Knowledge and barriers to screening for colorectal cancer among individuals aged 40 years or older visiting primary healthcare clinics in Al-Khobar, Eastern Province

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Abstract:

BACKGROUND: Colorectal cancer (CRC) ranks third as the most common cancer in the world and the 4th most common cause of deaths from cancer. In Saudi Arabia, CRC is the most common cancer in males and the third most common in females. Early screening reduces the risk of CRC and death. However, there is a lack of awareness of CRC screening in Saudi Arabia. The objective of this study was to determine the knowledge, practices, and barriers to CRC screening using the Health Belief Model (HBM).

MATERIALS AND METHODS: This study enrolled Saudis aged 40 years or older visiting PHCCs in Al-Khobar. Data were collected using a self-administered questionnaire or a direct interview of the selected participants. Information sought included sociodemographics, past CRC screening, CRC knowledge, and HBM items. Data analysis was done using SPSS; the Chi-squared test and ANOVA were used to determine statistical significance.

RESULTS: A total of 206 of the individuals approached completed the questionnaire. The average age was 51.1 years, and 51% were males. Only 10% reported that a physician had provided information on CRC prevention or discussed/recommended screening for CRC, and 10% had undergone screening for CRC. Seventy-five percent of respondents had heard of CRC, and 74% said that CRC was preventable. Regarding the HBM, no significant difference in the mean scores for perceived susceptibility, perceived severity, self-efficacy, and benefits of CRC screening was found by age groups. The mean score for perceived severity was higher for females than males. About 60% of participants were extremely likely to have a screening test for CRC done on the day if recommended by the doctor.

CONCLUSION: The knowledge and awareness of CRC screening of the targeted sample is inadequate. Individuals with higher perceived susceptibility, severity of CRC, and perceived benefit of the screening tests were more willing to undergo the test. The highest perceived barrier was having no symptoms, and the lowest was "getting a stool test is too much of a hassle." These findings underline the importance of having a national screening program and campaigns to deal with the concerns of people and raise awareness of CRC.

Keywords:

Colorectal cancer, Health Belief Model, primary healthcare, Saudi, screening

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Introduction

Colorectal cancer (CRC) is a significant health issue, the third most commonly diagnosed tumor, and the fourth leading cause of cancer-related deaths worldwide.[1] CRC is ranked the third most common cancer in the Kingdom of Saudi Arabia,[2] the most common cancer in men, and the third most common in women.[3] Studies have shown that early screening reduces CRC morbidity and mortality.[3] Early pathology detection is crucial to preventing or lowering CRC incidence and associated mortality rates. Owing to the elevated risk and the long interval between the early and advanced stages, screening for CRC is the ideal compared to other cancers.[4]

One of the studies estimated that the additional years of life gained with the screening methods is 16–34 years with colonoscopy every 10 years and 17–33 years with annual fecal immunochemical testing (FIT).[5] Moreover, the reduction of the mortality rate varied from 8% to 16% for guaiac fecal occult blood test (FOBT), whereas for flexible sigmoidoscopy, it ranged between 21% and 30%.[6] Several studies indicate a consensus on the cost-effectiveness of CRC screening techniques.[7,8]

The compliance rates in Saudi Arabia are markedly lower; a study in Riyadh city showed that only 6.7% of persons aged 50–55 years had undergone any CRC screening.[9] Moreover, females were less likely than male participants to engage in CRC screening programs.[9]

Some studies conducted in Saudi Arabia to assess the knowledge of colon cancer screening and the barriers to CRC screening have shown a lack of awareness and knowledge of CRC screening.[10] Although primary health-care physicians have better knowledge of CRC and the importance of screening, a large percentage do not adhere to the CRC screening recommendations.[10] One study reported that the most common barrier in the Saudi population was the lack of physician recommendations and the absence of signs and symptoms.[11] In addition, the Saudi population has some misconceptions of the onset and offset of CRC screening and factors that increase the risk of CRC.[12]

A study using the Health Belief Model (HBM) reported that higher perceived severity and susceptibility to CRC and the knowledge of the guidelines are associated with the intention of screening in Saudi Arabia.[13] Another study showed that in Saudis, fear and embarrassment influenced the willingness to undergo CRC screening.[14] Being aware of CRC, having the motivation to be healthy, and acknowledging the perceived benefits, severity, and susceptibility were associated with a higher uptake of CRC screening.[15]

There is sufficient evidence of the lack of awareness of CRC and screening for CRC in the Saudi population. However, there is a lack of assessment of what the causes of the deficiency of knowledge and lower CRC screening might be. This study's aim was to determine individuals' knowledge, awareness, practices, barriers, and facilitators for CRC screening of Saudis using the HBM.

Materials and Methods

This cross-sectional analytical study was carried out in primary health-care centers (PHCs) in Al-Khobar from February to April 2023. The study population was all Saudis (both males and females) aged 40 years or older visiting the PHCs either as a patient or accompanying a patient. The inclusion criteria were all Saudis (both males and females) aged 40 years or older visiting the PHC. The individuals with a known diagnosis of CRC, cognitive impairment, hemorrhoids, or blood diathesis were excluded. Ethical approval was obtained from the Institutional Review Board (IRB) Vide Letter No.IRB-UGS-2022-01-402 dated 25/10/2022, and informed written consent was taken from all participants.

The sample size was calculated using an online sample calculator. Considering 22% compliance to FOBT and CRC screening reported by a previous study in Saudi Arabia,[16] 95% confidence level (alpha = 0.05), the calculated sample size assuming a 5% margin of error was 264.

Four PHCs in Al-Khobar were randomly selected. The persons (40 years or older) attending the selected PHCs were chosen through systematic random sampling (every third eligible person attending the clinic). A self-administered questionnaire was developed based on the HBM scale and validated questionnaires from two previously published studies.[14,17] The questionnaire contained five sections: demographic data, past medical history, CRC screening, CRC knowledge, and HBM items (barriers to CRC screening [9 items], perceived susceptibility [4 items], severity [4 items], self-efficacy [4 items], and benefits of CRC screening [5 items]). The HBM items were measured on a 5-point Likert scale, from "strongly agree" to "strongly disagree:" strongly disagree = 1 point, disagree = 2 points, neutral = 3 points, agree = 4 points, and strongly agree = 5 points. The questionnaire was first developed in English, translated into Arabic, and validated by two experienced faculty members. Reliability analysis was performed for each subscale of HBM, and the Cronbach's alpha for barriers, susceptibility, severity, self-efficacy, and benefits scales was 0.77, 0.75, 0.76, 0.87, and 0.93, respectively. The questionnaire was put on online Google Forms.

A pilot study was conducted on 30 individuals in one of the PHCs to assess the clarity and comprehensiveness of the survey. The 30 participants in the pilot study were included in the total study sample. The average time for completing the questionnaire was about 10 min, and no modifications were required.

After obtaining the consent of the participants, they each completed the online self-administered questionnaire using an iPad provided by the researchers. For the illiterate or those who had difficulty using the iPad, the questionnaire was administered in an interview by one of the researchers or data collectors. The participants received instructions on filling out the questionnaire.

Data were analyzed using the Statistical Package for the Social Sciences (SPSS) version 27.0 (Armonk, NY: IBM Corp.). The data for qualitative variables were displayed as frequencies and percentages, whereas mean, standard deviation (SD), and median were computed for quantitative variables. The Chi-squared test was used to determine the difference between categorical variables. Nonparametric tests were used to compare the scores for subscales of the HBM by independent variables; the Mann–Whitney *U*-test was used to compare subscale scores by age, whereas the Kruskal–Wallis test was used to compare scores by age, education, marital status, and current employment status. All tests were performed at a 5% level of statistical significance.

Results

A total of 206 individuals participated in the study by completing the questionnaire. The mean age was 51.1 years (SD = 8.52); 46% of participants were between 40 and 49 years, 36% were 50–59 years of age, and 51% were males [Table 1]. Most participants (90%) were married and had high school or higher education (83%). Forty-eight percent of subjects were employed (government job, private job, military service, or self-employed) and 52% were unemployed or retired. Regarding the monthly household income, 47% had a monthly income of SAR 10,000 or less, 17% had an income of SAR 10,000–15,000, and 36% had a monthly income of more than SAR 15,000. Fifty-nine percent of individuals had at least one chronic condition, the most common being hypertension (30%), diabetes (27%), obesity (18%), and arthritis (16%) [Table 1].

Only 10% reported that a physician had discussed the prevention of CRC with them, while the majority (81%) reported that no physician had discussed this with them [Table 2]. Only 10% of the participants reported that a physician had discussed or offered to screen them for CRC. In comparison, the majority (87%) reported that

Table 1: Sociodemographic characteristics of 40 years or older Saudis visiting primary healthcare center in Al-Khobar, February–April 2023

Characteristics	Frequency (%)
Age (years)	
40–49	94 (45.6)
50–59	75 (36.4)
60–70	32 (15.5)
70+	5 (2.4)
Mean±SD	51.1±8.52
Sex	
Male	106 (51.0)
Female	100 (49.0)
Education	
Illiterate	9 (4.0)
Primary school	14 (7.0)
Middle school	12 (6.0)
High school	49 (24.0)
Diploma	23 (11.0)
Bachelor's degree	83 (40.0)
Postgraduate studies (Master's or Ph.D.)	16 (8.0)
Marital status	
Single	6 (3.0)
Married	185 (90.0)
Widowed	8 (4.0)
Divorced	7 (3.0)
Current employment status	
Government-sector job	59 (28.0)
Private-sector job	29 (14.0)
Military job	2 (1.0)
Self-employed	10 (5.0)
Unemployed (e.g., homemaker)	59 (29.0)
Retired	47 (23.0)
Monthly household income (Saudi Riyals)	
<5000	41 (20.0)
Between 5000 and 10,000	55 (27.0)
Between 10,000 and 150,000	36 (17.0)
>150,000	74 (36.0)
Type of health coverage currently has*	
Public (Government-sponsored) health coverage	130 (63.0)
Private (employer-sponsored) health coverage	67 (32.0)
Self-sponsored (cash) health coverage	35 (17.0)
Have you been diagnosed with any of the following conditions?*	
None	85 (41.0)
Inflammatory bowel disease (ulcerative colitis or Cohn's disease)	8 (4.0)
diabetes mellitus	55 (27.0)
Hypertension	61 (30.0)
Arthritis	32 (16.0)
Stroke	0 (0.0)
Bleeding disorders	1 (0.5)
Obesity (BMI >30)	38 (18.0)
Cancer (please specify below)	9 (4.0)
Others	9 (4.0)

*Multiple responses possible. BMI=Body mass index, SD=Standard deviation

no physician had ever offered screening or discussed it with them.

Table 2: History of colorectal cancer screening among persons visiting primary healthcare centers in Al-Khobar, February–April 2023

History of colorectal cancer screening	N (%)
Has any physician discussed with you the prevention of CRC? (e.g., diet, physical activity, and healthy lifestyle)	
Yes	21 (10.0)
No	167 (81.0)
Not sure	18 (9.0)
Has any physician discussed/offered you screening for CRC? (e.g., stool test and colonoscopy)	
Yes	21 (10.0)
No	179 (87.0)
Not sure	6 (3.0)
Have you ever had any screening tests for CRC?	
Yes	20 (10.0)
No	184 (89.0)
Not sure	2 (1.0)
If yes, which one?*	
Colonoscopy or sigmoidoscopy	12 (60.0)
Stool tests (e.g., FOBT or FIT)	12 (60.0)
CT colonography	5 (25.0)
Not sure	-
Others	-
When did you last have this screening test?	
Within the past 12 months	9 (45.0)
Within the past 5 years	6 (30.0)
Within the past 5 years	2 (10.0)
>5 years ago	3 (15.0)
Not sure	-

*Multiple responses possible. FOBT=Fecal occult blood test, FIT=Fecal immunochemical test, CT=Computed tomography

A small proportion (10%) of the subjects reported having had a screening test for CRC. Among those who had a CRC screening test, 60% had undergone colonoscopy or sigmoidoscopy, 60% had had stool tests (e.g., FOTB or FIT), and 25% had undergone computed tomography (CT) colonography. Most participants (45%) had their last screening test in the past 12 months, while 30% had their last test in the past 2 years, 10% in the last 5 years, and 15% more than 5 years before [Table 2].

Regarding knowledge about CRC, 75% of respondents had heard about CRC, and 28% reported that CRC was common in Saudi Arabia [Table 3]. Twenty percent of the participants answered that CRC was more common in males, and 57% were unsure. Only 20% reported that CRC could occur without symptoms. When participants were asked to identify the symptoms of CRC, the most common correct responses were blood in the stool (21%), abdominal pain (16%), weight loss (14%), and loss of appetite (12.6%).

The most commonly reported risk factors were obesity (66%), low-fiber/high-fat diet (39%), and old age (31%). When asked about factors that reduced the risk of CRC, the most commonly reported factors were regular physical activity (55%) and a healthy diet (92%) [Table 3]. A good majority (64%) reported that CRC could be screened for or diagnosed early, and 82% reported CT colonography as one of the modalities for CRC screening. About 46% reported <40 years as the recommended age to start screening for CRC, while 43.2% and 6.3% responded that 40–49 years and 50–60 years were the ages at which screening for CRC should start respectively. Seventy-one percent responded that CRC was preventable [Table 3].

The study participants' beliefs about CRC screening according to HBM are presented in Table 4. The mean scores for various items for the "Barriers" subscale ranged between 2.53 and 3.5. The highest perceived barrier to CRC screening was "not having symptoms would keep me from having a stool blood test" (mean = 3.5, SD ± 1.11), and the lowest perceived barrier was "getting a stool blood test is too much of a hassle and embarrassing" (mean = 2.53, SD = 1.23).

The mean scores for various items of the "Perceived susceptibility" subscale ranged between 2.35 and 3.21. Regarding perceived susceptibility to CRC, the highest mean score was for the item "The thought of colon cancer scares me" (mean = 3.21, SD = 1.20), and the lowest mean score was for the item "I will get colon cancer sometime during my lifetime" (mean = 2.35, SD = 0.95) [Table 4].

The mean scores for various items for the "Perceived severity" subscale ranged between 2.8 and 3.2. Regarding the perceived severity of CRC, the item with the highest mean score was "If I had colon cancer, my whole life would change" (mean = 3.2, SD = 1.13), and the item with the lowest mean score was "If I developed colon cancer, I would not live long" (mean = 2.8, SD = 1.15) [Table 4]. The mean scores for various items for the "Perceived self-efficacy" subscale ranged between 3.8 and 3.85. In terms of self-efficacy toward CRC screening, the item with the highest mean score was "I can go to clinic/hospital and obtain a stool blood test kit" (mean = 3.8, SD = 0.83), and the item with the lowest mean score was "I can complete a stool blood test even if I do not know what to expect" (mean = 3.8, SD = 0.89).

All the items for "Benefits of CRC screening" had mean scores of 4.0 or higher. The item with the highest mean score was "Having a stool blood test will help me detect colon cancer early" (mean = 4.02, SD = 0.77), and the item with the lowest mean score was "Having a stool blood test will help me not worry as much about colon cancer" (mean = 4.0, SD = 0.81) [Table 4].

Table 5 shows the distribution of responses to each item of Barriers, Perceived Susceptibility, Perceived Severity,

Table 3: Colorectal cancer knowledge among persons visiting primary health-care centers in Al-Khobar, February–April 2023

Questions about CRC knowledge	Frequency (%)
Have you heard about CRC?	
Yes	154 (75.0)
No	44 (21.0)
Not sure	8 (4.0)
Is CRC common in Saudi Arabia?	
Yes	58 (28.0)
No	19 (9.0)
Not sure	129 (63.0)
CRC is more common in?	
Males	41 (20.0)
Females	10 (5.0)
Both are the same	37 (18.0)
Not sure	118 (57.0)
Can CRC occur without symptoms?	
Yes	45 (22.0)
No	43 (21.0)
Not sure	118 (57.0)
Which of the following are symptoms of CRC?*	
Blood in stool	89 (21.0)
Alternating bowel habits (diarrhea and constipation)	53 (12.4)
Abdominal pain	67 (16.0)
Weight loss	58 (14.0)
Loss of appetite	54 (12.6)
I do not know	105 (51.0)
Which of the following increase the risk of CRC?*	
Old age	64 (31.0)
Low-fiber, high-fat diet	82 (39.0)
Obesity	138 (66.0)
Inflammatory bowel disease (Cohn's disease and ulcerative colitis)	71 (34.0)
Family history of CRC	50 (24.0)
Low physical activity	57 (27.0)
Smoking	18 (8.0)
Alcohol	53 (25.0)
Diabetes	38 (18.0)
Obesity	38 (18.0)
Not sure	89 (43.0)
Which of the following decrease the risk of CRC?*	
Regular physical activity	114 (55.0)
Daily aspirin	9 (4.0)
Healthy diet	188 (92.0)
Maintaining healthy weight	86 (42.0)
Stop smoking	71 (34.0)
Not sure	66 (32.0)
Can CRC be screened for or diagnosed early?	
Yes	132 (64.0)
No	6 (3.0)
Not sure	68 (33.0)
What are the available screening tests for CRC?*	
Colonoscopy or sigmoidoscopy	83 (40.0)
Stool tests (e.g., FOBT or FIT)	72 (35.0)
CT colonography	168 (82.0)
Not sure	97 (47.0)
At what age is it recommended to start screening for CRC?	
<40	94 (45.6)

Contd...

Table 3: Contd...

Questions about CRC knowledge	Frequency (%)
40–49	89 (43.2)
50–60	13 (6.3)
Not sure	10 (4.9)
How frequently is it recommended to screen for CRC? (years)	
Every year	111 (54.0)
Every 2	31 (15.0)
Every 3	23 (11.0)
Every 5	28 (14.0)
Every 10	13 (6.0)
Do you think CRC is preventable?	
Yes	147 (71.0)
No	8 (4.0)
Not sure	51 (25.0)

*Multiple responses possible. FOBT=Fecal occult blood test, FIT=Fecal immunochemical test, CT=Computed tomography, CRC=Colorectal cancer

Self-efficacy, and Benefits subscales of the HBM. The proportion of participants who responded "Agree or Strongly agree" to each item in the "Barriers" subscale varied from 26% to 60% [Table 5]. The proportion of participants who responded "Agree or Strongly agree" to each item in the "Perceived susceptibility" subscale varied from 8% to 50%. The proportion of participants who responded "Agree or Strongly agree" to each item in the "Perceived severity" subscale varied from 24% to 48%. The proportion of participants who responded "Agree or Strongly agree" to each item in the "Self-efficacy" subscale varied from 67% to 74%. The proportion of participants who answered "Agree or Strongly agree" to each item in the "Benefits" subscale ranged from 76% to 80% [Table 5].

Table 6 presents the mean scores for the Barriers, Perceived Susceptibility, Perceived Severity, Self-efficacy, and Benefits subscales of the HBM. The mean score for the "Barriers" subscale was 3.1 (SD = 1.2), the "Perceived susceptibility" subscale had a mean score of 2.0 (SD = 1.1), and the mean score for the "Perceived severity" subscale was 2.8 (SD = 1.4). The mean score for the "Self-efficacy" subscale was 3.0 (SD = 1.5), and the "Benefits" subscale had the highest mean score of 3.9 (SD = 1.3) [Table 6].

No statistically significant differences in scores of the "Barriers" subscale were observed by age, gender, marital status, and education [Table 6]. Only the mean scores for the "Barriers" subscale were marginally significantly different by current employment status ($P = 0.071$). Regarding mean scores for the "Perceived susceptibility" subscale, only marginally significant differences were found by education ($P = 0.084$).

Statistically significant differences were shown for mean scores for the "Perceived severity" subscale by education ($P = 0.002$) and marginally significantly different by gender ($P = 0.075$) [Table 6]. The mean scores

for the "Self-efficacy" subscale significantly differed by education ($P = 0.031$). A significant difference in mean scores for the "Benefits" subscale was found by age. No other significant differences were observed [Table 6].

When asked, "If your doctor recommended that you do CRC screening test, how likely is it that you will do it today?," about 60% said that they would have the CRC screening test that day [Figure 1].

Discussion

The study was conducted on individuals aged 40 years or older attending primary health-care clinics in Al-Khobar, Eastern Province, Saudi Arabia. It sought to determine the awareness and knowledge of CRC screening and the history of screening tests using the HBM.

The incidence and mortality due to CRC has been increasing in Saudi Arabia and in younger individuals.[13] This trend underlines the fact that it is crucial to direct efforts toward early detection to lower its incidence and mortality rate. The United States Preventive Services Task Force has updated the guidelines to encourage CRC screening from 50 to 45 years old.

Numerous studies have assessed the knowledge and awareness of different age groups. Some studies targeted the previous guidelines for screening 50–75-year-olds or the general population and, therefore, those aged 18 years and above.[9,13,17,18] Our study targeted individuals aged at least 40 years, similar to the study conducted in Riyadh.[9]

Screening is a key measure to the early detection of CRC. It is as crucial as having sufficient knowledge about it. Compliance in both Eastern and Western countries is low. Despite the availability of free public health services, the compliance rate in Saudi Arabia is even lower.[13]

Table 4: Mean points for each item for the Health Belief Model scale for colorectal cancer screening among persons visiting primary healthcare centers in Al-Khobar, February– April 2023

Health Belief Model items by subscales	Mean±SD	Median	Minimum	Maximum
Barriers to CRC screening				
Not having symptoms would keep me from having a stool blood test	3.5±1.11	4	1	5
Not knowing how to do the test would keep me from having a stool blood test	3.0±1.98	3	1	5
Fear of finding something wrong would keep me from having a stool blood test	2.9±1.30	3	1	5
Not having enough time would keep me from having a stool blood test	2.72±1.22	2.5	1	5
Financial reasons, such as medical costs and health insurance, would keep me from a stool blood test	2.67±1.33	2	1	5
Not having a doctor's recommendation would keep me from having a stool blood test	3.42±1.29	4	1	5
Doing this test will not affect my chances of getting colon cancer	2.62±1.18	3	1	5
Getting a stool blood test is too much of a hassle and embarrassing	2.53±1.23	2	1	5
I have more urgent and important problems than having a stool blood test	3.2±1.21	3	1	5
Perceived susceptibility to CRC				
I will get colon cancer sometime during my lifetime	2.35±0.95	2	1	5
The thought of colon cancer scares me	3.21±1.20	3	1	5
I am afraid to think about colon cancer	3.01±1.18	3	1	5
As I get older, my chances of getting colon cancer increase	3.0±1.108	3	1	5
Perceived severity of CRC				
Problems I would experience with colon cancer would last a long time	3.0±1.05	3	1.05	0.07
Colon cancer would threaten a relationship with my spouse or loved ones	2.9±1.06	3	1.07	0.07
If I had colon cancer, my whole life would change	3.2±1.13	3	1.14	0.08
If I developed colon cancer, I would not live longer	2.8±1.15	3	1.15	0.08
Self-efficacy toward CRC screening				
I can go to the clinic/hospital and obtain a stool blood test kit	3.8±0.83	4	1	5
I can get the sample back to the clinic/hospital	3.85±0.80	4	1	5
I can complete a stool blood test even if I do not know what to expect	3.8±0.89	4	1	5
Even if I am worried about cancer, I will still get a stool blood test	3.8±0.91	4	1	5
Benefits of CRC screening				
Having a stool blood test will help me detect colon cancer early	4.02±0.77	5	0.77	0.05
Having a stool blood test will help me not worry as much about colon cancer	4.0±0.81	3.9	0.81	0.06
Finding colon cancer early means that the treatment might not be as bad	4.0±0.85	4	0.85	0.06
A stool blood test can enable me to reduce a burden to my family by detecting colon cancer early	4.0±0.80	4	0.8	0.06
A stool blood test can enable me to take care of my family by detecting colon cancer early	4.0±0.79	4	0.79	0.06

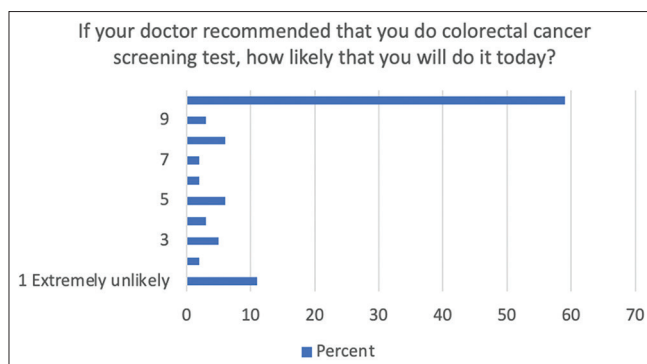SD=Standard deviation, CRC=Colorectal cancer

Figure 1: Likelihood to undergo colorectal cancer screening today if recommended by the doctor

Our study showed that 10% of the sample had had CRC screening; most had done stool tests (60%) and colonoscopy (60%). Another study in Saudi Arabia showed that 15.24% of their sample had had CRC screening, with colonoscopy being the most frequent method (72.73%) and the stool test used less frequently (13.94%).[13] Another study in Saudi showed that 13.2% of the sample had participated in CRC screening.[14]

Another study observed that many individuals with a family history of CRC were more willing to undergo CRC screening. Different factors contribute to the low levels of CRC screening, including the lack of awareness of CRC screening, individual fears, low recommendations from physicians, and low levels of expected help.[9] As reported in this study, approximately 59% of participants reported that they were "highly likely" to take a screening test for CRC if recommended by the doctor. They, the doctors, also have a substantial impact on changing the health beliefs of individuals as well as their behavior. Community health workers should act as the link between individuals with increased risks of CRC and health-care systems to enhance disease screening.[1]

The HBM serves as a guide to health promotion and disease prevention programs. The findings of this study

Table 5: Study participant's responses to each item for the Health Belief Model scale for colorectal cancer screening, Al-Khobar, February–April 2023

Health Belief Model items by subscales	Strongly disagree N (%)	Disagree N (%)	Neutral N (%)	Agree N (%)	Strongly Agree, N (%)
Barriers to CRC screening					
Not having symptoms would keep me from having a stool blood test	15 (7.3)	25 (12.1)	43 (20.9)	92 (44.7)	31 (15.0)
Not knowing how to do the test would keep me from having a stool blood test	27 (13.1)	49 (23.8)	44 (21.4)	69 (33.4)	17 (8.3)
Fear of finding something wrong would keep me from having a stool blood test	41 (19.9)	55 (26.7)	26 (12.6)	67 (32.5)	17 (8.3)
Not having enough time would keep me from having a stool blood test	38 (18.4)	65 (31.6)	33 (16.0)	57 (27.7)	13 (6.3)
Financial reasons, such as medical costs and health insurance, would keep me from a stool blood test	50 (24.3)	59 (28.6)	25 (12.1)	53 (20.8)	19 (9.2)
Not having a doctor's recommendation would keep me from having a stool blood test	25 (12.1)	29 (14.1)	29 (14.1)	81 (39.3)	42 (20.4)
Doing this test will not affect my chances of getting colon cancer	44 (21.4)	55 (26.7)	53 (20.8)	43 (20.9)	11 (5.2)
Getting a stool blood test is too much of a hassle and embarrassing	49 (23.8)	68 (33.0)	32 (15.5)	45 (21.8)	12 (5.9)
I have more urgent and important problems than having a stool blood test	23 (11.2)	33 (16.0)	62 (30.1)	56 (27.2)	32 (15.5)
Perceived susceptibility to CRC					
I will get colon cancer sometime during my lifetime	47 (22.8)	59 (28.6)	84 (40.8)	13 (6.3)	3 (1.5)
The thought of colon cancer scares me	21 (10.2)	42 (20.4)	41 (19.9)	76 (36.9)	26 (12.6)
I am afraid to think about colon cancer	24 (11.7)	51 (24.8)	49 (23.7)	62 (30.1)	20 (9.7)
As I get older, my chances of getting colon cancer increase	24 (11.7)	29 (14.1)	80 (38.8)	59 (28.6)	14 (6.8)
Perceived severity of CRC					
Problems I would experience with colon cancer would last a long time	14 (6.8)	47 (22.8)	78 (37.9)	48 (23.3)	19 (9.2)
Colon cancer would threaten a relationship with my spouse or loved ones	18 (8.7)	59 (28.6)	70 (34.0)	44 (21.4)	15 (7.3)
If I had colon cancer, my whole life would change	18 (8.7)	31 (15.0)	55 (26.7)	76 (36.9)	26 (12.7)
If I developed colon cancer, I would not live longer	35 (17.0)	46 (22.3)	74 (35.9)	35 (17.0)	16 (7.8)
Self-efficacy toward CRC screening					
I can go to clinic/hospital and obtain a stool blood test kit	2 (1.0)	13 (6.3)	38 (18.4)	115 (55.8)	36 (17.5)
I can get the sample back to the clinic/hospital	1 (0.5)	12 (5.9)	41 (19.9)	109 (52.8)	37 (17.9)
I can complete a stool blood test even if I do not know what to expect	4 (1.9)	17 (8.3)	36 (17.8)	112 (55.5)	34 (16.5)
Even if I am worried about cancer, I will still get a stool blood test	3 (1.5)	17 (8.3)	47 (23.1)	98 (48.0)	39 (19.1)
Benefits of CRC screening					
Having a stool blood test will help me detect colon cancer early	2 (1.0)	4 (1.9)	34 (16.5)	112 (55.5)	52 (25.1)
Having a stool blood test will help me not worry as much about colon cancer	2 (1.0)	7 (3.3)	40 (19.6)	106 (52.4)	49 (23.7)
Finding colon cancer early means that the treatment might not be as bad	3 (1.5)	10 (4.9)	30 (14.6)	111 (54.1)	51 (24.9)
A stool blood test can enable me to reduce a burden to my family by detecting colon cancer early	2 (1.0)	5 (2.4)	43 (20.9)	104 (51.0)	50 (24.7)
A stool blood test can enable me to take care of my family by detecting colon cancer early	2 (1.0)	5 (2.4)	41 (19.9)	108 (53.0)	49 (23.7)

CRC=Colorectal cancer

show significant marginal differences in the perceived severity scores based on gender, with females scoring slightly higher than males. A significant difference between age groups was seen for some health belief constructs (perceived benefits) ($P = 0.05$), which suggests that age may play a small role in the perceived benefits construct. However, there is no significant difference between age groups for the other constructs (barriers, perceived susceptibility, severity, and self-efficacy). Other results indicate no significant difference ($P = 0.637$) in the means of barrier scores at the different education levels.

There was a significant difference in the means of perceived severity ($P = 0.002$) and self-efficacy ($P = 0.0031$) scores at different education levels. However, a previous study showed that self-efficacy or seriousness is higher among

males than females.[18] On the other hand, there is no significant difference between the means of the barriers and benefits scores at the different education levels. This observation is concordant with a study conducted in Saudi Arabia, showing that neither sex nor educational level influenced the willingness to undergo CRC screening.[14] The study conducted in Turkey reported significant differences in barrier scores by education level; higher barrier scores were significantly associated with single participants and higher educational levels.[19]

The present study shows a marginally significant ($P = 0.071$) difference between the means of barrier scores in the different employment strata. Similar findings were reported in a previous study that found significantly higher barrier scores in students in working or retired participants.[19] Furthermore, no

Table 6: Comparison of mean scores for Health Belief Model subscales by sociodemographic characteristics of 40 years or older Saudis attending primary healthcare centers in Al-Khobar, Eastern Province, Saudi Arabia, 2023

Characteristics	Barriers		Perceived susceptibility		Perceived severity		Self-efficacy		Benefits	
	Mean±SD	*P*-value	Mean±SD	*P*-value	Mean±SD	*P*-value	Mean±SD	*P*-value	Mean±SD	*P*-value
Total	3.1±1.2		2.0±1.1		2.8±1.4		3.0±1.5		3.9±1.13	
Age (years)										
40–49	3.0±1.12	0.548	3.0±1.41	0.265	3.0±1.41	0.30	4.0±-1.4	0.668	4.0±-1.2	0.05
50–59	3.1±1.35		1.8±0.84		2.2±0.84		2.5±1.29		2.8±1.1	
60–69	2.9±1.32		2.9±1.18		3.0±1.14		3.6±0.96		4.0±0.78	
70 or above	3.0±1.3		2.9±1.12		2.9±1.13		3.7±0.92		3.9±0.9	
Sex										
Male	3.0±1.3	0.43	2.9±1.11	0.88	3.0±1.09	0.075	3.7±0.89	0.72	3.8±0.88	0.12
Female	3.0±1.31		3.0±1.18		2.9±1.18		3.6±1.0		4.0±0.85	
Marital status										
Single	3.2±1.29	0.746	3.3±1.35	0.136	3.3±1.27	0.184	3.6±1.08	0.588	4.1±0.93	0.476
Married	2.9±1.31		2.9±1.13		2.9±1.14		3.6±0.94		3.9±0.87	
Widowed	3.0±1.37		2.7±1.01		3.1±1.05		4.3±0.65		4.0±0.88	
Divorced	3.3±1.19		3.0±1.37		3.3±0.91		3.7±0.99		3.9±0.92	
Education										
Illiterate	3.1±1.45	0.637	3.1±1.2	0.084	3.6±1.2	0.002	4.2±0.94	0.031	4.1±0.77	0.45
Primary school	3.1±1.39		3.0±1.18		3.2±1.09		3.8±0.93		4.0±0.88	
Middle school	3.2±1.44		3.3±1.11		3.1±1.16		4.1±1.0		4.0±0.88	
High school	3.0±1.22		3.0±1.2		2.9±1.15		3.5±0.94		3.8±0.88	
Diploma	2.9±1.28		2.7±1.21		2.9±1.09		3.7±0.73		4.0±0.73	
Bachelor's degree	2.9±1.31		2.9±1.08		2.8±1.13		3.6±1.0		3.8±0.9	
Postgraduate studies (Masters or PhD)	3.0±1.32		2.9±1.17		3.3±1.01		3.7±0.8		3.9±0.86	
Current employment status										
Government-sector job	3.0±1.29	0.071	2.7±1.16	0.108	2.8±1.11	0.424	3.5±0.93	0.318	3.9±0.84	0.719
Private-sector job	2.8±1.34		2.9±1.15		3.2±1.1		3.7±1.05		3.8±1.01	
Military job	3.4±1.52		4.0±1.0		4.0±1.41		4.5±0.71		4.0±0.75	
Self-employed	3.2±1.2		3.0±1.06		2.9±1.2		3.5±0.82		3.6±0.67	
Unemployed (e.g., homemaker)	3.0±1.32		3.0±1.13		3.0±1.18		3.6±0.96		3.9±0.81	
Retired	2.9±1.3		3.0±1.14		3.0±1.11		3.8±0.89		3.8±0.92	

SD=Standard deviation

significant difference was found between the means of the dependent variables across the different marital status. A previous study carried out in Riyadh showed that though financial status was not a significant barrier to CRC screening in Saudi Arabia ($P < 0.001$), as 85.5% of all participants had medical insurance, the majority of them did not undergo CRC screening. Similar to our findings, the cost of the screening was not perceived as a barrier to screening for CRC in Saudi Arabia.[9,14] However, it was found that different factors, such as the fear of pain during colonoscopy (in 85% of participants), embarrassment of having FOBT (in 36% of participants), embarrassment of undergoing colonoscopy (in 71% of participants), and worry about the test results (in 65% of participants), were the main factors that led to poor compliance.[9] Another study done in Oman showed that several factors contribute to people's low participation in CRC screening; they also included embarrassment, anxiety, poor trust levels in health-care professionals, and religious and cultural beliefs. In contrast, the financial burden was a significant barrier to performing CRC screening in African Americans and Asian Americans.[20,21]

The perceived benefits of screening were found to have $P = 0.73$. Regarding the perceived seriousness and susceptibility, with $P < 0.001$ and $P = 0.004$, respectively, it was found that 47% of the participants were scared of thinking of the disease, and 14.5% only considered themselves at higher risk of having CRC despite their old age, from which we can infer that the population studied have limited awareness of this aspect of CRC. Males had significantly higher positive perception scores than females, $P < 0.01$.[9] The self-efficacy had $P < 0.00$.[9]

This study reported gaps in the study population's knowledge, awareness, and undergoing CRC screening. Although there are established benefits of CRC screening for early detection and prevention of CRC, the proportion of patients reporting that their physicians had discussed or offered screening for CRC and had ever been screened for CRC in the present study was very low. The reasons

for not undergoing CRC screening can be attributed to the absence of CRC symptoms and awareness of the importance of CRC screening. A systematic review on colorectal awareness in Saudi Arabia also reported poor levels of knowledge and awareness of CRC.[10]

Several studies indicate that patient screening behaviors are strongly influenced by primary care physicians' recommendations for screening.[9,22,23] Most of the sample (71%) responded that they were likely to undergo the CRC screening test if it was offered to them that day. Similar to a Saudi study, it showed that 73% of the sample was willing to undergo the CRC screening test.[13] In the current study, only 10% of participants reported that physicians had discussed the prevention of CRC, and 10% had been offered a CRC screening test. Likewise, a study in Saudi Arabia showed that FOBT and colonoscopy were recommended only to 26.5% and 12% of participants, respectively.[9] This observation raises concerns of physicians' recommendations as a barrier to CRC screening as assessed in the HBM. In our study, 39% of participants responded "Agree," and 21% "Strongly agree" to the item "Not having a doctor's recommendation would keep them from having a stool blood test."

Although a minority of participants (10%) reported that physicians had discussed with them CRC prevention or recommended screening for CRC, most (60%) were very likely to undergo screening tests immediately if recommended by the physician. This finding undergirds the point that physicians had significant roles in increasing the knowledge and awareness of CRC and the uptake of screening tests for CRC if recommended to patients. They also have a significant impact on changing the health beliefs and behavior of individuals.

The smaller sample, 206 compared to the calculated sample size of 264, could be the reason for not finding statistically significant differences between some groups. Generalizability is limited as the study had data from a single city in the Eastern province of Saudi Arabia. Therefore, the results may only be generalized to a similar population.

Conclusion

There is a knowledge and awareness deficit of CRC screening in the targeted sample. Individuals with higher perceived susceptibility, severity of CRC, and perceived benefit of the screening tests were more willing to undergo the test. There is a need to raise public awareness of CRC in Saudi Arabia through health education programs and awareness campaigns. Health-care professionals should not be hesitant in sharing their knowledge with their patients and should recommend CRC screening,

especially to those at higher risk of CRC. Future studies should do an in-depth exploration of the perspective of CRC screening by PHC physicians. These studies must evaluate the impact of a health education program on enhancing awareness of CRC and screening for CRC. Finally, we recommend that a national CRC screening program be initiated.

Conflicts of interest

There are no conflicts of interest.

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