced stage.[12] Given the diverse population of the country, heterogeneous knowledge regarding CRC is expected. Thus, the primary objective of the current study was to assess the awareness of CRC symptoms and risk factors among the at-risk population (aged 50–74) visiting the primary healthcare (PHC) centres in Qatar. The secondary objective was to assess the differences in awareness among population subgroups.

METHODS

Study design and setting

This was a cross-sectional study conducted at the PHC centres in Qatar between September 2018 and January 2019. A network of PHC centres is distributed across the country through which a comprehensive promotive, preventive and curative care is provided free of charge. They are the first line of contact with the community and each health centre has a well-defined catchment population from different ethnic, cultural, social and educational backgrounds; which offers a good representation of the community. At the time of the study, there were 23 PHC centres distributed across the country's three administrative health regions (North, West and Central). The study was conducted across six PHC centres, where two health centres were chosen from each region.

Study population and sampling

The inclusion criteria were patients or accompanying people, aged 50–74 years, Arabic or English speakers, visiting one of the selected PHC centres during the study period. The study excluded individuals who previously underwent CRC screening because they have already received counselling about CRC symptoms and risk factors as part of their CRC screening procedure. Thus, their enrolment would interfere with the study main objective. Individuals with cognitive or communication difficulties were also excluded. The participants were chosen through a non-probability convenient sampling technique.

Patient and public involvement

We did not involve patients or the public in our work.

Sample size

According to Qatar's 2015 Census, there were 211 207 individuals aged 50 years and above in the country. Thus, the estimated sample size was 384 individuals based on a 95% CI, precision of 5%, a hypothesis that 50% (±5%) of participants were aware of CRC symptoms and risk factors and a non-response of 20%. The calculation of sample size was performed to obtain a sufficiently precise estimate of the minimum number of study participants to ensure study power.

Data collection

The data collection was done through face-to-face structured interviews using the questionnaire described below. The eligible participants were approached by trained interviewers (resident physicians) at the main waiting areas of the selected PHC centres. After that, they were given a brief orientation about the study and were invited to participate. All consented individuals were interviewed in their preferred language (English or Arabic). The duration of the interview ranged from 15 to 20 min. On completing the interview, the participants were encouraged to ask any question. They were provided with an educational booklet on CRC prepared already by PHC cancer screening department. Additionally, all participants were counselled about CRC and encouraged to take part in bowel cancer screening. Those who reported any concerns or potential symptoms of bowel cancer were referred to their primary care physician for further assessment.

Questionnaire

The current study used the validated Bowel/Colorectal Cancer Awareness Measure (Bowel/Colorectal CAM) survey. The questionnaire was designed to evaluate the awareness of CRC among the public. This survey instrument was developed by University College London and Cancer Research UK. It is based on a generic CAM developed by Cancer Research UK, University College London,

Kings College London and Oxford University in 2007 and 2008.[13] It possesses satisfactory internal reliability with a Cronbach's alpha of 0.84 across all components and test–retest reliability of r=0.7. The questionnaire is composed of prompted (close-ended) and unprompted (open-ended) questions. However, we used the prompted section of the questionnaire because it satisfies the study's objectives. Further details about the questionnaire have been described elsewhere.[14]

The study's questionnaire was translated and back translated (English–Arabic) by two independent translators and any aberrancy was corrected accordingly. Additionally, one item on tobacco use was added to the list of CRC risk factors. The study questionnaire consisted of three main sections. Section A included six questions about the background characteristics (age, gender, nationality, marital status, level of education, employment status). Section B consisted of nine close-ended questions that measure the participants' awareness of CRC symptoms. Section C encompassed 11 close-ended questions related to the participants' awareness of CRC risk factors. Regarding sections B and C, the researchers assigned one point for each 'correct' response and null for the 'incorrect or I do not know' responses. As a result, the total score ranged from 0 to 9 for section B and 0 to 11 for section C. Furthermore, the overall awareness score ranged from 0 to 20 by combining the scores of sections B and C. The instrument was piloted on 30 participants from the study population to assess its comprehensiveness and clarity.

Statistical analysis

The collected data were analysed using SPSS V.23. Descriptive statistics were calculated for continuous and categorical variables where appropriate. Pearson's χ^2 test was used to assess the association between categorical variables. Analysis of variance (ANOVA) test was used to analyse the differences among group means in the sample. A multivariate linear regression model was constructed to identify the independent predictors of CRC awareness and tested for interactions and collinearity. The unadjusted and adjusted differences in means were reported for all potential predictors (age, gender, nationality, marital status, level of education and employment). The level of statistical significance was set at 0.05.

RESULTS

Demographic characteristics

A total of 448 out of 566 invited individuals participated in the study (response rate: 87%) with time constraint being the main reason for non-participation. Table 1 presents the participants' background characteristics. The participants' mean age was 58.48 years (SD ±6.37). More than half of the respondents were females (53.5%), non-Qatari Arabs (52.2%), married (86.8%) and unemployed (54.4%).

Table 1 Background characteristics of participants (N=448)

Variable	n (%)
Age (years)	
50–59	254 (56.7)
60 or more	194 (43.3)
Gender	
Male	208 (46.5)
Female	239 (53.5)
Nationality	
Qatari	107 (24.0)
Non-Qatari Arab	233 (52.2)
Non-Arab*	106 (23.8)
Marital status	
Married	389 (86.8)
Divorced/widow	51 (11.4)
Unmarried†	8 (1.8)
Level of education	
No formal education	69 (15.4)
Primary	82 (18.3)
Secondary	101 (22.6)
Tertiary	195 (43.6)
Employment	
Employed	204 (45.6)
Unemployed	243 (54.4)

Missing information: gender (n=1), nationality (n=2), level of education (n=1), employment (n=1).
*Non-Arab (Asian, Western and African).
†Unmarried (single, divorced or widow).

Awareness of CRC symptoms and risk factors

The mean awareness score of CRC symptoms among study participants was 3.63/9 (SD ±2.7), while that of risk factors was 5.43/11 (SD ±3.3). Thus, the overall mean awareness score was 9.03/20 (SD ±5.5).

Table 2 describes the percentages of participants who identified the symptoms and risk factors of CRC. Out of nine symptoms related to CRC, the most commonly recognised symptoms were 'lump in abdomen' (56.5 %), 'unexplained weight loss' (54.5 %) and 'blood in stools' (46.9%). On the other hand, the least commonly recognised symptoms were 'pain in back passage' (22.5%) and 'bowel does not empty' (27.9%). Furthermore, the most commonly recognised CRC risk factors were the 'daily eating of processed meat' (71.7%), 'tobacco use' (69.2%) and 'drinking alcohol' (63.6 %). However, 'diabetes' (23.7 %), 'low fruit and vegetables' (34.4%) and 'older age' (37.7%) were less commonly recognised risk factors.

Females were more likely to recognise the link between unhealthy lifestyle behaviours and CRC than their male counterparts as shown in table 3. For instance, females were more aware about the association of CRC with the following factors: daily consumption of processed meat (76.5% vs 66.7%; p=0.014), tobacco use (74.8% vs 63.6%; p=0.007), drinking alcohol (69.3% vs 57.8%; p=0.008),

Table 2 Frequency distribution regarding the awareness of CRC symptoms and risk factors among participants (N=448)

	n (%)
CRC symptoms	
Lump in abdomen	253 (56.5)
Unexplained weight loss	244 (54.5)
Blood in stools	210 (46.9)
Pain in abdomen	189 (42.2)
Change in bowel habit	173 (38.6)
Bleeding back passage	171 (38.2)
Tiredness	158 (35.3)
Bowel does not empty	125 (27.9)
Pain in back passage	101 (22.5)
CRC risk factors	
Daily eating of processed meat	321 (71.7)
Tobacco use	310 (69.2)
Drinking alcohol	285 (63.6)
Chronic bowel disease	242 (54.0)
Daily eating of red meat	239 (53.3)
Close relative with CRC	206 (46.0)
Diet low in fibre	204 (45.5)
Overweight (body mass index ≥25 kg/m^2)	187 (41.7)
Older age	169 (37.7)
Low fruit and vegetables (<5 servings/day)	154 (34.4)
Diabetes	106 (23.7)

CRC, colorectal cancer.

daily consumption of red meat (62.6% vs 43.0%; p<0.001) and having less than five portions of fruit and vegetables (46.2% vs 20.9%; p<0.001).

The relationship between background characteristics and the CRC awareness mean score

Table 4 describes the relationship between the participants' background characteristics and their CRC awareness mean score. On bivariate analyses, the respondents' nationality and educational level were significantly associated with the awareness regarding CRC symptoms. In addition, the respondents' gender, nationality, educational level and employment status were significantly associated with the awareness of CRC risk factors.

Predictors of CRC awareness

The univariate analysis showed that gender, nationality and level of education were associated with the overall awareness of CRC among our study participants (table 5).

The fully adjusted regression model (table 5) showed that female participants possessed higher overall awareness of CRC by a score of 2.52 (95% CI 1.15 to 3.88) compared with male participants. Furthermore, non-Qatari Arabs and non-Arabs were significantly more likely to be aware of CRC compared with Qataris by a score of 2.91 (95% CI 1.64 to 4.18) and 1.76 (95% CI 0.28 to 3.24), respectively. Moreover, participants with primary, secondary and tertiary education were significantly more likely to have a high awareness of CRC compared with participants without formal education by a score of 3.53 (95% CI 1.85 to 5.23), 2.97 (95% CI 1.29 to 4.66) and 4.10 (95% CI 2.55 to 5.66), respectively. On the other hand, age, marital status and employment did not show significant difference of the overall score in the regression model.

DISCUSSION

The current study aimed to assess the awareness of CRC symptoms and risk factors among adults aged 50–74 years in Qatar. The mean awareness score of CRC symptoms among study participants was 3.63/9 (SD ±2.7), while that of risk factors was 5.43/11 (SD ±3.3). Thus, the overall mean awareness score was 9.03/20 (SD ±5.5).

This is in line with earlier studies in the region. A study in Bahrain among the general population revealed low awareness about the symptoms and risk factors of CRC. It was found that the score of overall CRC knowledge was 56% and that of symptoms and risk factors was 59% and 53%, respectively.[15] Also, a recent national study in Saudi Arabia examined the awareness of 5720 participants on

Table 3 The relationship between gender and awareness of lifestyle risk factors for colorectal cancer (N=448)

Lifestyle risk factor	Female n (%)	Male n (%)	P value
Daily eating of processed meat	182 (76.5)	138 (66.7)	0.014*
Tobacco use	178 (74.8)	131 (63.6)	0.007*
Drinking alcohol	165 (69.3)	119 (57.8)	0.008*
Daily eating of red meat	149 (62.6)	89 (43.0)	<0.001*
Low fruit and vegetables (<5 servings/day)	110 (46.2)	43 (20.9)	<0.001*
Diet low in fibre	113 (47.5)	90 (43.7)	0.24
Overweight (BMI ≥25 kg/m^2)	95 (39.9)	91 (44.2)	0.20

*Statistically significant.
BMI, body mass index.

Table 4 The association between participants' background characteristics and their awareness regarding colorectal cancer symptoms and risk factors (N=448)

	Awareness			
	Symptoms		Risk factors	
Variable	Mean score (95% CI)	P value	Mean score (95% CI)	P value
Age (years)		0.201		0.082
50–59	3.77 (3.42 to 4.12)		5.67 (5.26 to 6.08)	
60 or more	3.43 (3.05 to 3.82)		5.12 (4.65 to 5.59)	
Gender		0.146		0.003*
Male	3.41 (3.01 to 3.80)		4.92 (4.44 to 5.40)	
Female	3.79 (3.45 to 4.13)		5.85 (5.46 to 6.24)	
Nationality		<0.001*		<0.001*
Qatari	2.71 (2.25 to 3.18)		4.63 (4.03 to 5.23)	
Non-Qatari Arab	4.20 (3.85 to 4.54)		5.81 (5.42 to 6.21)	
Non-Arab	3.30 (2.71 to 3.89)		5.42 (4.67 to 6.16)	
Marital status		0.846		0.668
Married	3.63 (3.35 to 3.92)		5.46 (5.12 to 5.80)	
Unmarried	3.56 (2.90 to 4.22)		5.26 (4.54 to 5.98)	
Level of education		<0.001*		0.003*
No formal education	2.00 (1.45 to 2.55)		4.07 (3.22 to 4.92)	
Primary	3.55 (2.95 to 4.15)		5.72 (5.12 to 6.32)	
Secondary	3.61 (3.10 to 4.13)		5.80 (5.15 to 6.45)	
Tertiary	4.26 (3.86 to 4.65)		5.58 (5.10 to 6.06)	
Employment		0.319		0.04*
Employed	3.49 (3.08 to 3.90)		5.09 (4.61 to 5.58)	
Unemployed	3.75 (3.43 to 4.08)		5.74 (5.35 to 6.13)	

*Statistically significant.

CRC-related symptoms and risk factors. As a result, the mean score of the respondents' awareness was low at 11.05/23.[16]

In comparison to our study, a population survey in the UK using the Bowel/Colorectal CAM instrument showed higher awareness regarding CRC symptoms and risk factors. Specifically, the most recognised symptom and risk factor in the British study were 'blood in stools' (88.6%) and 'close relative with CRC' (65%). However, our study identified 'lump in abdomen' (56.5%) and 'daily eating of processed meat' (71.7%) to be the most recognised symptom and risk factor. The least recognised symptom in the UK study was 'bowel does not empty' (47%). On the other hand, 'pain in back passage' (22.5%) was the least recognised symptom in our study. 'Diabetes' was the least recognised risk factor in both studies and was recalled by only a quarter of the participants.[14] The level of education among our study population (43.6% had tertiary education) was higher than that of the UK study (25.6%). However, this observation did not reflect on the level of CRC awareness. Subsequently, the level of education may not be associated with the level of health literacy. The observed difference in the awareness might be explained by the relatively recent introduction of the national bowel cancer screening programme and awareness campaigns in Qatar. The programme is a population-based initiative that aims at promoting education, awareness and early detection of bowel cancer among those at risk (aged 50–74 years).[17] It is in line with the Public Health Strategy 2017–2022 that focuses on preventive and community-based care.[18]

Another survey in Malaysia, using the Bowel/Colorectal CAM tool, revealed lower CRC awareness in comparison to our findings. In the Malaysian study, the mean awareness scores for CRC symptoms and risk factors were 2.89 (SD ±2.96) and 3.49 (SD ±3.17).[19] This could be explained by the difference in the study settings and the characteristics of the participants. In our study, almost half (43.6%) of the participants reported having a tertiary level of education. On the other hand, the Malaysian survey was conducted in a rural area where only a minority of participants (6.6%) had attained a tertiary level of education.

The present study identified the female gender and formal education as significant predictors of higher CRC awareness. Such results are in line with findings of a regional study conducted in the United Arab Emirates.[20]

Table 5 The predictors of overall awareness of colorectal cancer among the study participants (linear regression) (N=448)

	Univariate linear analysis			Multiple linear regression	
Variable	Mean (SD)	Unadjusted difference in mean (95% CI)	P value	Adjusted difference in mean (95% CI)	P value
Age (years)					
50–59	9.44 (5.50)	Reference		Reference	
60 or more	8.50 (5.54)	−0.94 (−1.97 to 0.09)	0.07	0.33 (−0.74 to 1.41)	0.53
Gender					
Male	8.31 (5.80)	Reference		Reference	
Female	9.62 (5.19)	1.31 (0.30 to 2.33)	0.01*	2.52 (1.15 to 3.88)	0.001*
Nationality					
Qatari	7.30 (5.05)	Reference		Reference	
Non-Qatari Arab	9.99 (5.12)	2.68 (1.44 to 3.92)	<0.001*	2.91 (1.64 to 4.18)	<0.001*
Non-Arab	8.72 (6.40)	1.41 (−0.43 to 2.87)	0.05*	1.76 (0.28 to 3.24)	0.02*
Marital status					
Married	9.08 (5.63)	Reference		Reference	
Unmarried	8.73 (4.84)	0.35 (−1.17 to 1.87)	0.61	−0.62 (−2.13 to 0.88)	0.41
Level of education					
No formal education	6.01 (5.34)	Reference		Reference	
Primary	9.27 (4.80)	3.25 (1.62 to 4.88)	<0.001*	3.53 (1.85 to 5.23)	<0.001*
Secondary	9.42 (5.21)	3.40 (1.77 to 5.02)	<0.001*	2.97 (1.29 to 4.66)	<0.001*
Tertiary	9.81 (5.74)	3.79 (2.27 to 5.30)	<0.001*	4.10 (2.55 to 5.66)	<0.001*
Employment					
Employed	8.56 (5.89)	Reference		Reference	
Unemployed	9.47 (5.17)	−0.91 (−1.93 to 0.11)	0.08	0.79 (−0.62 to 2.20)	0.27

Dependent variable: overall awareness mean score. Enter multiple linear regression applied. Model assumption is fulfilled. No interactions and no multicollinearity were detected. R^2=14.0%.
*Statistically significant.

Another survey of more than 10 000 participants in Hong Kong revealed that male gender was associated with low CRC awareness.[21] On the other hand, a study in Saudi Arabia and a community-based survey in Jordan reported no significant association between gender and knowledge of CRC.[16 22]

The current study has strengths and limitations. First, the study was the first of its kind to evaluate CRC awareness and its predictors among the at-risk population in Qatar. The study achieved a high response rate (87%) and the sample included a variety of nationalities that represent the diversity of the community in Qatar. In addition, the use of a validated questionnaire through face-to-face interviews by trained data collectors strengthened the validity of the study results. However, the research has some limitations. First, we did not use the unprompted (open-ended) items of the CAM questionnaire to satisfy the study's objectives and due to time constraint. Second, we did not assess the participants' family history for CRC. Finally, the non-probability sampling method used in the study may affect the generalisability of the results.

CONCLUSION

In general, the awareness of CRC symptoms and risk factors was low among the at-risk (50–74 years old) population in Qatar. Specifically, the regression analysis showed males, Qataris, and those with no formal education had low awareness of CRC symptoms and risk factors. This underlines the importance of tailoring future educational campaigns that are relevant, specific (with focus on the male gender and those with low education) and are based on local evidence and effective engagement of the target population.

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Contributors AA-D conceived and designed the study. AA-D, MC, MB, MO and OA contributed to the recruitment of the participants and to the acquisition of the data.

AA-D analysed the data. NS and NA-K contributed to the design of the work and interpretation of the findings. AA-D and MC evaluated the results and wrote the manuscript. All authors revised and approved the final manuscript.

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