MEDICAL SCIENCE

Awareness about Colorectal Cancer (CRC) among the primary health care attendees in Qassim province

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ABSTRACT

Background: As per the ministry of health statistics, among the non communicable diseases, cancers prevalence is increasing globally as well as in Saudi Arabia specially Colorectal Cancer (CRC). In our regular primary health care (PHC) practice, we also observed some patients with spectrum of various clinical presentation of gastro intestinal symptoms among adults. *Methodology:* A cross sectional study was conducted among the PHC attendees during the period from June 2021 to December 2022 among 379 sample. Data entered and analysed by using SPSS. Statistical tests like simple proportions, for categorical analysis chi square test, risk factors association with CRC, logistic regression analysis was applied. *Results:* In the current study, nearly fifty percent (50.9%) of the participants were having good CRC knowledge about common symptoms. Close to two thirds of the study population (69.5%) presented their perceptions as dietary factors, fast foods and oily foods for the causes of CRC. Also, 2/3rds (68.6%) were having knowledge about screening test for CRC. Regression analysis applied and shown significant association observed between risk factors of fast-food consumption, daily red meat consumption and physical inactivity with CRC knowledge respectively (P - 0.026, 0.012 and 0.004). *Conclusions:* Based on the results, relatively less CRC knowledge among the primary health care attendees. Nearly one third (35.6%) of people to undergo FOBE test for CRC. There is a need to increase awareness about risk factors and screening of CRC and reinforcement of existing awareness program. Need further studies to substantiate the present study findings in our population.

Keywords: Awareness CRC, common symptoms, risk factors, screening, Primary health care centres, Qassim Province.

1. INTRODUCTION

For the last two decades, there is increase of non-communicable diseases including all types of cancers in the globe. Of which, one of the common cancers of Colorectal Cancers (CRC) incidence and prevalence are increasing

trend was observed in all over the world, including in Saudi Arabia. As per the ministry health 2020 chronic disease registry stated that > 90 of cases of CRC above 50 years of age and also mentioned as CRC incidence as top ranked disease in the country. This gradual increase could be due to partly genetic and environmental factors. Colorectal Cancer (CRC) also known as colon cancer, bowel cancer or rectal cancer and cancer originate from the colon and some part of rectum (Bakry et al., 2021).

The incidence of Colorectal Cancers is increasing in Saudi Arabia and many studies identified as some of risk factors involvement for CRC, as low fibre diet intake, high fat, spicy and oily foods, more red meat consumption in their regular diets, non-adherence to screening program, other lifestyle factors and ignorance. In some studies, observed certain common symptoms presentation for CRC are as change in bowel habits, blood in stool, weight loss, lump in abdomen and fatigue (Sewitch et al., 2006; Di-Maso et al., 2013).

To reduce the Colorectal Cancer (CRC) in the community, need to adopt some screening program has been used to be a beneficial tool for preventing CRC through early identification and removal of premalignant adenomas and thus decreasing related mortality and morbidity of the disease. Some studies have shown that screening can reduce 53% decline in the rate of mortality due to CRC based on data from the United States. Screening strategies as per the United States Preventive Services Task Force (USPSTF) guidelines recommends screening for CRC high-sensitivity faecal occult blood testing (FOBT) annually or sigmoidoscopy every 5 years or full colonoscopy every 10 years and barium enema for adults between 50 and 75 years old (USPSTF, 2014).

A cross sectional rural based study conducted in multi-ethnic population residing at Perak state in Peninsular Malaysia among 2379 individuals using multi stage sampling method. This study revealed that among study participants, about warning signs and risk factors knowledge only 38% and 32% respectively (Su et al., 2013).

A national study was conducted in Saudi Arabia by Almadi and Alghamdi, (2019) highlighted about the acceptance of the public to undergo CRC screening and to explore potential barriers to CRC screening. This study revealed result as that on multivariate analysis, male gender was significantly associated with a higher probability of acceptance of screening (Almadi and Alghamdi, 2019).

A study conducted by Nasaif and Al-Qallaf, (2018) about risk factors of CRC and mentioned in their study as common symptoms of Colorectal Cancer such as changes in bowel habits in 46% and lower abdominal pain in 44%. The mean knowledge and standard deviation about the CRC were more in females and significant association was observed, comparatively males (Nasaif and Al-Qallaf, 2018).

The main aim of the study to identify the risk factors, knowledge and attitude towards Colorectal Cancers among the participants attending the primary health care centres. Also, to create awareness among the study population about CRC and the impact of the Colorectal Cancers in the community.

Objectives

To find the demographic factors in the study population and its associations with Colorectal Cancer knowledge

To determine the knowledge and attitude about Colorectal Cancers in the study population

To identify the risk factors and its association with Colorectal Cancer knowledge

2. METHODOLOGY

Target Population

All the participants attending at Primary health care centres aged 18 years and above population were included in the study.

Study design

Cross sectional study was conducted at primary health care centres in Qassim region.

Study Duration

One year from June 2021 to December 2022.

Sample size

The sample size was calculated by using the WHO statistical software for sample size calculator. Based on the knowledge on Colorectal Cancer was reported in a study conducted by Nasaif and Al-Qallaf, (2018) in Bahrain and study stated that 56% were aware about CRC. Same prevalence taken for sample size calculation as 56% with a 95% confidence interval and precision taken as 0.05. Based on the above parameters, the sample size estimate was 379.

Sampling Method

In Qassim, there are 155 primary health care centres are functioning as per the Qassim health cluster information. Of which 8% of the primary health care centres (13/155) were selected to conduct the study. Hence, 13 primary health care centres included in the present study which included the areas of Buraidah, Unaizah and Bukayriyah belongs to Qassim province. Selection of primary health care centres will be done by using simple random method. Based on the available sample frame in the primary health care centres appointments, patients accompanying persons selected from the waiting area. Interested patient attendants selected by a simple random method till our required sample completion at the primary health care centres.

Inclusion Criteria

Primary health care patient attendants aged 18 years and above.

Exclusion Criteria

Pregnant women and lactating women and patients' attendants known to have psychiatric illness were excluded.

Tool development

Based on some previous studies conducted at different parts of the country as well as international level studies. Variables were organized and validated with subject experts and also research experienced faculty opinions taken. After completion of the validation, pilot study was conducted on 30 samples which were not included in our main study.

Data collection procedure

Data was collected by interview method and questionnaire included 2 parts. First part dealt with demographic variables like age, gender, education and occupation. Second part of the questionnaire denoted with other knowledge and attitude questions related to Colorectal Cancer. Certain part of the questions was, heard about Colorectal Cancer and perceptions of the participant about CRC.

Knowledge on different factors like lifestyle factors, psychological factors and awareness about screening of Colorectal Cancers, interest about screening and knowledge about availability of treatment questions were included. Some knowledge questions about the common symptoms of CRC included in our study as blood in stool, weight loss and change in bowel habits, fatigue and lump in abdomen were classified as yes and no in our questionnaire. Out of 5 common symptoms, anyone participant answered 3 or more was considered as good knowledge and < 3 considered as poor knowledge.

For the female side data collection purpose, female data collectors were recruited. 1 day sensitization program was conducted for female data collectors. Method of collection of data explained and piloted with some sample under observation of principal investigator, then started collection of data from the participants by interview method.

Statistical analysis

Collection of data was entered, cleaned and analysed by SPSS. Simple proportions, means and standard deviations were calculated for continuous variables. For categorical analysis, the Chi- squared test was applied. For the risk prediction, logistic regression analysis was applied between the CRC knowledge and risk factors of CRC. The level of significance was considered as $P <$ or equal to 0.05.

Ethical considerations

After obtaining Institutional ethical committee clearance, study was initiated. The approval for the study was granted with number 1443-305484, dated on 20.09.2021 from regional ethics committee, Qassim, in accordance with national bioethics committee, Saudi Arabia. Before collection of the data, permission was also obtained from primary health care centres directors. Informed consent was taken and attached with each questionnaire. Privacy of the participant and confidentiality was completely protected.

3. RESULTS

In the present study, about 344 primary health care attendees participated. The study questionnaire distributed to 379 study participants and responded to our questionnaire was 344 and response noticed in our study was 91% (344/379). In the current study, the mean age and standard deviation was 44.45 ± 12.63. Almost 92% were Saudi nationals participated in the study? In the study population, nearly fifty percent (50.9%) of the participants were having good Colorectal Cancer knowledge about common

symptoms of CRC. About 77.9% (268/344) were married population in the current study. Mean family income and standard deviation in the study population was Saudi riyal 7944 ± 4151.53 and income range is 17500 SR per month.

Nearly 72% were heard about Colorectal Cancer in the study group. In the study population about 68.6% (236/344) were having knowledge regarding screening test is there for CRC. Of which, nearly 62.2% (214/344) were interested to undergo screening test for CRC. For the question of, is there any treatment for CRC, about 75.9% was mentioned as yes. For the preference of type of system of medication, about 58.4% were preferred allopathic system of medicine and 37.5% were preferred complementary and alternative medicine (CAM) system of medicine. Regarding attitude towards the CRC, more than one third (37.2%) gave response as not sure and only 28.8% were shown the positive attitude towards disease.

Mean body mass index (BMI) in the study population was 27.6 and range is 18 to 46 kg/metre^2. Independent t test was applied between the mean BMI and the Colorectal Cancer knowledge categories. There was no significant difference was observed between the CRC knowledge scores and BMI (Mean BMI and standard deviation among >60 score 27.87 ± 4.99 (n-175) and mean BMI and standard deviation in the < 60 score group 27.31 ± 4.84 (n-169).

Table 1 Demographic characteristics among the study population

Nationality	Number of participants	Percentage
Saudi	316	91.9
Non-Saudi	28	8.1
Age ± SD	44.45 ± 12.63	
Age Category: 18-30 years	59	17.2
31-45 years	124	36
46-60 years	124	36
> 60 years	37	10.8
Male	233	67.7
Female	111	32.3
Education -Illiterate	26	7.6
School	101	29.4
Diploma	80	23.3
Bachelor	130	37.8
PG and above	7	2
Unemployed	96	27.9
Housewives	69	20.1
Govt employee	112	32.6
Private employee	67	19.5
Total	344	100

Table 1 depicted that in the study population, about 67.7% were males. Close to half of the people (46.8%) more than 45 years of age group. Nearly two fifths of the people (39.8%) study participants bachelor and above degree education population. About one fifth (20.1%) of study population was housewives category.

Table 2 Perceptions of participants about the causes of Colorectal Cancer (CRC)

Causes of CRC	Yes	No
Dietary factors	239 (69.5)	75 (21.8)
Fast foods & oily foods	239 (69.5)	105 (30.5)
Low fruits	123 (35.8)	205 (59.6)
Low vegetables	139 (40.4)	205 (59.6)
Low fibre foods	114 (33.1)	230 (33.1)
Spicy foods	204 (59.3)	140 (40.7)
Daily red meat consumption	112 (32.6)	232 (67.4)

Table 2 stated that in the study population, about 69.5% of participants gave perceptions as causes for Colorectal Cancers mentioned as dietary factors, fast foods and oily foods. Nearly one third of the people (33.1%) gave response as low fibre foods for causing the Colorectal Cancer.

Table 3 Opinions about lifestyle factors and other factors frequency in relation to CRC among the study population

Lifestyle factors	Yes	No
Smoking	249 (72.4%)	95 (27.4%)
weight gain	187 (54.4%)	157 (45.6%)
Physical inactivity	188 (54.7%)	156 (45.3%)
Poor hygiene	140 (40.7%)	204 (59.3)
Psychological factors	212 (61.6%)	132 (38.4%)
Stress	184 (53.5%)	160 (46.5%)
Depression	152 (44.2%)	192 (55.8%)
Psychosocial factors	336 (97.7%)	8 (2.3%)
Poverty	96 (27.9%)	248 (72.1%)
Unemployment	61 (17.7%)	283 (82.3%)
Drugs	209 (60.8%)	135 (39.2%)
Chance	192 (55.8%)	152 (44.2%)
Health problems	220 (64%)	124 (36%)
Family history	222 (64.5%)	122 (35.5%)
Environmental factors	166 (48.3%)	178 (51.7%)
Pollution	161 (46.8%)	183 (53.2%)
Preservatives	197 (57.3%)	147 (42.7%)

Table 3 shown that the about 72.4% of study population opined that smoking as one of risk factor for causing Colorectal Cancer. Just more than half of the participants gave opinion as weight gain and physical inactivity as a risk factor for Colorectal Cancers 54.4% and 54.7% respectively. In the study group, about two thirds of the participants (64.5%) were answered as yes for family history and 64% for health problems as a risk factor for the CRC.

Table 4 Socio demographic factors association with Colorectal Cancer knowledge among the study population

Socio-demographic factors	CRC knowledge good (>60 score)	CRC knowledge poor (<60 score)	X^2 & P value
Male	110 (52.8%)	123 (47.2%)	X^2 – 3.874, P - 0.049, CI: 1.0 to 2.49
Female	65 (41.4%)	46 (58.6%)	
Saudi	156 (50.6%)	160 (49.4%)	X^2 – 3.51, P - 0.061, CI: 0.95 to 4.93
Non-Saudi	19 (32.1%0	9 (67.9%)	
Married	138 (48.5%)	130 (51.5%)	X^2 –0.187, P - 0.666, CI: 0.53 to 1.48
Single	37 (51.3%)	39 (48.7%)	

X^2: Chi square test, P: Probability value, CI: Confidence interval.

Table 4 shown that the 52.8% of males were having CRC knowledge > 60 score, whereas in females only 41.4% were having more than 60 CRC knowledge score. There was statistically significant association was observed between the male gender and CRC knowledge score ($P<0.05$).

Figure 1 depicted that in the study population about close to two thirds (67.4%) were chose the correct answer for lump in abdomen symptom and 64% were selected correct answer for blood in stool symptom.

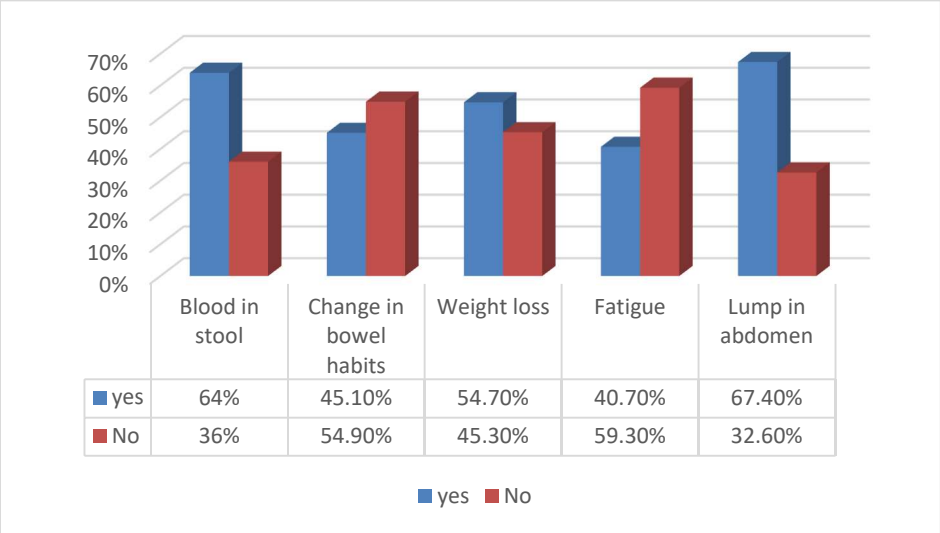

Figure 1 Perceptions of participants about common symptoms of CRC in the study

Table 5 Participants perceptions about the screening of CRC in the study population

Screening for CRC status	Yes	No
Know screening test for CRC (n-344)	236 (68.6%)	108 (31.2%)
Among yes, knowledge for screening test FOBE–stool sample (n-236)	84 (35.6%)	152 (64.4%)
Reasons for interest towards screening CRC (n-214)	Number	Percentage
Peace of mind	69	32.2
Physical fitness	64	30
Early identification	81	37.8
Reasons for not interested for screening CRC (n-130)	Number	Percentage
Shyness	1	0.7
Not accessible	6	4.6
Not aware	31	23.8
Acceptability	39	30
Fear About Procedure	25	19.2
Lack of time	4	3
Values/Culture/Religion	7	5.4
Other factors like age	11	8.5
Other factors like no symptoms of CRC	6	4.6

FOBE: Faecal occult blood examination

Table 5 stated that in the study population, about 236 (68.6%) were having knowledge about screening test for Colorectal Cancer. Among them, about 84 (35.6%) were interested to towards FOBE test. Nearly 37.8% were mentioned reason as early identification of the CRC. Regarding non acceptance of the screening test for CRC, nearly one third (30%) were mentioned as acceptability reason, 23.8% not aware and 19.2% were fear about procedure response given.

Table 6 Attitude of participants' agreement about CRC disease prevention and treatment status in the study population

Variables	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
CRC Prevention	5 (1.5%)	45 (13.1%)	80 (23.3%)	156 (45.3%)	58 (16.9%)
CRC curable	8 (2.3%)	72 (20.9%)	83 (24.1%)	147 (42.7%)	34 (9.9%)

Table 6 mentioned that the nearly two thirds (62.2%) of the study population clearly stated that their agreement for CRC prevention as agreed and above. For the context of CRC curable, about 52.6% were mentioned as agreed and above statement.

Table 7 Logistic regression analysis of risk factors of CRC in relation to knowledge about the CRC in study population

Variables	Categories	AOR	P value	Confidence interval
Fast foods	Ref. Cat: 1 (yes)	0.532	0.026	0.306 to 0.926
Low fruits	Ref. Cat: 1 (yes)	0.476	0.149	0.174 to 1.305
Low vegetables	Ref. Cat: 1 (yes)	1.015	0.976	0.388 to 2.654
Low fibre diet	Ref. Cat: 1 (yes)	0.686	0.159	0.406 to 1.159
Spicy Foods	Ref. Cat: 1 (yes)	0.840	0.494	0.511 to 1.383
Red meat	Ref. Cat: 1 (yes)	0.486	0.012	0.276 to 0.856
Smoking	Ref. Cat: 1 (yes)	1.084	0.771	0.630 to 1.866
Weight gain	Ref. Cat: 1 (yes)	0.707	0.161	0.436 to 1.148
Physical inactivity	Ref. Cat: 1 (yes)	0.491	0.004	0.301 to 0.800

Ref.cat: Reference category.

Table 7 regression analyses shown that there was statistically significant association was observed between the CRC knowledge and risk factors of fast-food consumption, daily red meat consumption and physical inactivity respectively (P-0.026, 0.012 and 0.004).

4. DISCUSSION

The present cross-sectional study was conducted at the selected primary health care centres of Qassim province during the period from the June 2021 to December 2022. As the primary health care centres address the most of the health problems and acts as frontline health care services to resolve basic health problems of the population and fulfils the needs of the community, as per ministry of health cancer registry 2020 shown the substantial increase of cancers globally including in Saudi Arabia. Common cancer of colorectal disease (CRC) identified and attributed the significant mortality and morbidity among the population and shown the prevalence of CRC including both genders 14.4% (Males 19.3% and females 9.2%).

In the current study, the mean age and standard deviation was 44.45 ± 12.63. Another cross-sectional study conducted in Ethiopia in the year 2021 mentioned that the mean age and standard deviation of the study population was 47.30 ± 17.81, which is close to our study finding (Hamza et al., 2021). A local study conducted in a Riyadh, King Saud University and study shown the mean age and standard deviation as 50.7 ± 9.8. On the whole mean age distribution depends upon the age criteria and participants enrolment (Alshammari et al., 2020). A study conducted in Saudi Arabia among participants in all the regions published in the year 2016 stated that age group selected in their study was 18 years and above and majority of participants were in younger age group (Alzahrani et al., 2016).

In our study, distribution of gender males: Females as 67.7% and 32.3% respectively. Almost close prevalence of males and females in an Aseer region study revealed as 64.7% and 35.3% (Al-Sharif et al., 2018) and other international study conducted in Malaysia among the Klang valley urban population mentioned as a contrast finding of males and females in their study as males 38.5% and females were 61.5% (Sindhu et al., 2019).

In our study nearly 72% were heard about Colorectal Cancer in the study group. We found in a study conducted in Kuwait among general population awareness about the CRC was 75.1% (Saeed et al., 2018). Another study in United Arab Emirates published in the year 2018 mentioned as awareness about CRC was 60% (Al-Abdouli et al., 2018). Relatively, low awareness (36%) was observed about CRC in a study conducted in Poland among the general population (Lewandowski et al., 2020).

In the current study population about 68.6% (236/344) were having knowledge regarding screening test availability for CRC. A study conducted in a population of Makkah about screening test for the CRC mentioned as 16.3% (Barasheed et al., 2020), in Riyadh study 47.2% (Alshammari et al., 2020) and in UAE study 33% (Al-Abdouli et al., 2018) which seems to be low. Very higher level of awareness (81.5%) about screening test for CRC was observed in a study conducted in Australia (Christou and Thomson, 2012). And little more percentage of 96% awareness about CRC was observed in a USA study published in the year 2012 (Brandt et al., 2012).

Among screening test acceptance people, about 62.2% of study group interested to go for screening test for CRC in our study. A study conducted in Riyadh, little more prevalence of 75% of study population interested to go for screening test for CRC, as Riyadh city is a capital and big city, obviously population as little more aware about the CRC screening (Alshammari et al., 2020).

In another domain of type of screening test, nearly 35.6% were shown interest to undergo faecal occult blood examination (FOBE) in our study. Close to same percentage of people interested for the screening test of FOBE in UAE population in their study

as 37% (Al-Abdouli et al., 2018) and study conducted in China mentioned about FOBE for CRC was 43% (Huang et al., 2021). Very low percentage of population (16.6%) interested to undergo the screening test of FOBE for CRC, conducted in all regions of Saudi Arabia study.

In the context of reason to undergo for screening for CRC, nearly 70% were mentioned reason as early identification and peace of mind for the CRC detection in the current study. A study conducted in Lebanon in the year 2019 and mentioned the reason for undergoing FOBE for CRC for early identification of the diseases was 55% (Tfaily et al., 2019). Very high percentage (94%) was noticed in the study conducted in United Kingdom among the different nationalities, as a reason of peace of mind in their open-ended questionnaire to undergo the screening test for the CRC (Robb et al., 2008).

Regarding non acceptance of the screening test for CRC in our study, 19.2% were given response as fear about procedure. A study conducted in Riyadh mentioned very low percentage (7%) of reason mentioned about fear to undergo the screening test for CRC (Alshammari et al., 2020). Also mentioned as an acceptability reason for screening in our study was 30% (39/130) and almost same percentage (29%) of acceptability reason of screening test for CRC was noticed in Ethiopian study (Mc-Alearney et al., 2008). A study conducted in Riyadh stated that as the high fat and low fibre diet combined represents as a 55.4% for CRC (Alshammari et al., 2020).

Nearly one third of the people 32.6% (112/344) gave response as daily red meat consumption in their diets causing the Colorectal Cancer opinion in our study. Other study conducted in Kuwait in relation to daily red meat consumption causing CRC mentioned as 37.2% (Saeed et al., 2018) and in a Qatar study among general population revealed as a daily use of red meat causes the CRC about 53.3% (Al-Dahshan et al., 2020).

About 72.4% of study population opined that smoking as one of risk factor for causing Colorectal Cancer in the current study. Almost similar percentage of smoking as a risk factor for getting the CRC in Ethiopian population mentioned as 78.2% (Hamza et al., 2021). Just more than half of the participants gave opinion as a risk factor for CRC was physical inactivity (54.7%) in our study. In Australia study Christou and Thomson, (2012) mentioned about three fourth of the study group (75%) revealed as a risk factor for CRC for the same risk factor. Also, a study conducted in China stated the as a risk factor for CRC for the same physical inactivity was about 56.1%, which is close to our study result (Huang et al., 2021).

Regarding common symptoms observed in the current study, about more than 2/3rd (64%) gave response as blood in stool as a common symptom for CRC. Little low percentage (46.9%) of blood in a stool as common symptom found in Qatar study (Al-Abdouli et al., 2018) and close to our study finding of blood in stool as a common symptom for CRC (65.3%) was observed in a Lebanon study (Robb et al., 2008). About 76% percentage of blood in stool as a common symptom for CRC was observed in China study (Huang et al., 2021).

Change in bowel habit as a common symptom was found in our study as 45.1% for CRC. A study conducted in UAE mentioned as a common symptom of altered bowel habits was observed in 55% of the study participants (Al-Abdouli et al., 2018). For the same symptom frequency in the Qatar study was 38.6% (Al-Dahshan et al., 2020) and more percentage was observed in Australia was 76.1% (Christou and Thomson, 2012). The different frequencies of common symptoms for CRC could be due to participants' knowledge, disease occurrence and geographical distribution of the diseases and its presentation of the symptoms.

Present study denoted that about 50.9% of the participants having good Colorectal Cancer knowledge based on five common symptoms. A study conducted in Bahrain observed good CRC knowledge about the same common symptoms of CRC was 59% (Nasaif and Al-Qallaf, 2018). Low levels of Colorectal Cancer knowledge of 26.6% among the population was observed in Jordan (Omran et al., 2015) and some European countries of Spain also noticed low awareness about CRC symptoms (Gimeno-Garcia, 2012). Other studies published in the year 2009 and 2011 in Spanish population also mentioned the knowledge range from 21% to 56% about CRC awareness at least one or more symptoms of CRC (Gimeno-Garcia et al., 2009; Gimeno-Garcia et al., 2011). The low CRC knowledge could be due to studies conducted decade ago, that may be a reason to have less CRC knowledge.

Some of the limitations observed in the study, as our study conducted among the primary health care visiting population, hence generalizability to whole population is not advisable because, those populations not visited to PHCC, will be having different knowledge levels for CRC. But our study finding will give alarm for the direction to improve CRC awareness among the population through our PHC services.

Need more similar studies in similar settings are required to substantiate our present study findings. During the data collection, we faced little difficulty in getting the sample from waiting area. Nearly 10 persons refused to undergo the study. Some persons not participated in our study due to their time constrains and also not interested about the research.

5. CONCLUSIONS

Based on the study findings, about two thirds (72%) of the study population heard about Colorectal Cancer awareness also identified in our study, near to fifty percent (50.9%) of study population having good knowledge about the common symptoms of CRC. Only one third of the population (35.6%) were aware about the faecal occult blood test (FOBE) used as a screening procedure for the CRC nearly two thirds of the study population were aware about dietary factors and smoking factors for CRC and one third of the people were aware about daily red meat consumption identified as a risk factor for CRC.

Recommendations

Based on the study results, there is a need to develop primordial preventive strategies for the awareness of risk factors and reinforcing existing awareness programs. Also, create awareness for high-risk population, to go for screening test as a secondary prevention step for early identification of CRC in our province, Saudi Arabia.

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Author Contributions

Thamer Saleh Tofail Alhassan involved from research idea, in the design of the study, data collection and writing of the manuscript. Chandra Sekhar Kalevaru contributed in all the steps of research process from the proposal of the study, reviewing and editing the manuscript and supervision.

Ethical approval for study protocol /Study design /Methodology

The study was approved by the Qassim Regional Research Ethics Committee at concordance with National Committee of Bio & Medical Ethics (NCBE), Kingdom of Saudi Arabia (ethical approval number: 1443-305484).

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Conflict of interest

The authors declare that there is no conflict of interests.

Data and materials availability

All data sets collected during this study are available upon reasonable request from the corresponding author.

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