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RESEARCH ARTICLE

ASSESSMENT OF KNOWLEDGE AND PERCEIVED BARRIERS ABOUT COLORECTAL CANCER SCREENING AMONG MINISTRY OF HEALTH PRIMARY HEALTH CARE PHYSICIANS IN MAKKAH AL-MOKARRAMAH CITY, 2016.

Dalia Awad Al-Johani[1], Ali Hammad Al-Zahrani[2] and Bakr Bakr Kalo[3].

1. Affiliation: MBBS, Family Medicine resident.
2. Affiliation: Family Medicine Consultant.
3. Affiliation: Family and Community Medicine Consultant , Public health department , Ministry of health.

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Key words:-
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Abstract

Background: Colorectal cancer is a widespread and lethal disease; it categorized fourth in the most common causes of cancer death. This study aimed to assess the level of knowledge and perception of colorectal cancer screening among primary health care physicians of the ministry of health in Makkah Al-Mokarramah city.

Method:a cross-sectional descriptive study conduct among primary health care doctors who worked in primary health care centers in Makkah Al-mokaramah during 2016.

Results: One hundred fifty doctors accepted to participate in the study of which 83 (55.3%) were female and 67 (44.7%) were male. Eighty-one (54%) had a bachelor degree, followed by 36 (24%) had Family Medicine board or equivalent, and 24(16%)had diploma certificates. There was 42 (28%) physicians had less than five years' experience. More than tow third reported that the recommended age to start screening is 50. Regarding the recommendations of the suitable screen test, the majority chose fecal occult blood test(90.7%), then colonoscopy (70.7%) followed by flexible sigmoidoscopy (64.0%). More than half 78 (52%) showed a reduced level of knowledge while only 25 (16.7%) showed the excellent level (more than 75%). The difference was significant, $p<0.001$.

Conclusion: This study shades light on the poor level of knowledge about CRC screening, among primary health care physicians. More educational and training program needs to be conducted for health providers. Further studies need to be carried out on larger sample size on a national base.

Introduction:-

Colorectal cancer (CRC) is a widespread and lethal disease; it categorized fourth in the most common cause of cancer death.(1,2)

Worldwide, CRC is the third commonly cancer in males and the second in females by 1.4 million new cases, and about 694,000 deaths occurred in 2012. Rates are significantly higher in men than in women.(3,4)

Corresponding Author:-Dalia Awad Al-Johani.
Address:-Affiliation: MBBS, Family Medicine resident.

Several studies indicate increasing in the rate of incidence by 2030 to 2.2 million and more and 1.1 million deaths. (5).

The impact of CRC differs greater than 10-fold with highest incidence rates are in high-income countries such as Australia, New Zealand, Europe, Canada, and the USA. It affects 30–50 people per 100,000 individuals. The rates are low in Africa and South-Central Asia where it affects 3–11 per 100,000 inhabitants. All of the above indicates that there is a relation between CRC and western lifestyle such as sitting lifestyle, Western diet, and smoking. (6,7,8) In the United States, the incidence and mortality have been gradually decreasing. In 2016.(8) In Kingdome of Saudi Arabia(KSA), according to the Saudi Cancer Registry 2013, There were 1387 cases of CRC representing 11.9% of all newly diagnosed cases in 2013. This cancer considers first in male population and third in female population. It affected 763 (53.1%) men and 651 (46.9 %) females with a male to female ratio of 113:100. The overall Age-standardized rate (ASR) was 11.7/ 100,000 and for women 10.1/ 100,000. (9).

The median age at diagnosis was 60 years among males (range 13-98 years) and 56 years among females (range 12-109 years). (9) Several studies that suggest increasing the incidence of CRC in Saudi around fourfold in both genders by the year 2030. (10)

The real cause of CRC is still unknown. However, there are several risk factors can affect on its incidences, such as family history, age, gender, chronic inflammatory bowel diseases, diabetes, heavy tobacco use, Low socioeconomic status, High-fat, low-fiber diets, a lack of physical activity and obesity. (8, 11)

Age is the primary risk factor for sporadic CRC. It is uncommon before the age of 40, and age-specific incidence rates increase in each subsequent decade after that. (12), where the median age at diagnosis is 68 in men and 72 in women for colon cancer, and it is 63 years of age in both gender for rectal cancer.(8)

The second main risk factor is gender, where CRC incidence rates are 30% higher in men than in women, and mortality rates are 40% higher. The precise reasons for this disparity are not entirely known. However, it could be a reflection of the differences in exposures to risk factors (e.g., cigarette smoking) and sex hormones, as well as complex interactions between these influences.(8) Although that CRC is one of the most common cancer worldwide, however, it is preventable cancer by screening, which decreases incidence and mortality of the disease. (1, 13)

Several guidelines were established to help in early detection of CRC and reduce mortality, from these guidelines:
1. American Cancer Society (ACS),
2. "The United States Preventive Services Task Force" (USPSTF),
3. American College of Physicians,
4. American College of Gastroenterology,
5. National Comprehensive Cancer Network,
6. "European guidelines for quality assurance in CRC screening and diagnosis." (14,15)

In 2015, Alsanea and colleagues put the first national guidelines for CRC screening in KSA. The Saudi Centre for Evidence-Based Healthcare formed a team of experts from the Saudi Society of Colon and Rectal Surgery, Gastroenterology Association, Oncology Society, the Chapter of Enterostomal Therapy, the Family Medicine and Department of Public Health at the Ministry of Health(MOH) and a patient advocate. This team worked with a methodological team from McMaster University, Canada to design the guideline. (2,16)

This guideline focused on the age of starting screening, the age to stop it and presented different detection methods, however, it didn't discuss the risk factors or how to deal with high-risk groups.(2,16)

All the guidelines and research demonstrated the importance of screening, where it helps in detecting any precancerous polyps-abnormal growths in the colon or rectum, so it can remove before transforming to cancer. (17,18) The recommended screening strategies in all guidelines for average-risk adults aged 50 years and older include the following: 1.High-sensitivity fecal occult blood test(FOBT) annually. 2.Flexiblesigmoidoscopy every five years. 3. A combination of high-sensitivity FOBT every three years and flexible sigmoidoscopy every five years. 4. colonoscopy every ten years. 5. Computed tomographic colonographyor(virtual colonoscopy) every five years. 6. It is reasonable to stop screening at age between 75 to 85 years at the latest.(2,19)

Patients who at high risk to recommend an earlier age (40 to 45years) screening for those who have:
1. A personal history of an adenomatous polyp or hereditary non-polyposis CRC, familial adenomatous polyposis.
2. The family history of the first-degree relative with CRC or advanced adenoma diagnosed at younger than 60 years or Two or more first-degree relatives with CRC or advanced adenoma at any age.

Inflammatory bowel diseases are causing pancolitis or longstanding (8 to 10 years) active disease.
Personal history of childhood exposure to abdominal radiation therapy.(2,19)

Several barriers may affect CRC screening such as the cost, shortage of insurance coverage, fear and discomfort of screening tests, lack of awareness by both the patient and the physicians, which mean that there is need to increase the awareness among them to make preventive services more efficient. The knowledge of primary health care physicians (PHCPs) is essential where the main role of is to provide CRC screening and other preventive services through health education, counseling, conducting screening tests, referring patients for advanced care, and follow-up care. It reported that PHCPs recommendation of CRS screening had a strong influence on patient's acceptances. Furthermore, the involvement of them in screening programs has been recommended by most guidelines. (1)

This study aimed to assess the level of Knowledge and perception of Colorectal Cancer screening among Ministry Of Health Primary Health Care Physicians inMakkah Al-Mokarramahcity,a and to determine the associated factors.

Methodology:-

A cross-sectional descriptive study conduct by the distribution of valid questionnaire among PHCPs working in the 81 PHCCs of the MOH in Makkah Al-Mokarramah city, during 2016.

Raosoft website calculated the sample size for sample size calculation. It was138 Physicians (based on an error of 5%, a confidence interval of 95% and a prevalence of 50%), By adding 10% (which equal 14) to compensate for non-responders and defaulters, the total sample size was estimated to be 152 physicians.

Data collection tool:-

The questionnaire was adopted from national cancer institute. It was revalidated by four consultants from family medicine and gastroenterology after some modifications have been made during the pilot study.

The questionnaire consists of five main parts:
1\ Demographics data: Gender, age, nationality, medical degree and years of working experience in PHC.
2\ Recommendations for CRC screening: include four selected tests: FOBT, flexible sigmoidoscopy, colonoscopy, and double-contrast barium enema.For each test, there were three questions(1- is the test recommended, 2- recommended starting age,3- recommended frequency of testing). In total they are 18 items, each correct answer was scored "1" and wrong answer as "0", the total score equal 18. The scores were categorized as poor knowledge (score0-8), adequate knowledge (score9-14), and perfect (score13-18). Passing score was equal 50% (9).
3\ CRC screening test and follow-up: availability of periodic health examination screening in PHCC, CRC screening, if physicians get any incentive for CRC screening, recommended initial follow-up test for a positive(FOBT, flexible Sigmoidoscopy, colonoscopy) and referral to other providers.
4\ Potential Screening barriers: contain a list of 9 barriers about the patient, system, and physicians. The doctors were required to put their opinion whether each is a major, minor, or not a barrier to CRC screening. Participants had a chance to state other obstacles to CRC screening that were not part of the list.
5\ Practice Characteristics: include number of physicians in center and frequency of patients seen per day.

Reliability:-

Cronbach's Alpha coefficient test was used to check the reliability of the questionnaire; it was 0.88 for knowledge and 0.90 for perceived barriers.

Study variables:-

a\ Dependent variables: Knowledge and perceived barriers About Colorectal Cancer Screening among Ministry Of Health Primary Health Care Physicians in Makkah Al-Mokarramah.

b\ Independent variables: age, gender, nationality, medical degree, Years of experience in primary care, the number of physicians in the primary care center and the average number of patients they see per day.

Data entry and analysis:-
Data analysis was done by using the Statistical Package for the Social Sciences (SPSS) statistical program version 22. For nonparametric data (frequencies and percentages) were used.While for parametric data (mean and standard deviation) used for description. Statistical tests such as Chi-square, T-test and other appropriate tests were used.P-value of less than 0.05 was considered statistically significant.

Results:-

Response rate:-
Out of 152 physicians, 150 accepted to participate in the study representing 98.6% response rate.

Out of 150 participants, 83 (55.3%) were female, and 67 (44.7%) were male, 86 (57.3%) were non-Saudis and the other 64 (42.7%) were Saudis. Around 98 (65.3%) were from age group 20-40 with mean age score 39.4±11 range (26-65).Of the participants more than half 81 (54%) had a bachelor degree, followed by 36 (24%) had Family Medicine board or equivalent and 24(16%)had diploma certificates. There was 42 (28%) physicians had less than five years' experience with mean score 9.7±7.6 range (1-31). **(Table 1)**

Recommendations for Colorectal Cancer screening:-
Fecal occult blood test:-
Regarding physicians recommendations to asymptomatic average-risk patients who have not screened for CRC, the majority 136 (90.7%) recommended FOBT. From them, 94 (69%) recommended starting it at the age 50 years and above, more than half 71 (52.3%) recommended repeat it yearly, while 40 (29.5%) recommended repeat it every 2-5 years. **(Table 2)**

Flexible sigmoidoscopy:-
Almost two-thirds of the physicians 96 (64%) recommended the Flexible sigmoidoscopy. The majority of them 71(74%) recommended starting it at the age 50 years and above. On the either hand 17 (17.7%) supported it before age 40. Sixty-two 2 (65%) recommended repeat it every 6-9 years, while 24 (24.7%) recommended repeat it every 2-5 years, only 8 (8.3%) physicians recommended repeat it yearly. **(Table 2)**

Colonoscopy:-
Around two-thirds of the doctors, 106 (70.7%) recommended Colonoscopy. The majority 89 (84%) recommended starting it at the age 50, and above. On the other hand, 10 (9.4%) recommended it before 40 years. Forty-six (43.4%) recommended repeat it every ten years, while 17 (16%) physicians recommended repeat it yearly. **(Table 2)**

Double contrast barium enema:-
More than half of participants 79 (52.7%) not recommended double contrast barium enema while 44 (29.3%) recommended it. The majority of them 30 (68.2%) suggested it at the age 50 years, and above while only 7 (15.9%) supported it before 40 years, 23 (52.3%) recommended repeat it every 6-9 years, while only 4 (9.1%) physicians recommended repeat it yearly. **(Table 2)**

other recommendations:-
The results showed that 76 (50.7%) physicians reported that it is reasonable to stop CRC screening at age 75 years and more. Regarding the require for guaiac FOBT, 52 (34.7%) stated three samples followed by 47 (31.3%) reported two specimens, 21(14%) recorded 1 sample while 30 (20%) did not know the number of samples. **(Table 3)**

CRC screening and follow-up activities:-
More than half 83 (55.3%) recommended colonoscopy an otherwise healthy patient as an initial follow-up for positive FOBT, followed by repeat FOBT 62 (41.3%). Almost two third 105 (70.3%) reported colonoscopy as the first follow-up in a patient with a positive, flexible Sigmoidoscopy, while 48 (32%) reported Repeat Colonoscopy as the first follow-up in a patient with a positive colonoscopy. Regarding the question of referring suspected patient to the hospital 85 (56.7%) reported referring to the surgeon while 55 (36.7%) reported gastroenterologist. **(Table3)**

knowledge score for CRC screening:-
More than half 78 (52%) showed an inadequacy level of knowledge (less than 50%) while only 25 (16.7%) showed the perfect level of knowledge (more than 75%). In 11 items out of 18 (61.1%) more than half answered, the right responded. However, there are two items which all of the participants answered them wrong (the age of starting

screening and the frequency of screening for double contrast barium enema). This difference was statistically significant, p<0.001. **(Table 4& Figure 1).**

Association between physicians` demographic and Knowledge about CRC screening:-
There was a significant association between medical degree and Knowledge about CRC screening, where physicians with Family Medicine board certified or equivalent had high knowledge mean score than physicians with family medicine diploma and doctors with general practice MBBS (10.4 ±3.14 vs. 8.5 ±3.6 vs. 6.6 ±2.8, p<0.001). On the other hand, there was no significant association between other demographic data (age, gender, nationality and years of experience in primary health care) and Knowledge about CRC screening.**(Table 5 & Figure 2).**

Potential barriers to CRC screening:-
The two largest barriers reported by 65.3% and 63.3% of the physicians were the lake of qualified providers to conduct both screening other than FOBT and follow-up with invasive endoscopic procedures respectively. Followed by patient fear of finding cancer (62.7%) then unclear policy or national guideline for CRC screening (61.3%).Lack of physician knowledge about CRC screening, patient embarrassment or anxiety about screening tests and lack of time were reported as significant barriers from (44.7%), (40%) & (30.7%) respectively. On the other hand, the last major barriers were PHCPs do not actively recommend screening to their patients (28.7%), and Patient beliefs screening is not effective (24.0%). **(Table 6 & Figure 3).**

Association between physicians` demographic and potential barriers to CRC screening:-
There was a significant association between gender and one potential barrier to CRC screening (Lack of physician knowledge about CRC screening), where female doctors reported it more than male physicians (76- 91.6% vs. 53-79.1%, p=0.029). On the other hand, there was no significant association between gender and the others potential barriers.Regarding age , there was significant association between age and two potential barriers to CRC screening (Patient beliefs screening is not effective, and Primary care physicians do not actively recommend screening to their patients because they think screening is not necessary), where the older doctors reported these two potential barriers more than younger physicians (64.3% vs. 76.1% vs100.0% , p=0.037) and (55.1% vs. 60.9% vs100.0% , p=0.030) respectively, while there was no significant association between gender and the others potential barriers . There was a significant association between medical degree and one potential barrier to CRC screening (Patient beliefs screening is not sufficient), where physicians with family medicine diploma reported this potential barriers more than other doctors (p=0.004), while there was no significant association between gender and the others potential barriers**.**

Regarding experience years, there was a significant association with three potential barriers to CRC screening, (Shortage of qualified providers to conduct follow-up with invasive endoscopic procedures. Lack of physician knowledge about CRC screening. And No clear policy or national guideline for CRC screening (p=0.029 , p=0.014 and , p<0.001) respectively. On the other hand, there was no significant association between experience years and the others potential barriers.

CRC screening performance &**clinical practice history of the participants:-**
Only 29 (19. 3%) of the physicians reported that there is a periodic health examination screening in their centers, from them only 3 (10.3%) reported CRC screening included in this regular health examination screening while 24(82.8%) not included it. Only 15 (10%) stated incentive for CRC screening. **(Table7).**

Regarding clinical practice history of the participants, the findings showed that more than half 85(56.7%) reported that the number of physicians including himself/herself in the center ranged between (2-10). Almost the quarter 37 (24.7%) recorded that the number of doctors including himself/herself is less than 5, while 28 (18.7%) reported that the number of physicians including himself/herself is more than 10. Almost two-third of the physicians 93(62%) reported seeing less than 50 patients during a typical week while 57 (38%) stated seeing more than 50 patients during a typical week. **(Table 7)**

Discussion:-

Cancer is an enormous public health problem. around the world CRC considers as one of the primary cancers affects both men and women, it can be prevented by early detecting and screening. (20)

PHC sectors and the health care providers working there are the in the first line of the defense against this cancer. (27) Several studies were conducted in KSA and demonstrated the importance of early screening. (1,20) This study aimed to assess the level of Knowledge about CRC screening and to identify socio-demographic factors associated with the Knowledge level among PHCPs of MOH in Makkah Al-Mokarramah city, 2016.

The results of the current study showed that more than half of physicians don't have an adequate level of knowledge about CRC, this consistent with other studies conducted in KSA & Jordan, which mean that many of the physicians were not up-to-date with information about CRC screening, the recommendations, and the guidelines. (1,13,20)

Regarding the comparison of knowledge levels and demographic data, there was significant association between medical degree and knowledge level where physicians with board certificates were more knowledgeable than others with diploma or bachelor, this consistent with Riyadh study, (1) and USA study.(23)

In the current study female physicians were more aware than male which consistent with Saskatchewan study, (28) and contrast Riyadh study. (1) On the other hand, older physicians with more than ten years of experience had the higher level of knowledge than younger and fewer experienced practitioners, this consistent with Saudi study, (1) and contrasted Saskatchewan study. (28)

Regarding the recommendation of the suitable screen test, the majority chose FOBT (90.7%). A similar result was found in Riyadh study (94.6%), (1) while it is higher than what reported in Oman study (54.1%). (23) These findings were indicating the increase in the number of physicians who preferred FOBT.

On the other hand, (70.7%) recommended the colonoscopy. In contrast in Riyadh study the majority chose colonoscopy (98.5%),(1) and in Oman study (82%) chose colonoscopy.(23) This could explain by looking at the barriers reported by the physicians where the main one was the shortage of training in performing endoscopic procedures .

In the current study 64.0% recommended flexible sigmoidoscopy, similar result was reported in Oman study (65.6%), (23) while in Riyadh study 94.6% recommended flexible sigmoidoscopy.(1)

More than tow third said that the recommended age to start screening is 50 and more, and half recorded stopping screening in age more than 75 years. These findings indicate that there is increasing the awareness among physicians about screening age to detect CRC early and reduce coast and mortality. Similar results found in Oman study (63.3% & 41.7%) for starting and stopping age respectively. (23) While in Saudi study 78.5% reported 50 years to start and only 14.6% recorded 75 years to pause. (1) In contrast, the results in Jordan study was lower (24.1% and 7.3%) for starting and stopping age respectively. (13)

More than half reported doing FOBT yearly, 43.4% recorded doing colonoscopy every ten years and less than quarter reported doing flexible sigmoidoscopy between 2-5 years. Similar results found in Riyadh study for FOBT and colonoscopy (53.1% & 43.8%). The rate of repeating Flexible sigmoidoscopy was higher (45.4%),(1) which indicates increasing in the number of physicians who followed the guidelines in the frequency of conducting the screening based on the modality used. On the other hand, the results in Jordan study was lower for all three times (15.1%, 10.3% & 3.4%). (13) Also in Oman study, 53.3% and 43.3% reported the right answers for FOBT and flexible sigmoidoscopy, while only 8.3% reported the correct answer for colonoscopy. (23)

One-third (34.7%) reported the need for three samples for FOBT; this is lower than the results from Saudi study (52.7%). (1)

Colonoscopy was the primary screening method to choose for follow-up after positive FOBT and flexible sigmoidoscopy (55% ,70%) respectively, which consistent with other studies that colonoscopy is the golden standard screening test. (1,13,20,23,25,29)

The findings of the current study are agreed with other studies and demonstrated the fact that physicians had good knowledge about the age of running CRC screening. However, there are varieties in the rate of specific knowledge about the frequency of screening and age to stop, this lake of knowledge work as a significant barrier to CRC screening .

Concerning the obstacles run the screening tests, the results showed that almost two third reported a shortage of training on others methods than FOBT, lack of training in endoscopy, no clear guidelines and patients' fears. Similar results were found in Saudi study (67.5%,62.8%,76.9% & 60.7%) respectively , (1) and in Jordan study (73%,66%,63% & 68%) respectively. (13) This finding highlighted the need for national guidelines, which physicians can be followed and never depend on their anticipation and suspicious, in Riyadh study, the results showed that practitioner's who followed USPSTF or CDC guidelines had better knowledge score than other who don't follow any instruction, (1)

In Oman study, the authors reported that physicians and nurses who had the perfect level of knowledge followed the guidelines recommendation and encouraged the patient to screen. (23) In the USA the practicing of CRC screening is good where 90-95% of physicians recommended screening as what the guidelines say.(29) In the USA The Clinical Guidelines Committee of the American College of Physicians (ACP) collected all the recommendation of CRC from 4 main guidelines and developed a guidance statement for clinicians. These guidelines are: " the joint guideline" prepared by the American Cancer Society (ACS) , the U.S. Multi-Society Task Force on Colorectal Cancer (USMSTF), the American College of Radiology (ACR) and "individual guidelines" prepared by the Institute for Clinical Systems Improvement (ICSI). (30)

In Saudi Arabia, Alsanea N and his colleagues conducted a study about the need for guidelines for CRC screening, where the Saudi Centre for Evidence-Based Healthcare created a team of experts from various official institutions and associations. This team worked together with McMaster University, Canada experts to develop national guidelines for colorectal cancer screening.(22)

Regarding the other barriers less than half reported patients embarrassment and the lake of time, which consistent with Malaysia study. (29) This barrier could be avoided by increasing training program to raise physicians skills in running screening test, also increase the level of knowledge will allow doctors to communicate with patients and help them in choosing the right decision and answer their questions without embarrassment feeling.

The response rate (98.6%) was higher than other similar studies in Riyadh, Saudi Arabia (76%), (1) Jordan (45.8%) (13)and Malaysia (87.9%). (29)

This high response rate means that there is a good representing the population and increase the ability to generalize the results and lowers the degrees of bias. Even with that, there is need to revise the survey to make it more concise and focus which helps in maximizing the response rate..

Limitations:-
There was a limitation in time and resources..

Conclusion:-

This study shades light on the level of knowledge about CRC, among PHCPs. There is increasing in the knowledge level about FOBT which consistent with the general trend to use it. There was a significant association between the knowledge level and medical degree, while there was no significant relationship between the knowledge level and gender, age and years of experience. The results showed a poor knowledge in several areas, particularly (frequency of testing, referral, and age to stop). The main barriers were a shortage of training with the absence of clear guidelines and patients fears.

The authors recommended the following:-

- More studies need to be run to determine the role of PHCPs in providing knowledge of CRC on the more large sample and a national base.
- Changing medical curricula to allow all medical students to have all the right information before graduating.
- Design and implement a more contentious medical education program for PHCPs with an emphasis on the importance of screaming to reduce the incidence of CRC.
- Facilitate the access internet and medical journal to allow physicians and health provider to improve their knowledge of the CRC and the new methods of screening, preventing and treating it.
- Design and implement more educational program campaigns to increase the level of awareness among the community.

- Utilize the media to increase the awareness of CRC screening.
- Improve service quality and increase the clinics responsible for screening and train the staff CRC screening.
- Apply for the nationally organized screening program.

Table 1:-Demographic data of the physicians (n=150).

Variables	N	%
Gender		
Male	67	44.7
Female	83	55.3
Age		
20-40	98	65.3
41-60	46	30.7
>60	6	4.0
Range	26-65	
Mean±SD	39.4±11.0	
Nationality		
Saudi	64	42.7
Non-Saudi	86	57.3
Medical degree		
Family medicine board certified or equivalent	36	24.0
Family medicine diploma	24	16.0
General Practice MBBS	81	54.0
Others	9	6.0
Years of experience in primary health care		
<5	42	28.0
5-10	39	26.0
11-15	38	25.3
>15	31	20.7
Quartile	4-13	
Median	8	

Table2:-Physicians` recommendations for FOBT (n=150)

Variables	(FOBT)		Flexible sigmoidoscopy		Colonoscopy		Double-contrast barium enema	
	N	**%**	**N**	**%**	**N**	**%**	**N**	**%**
Recommended Test								
Yes[a]	136	90.7	96	64.0	106	70.7	44	29.3
No [b]	11	7.3	35	23.3	35	23.3	79	52.7
I don't know	3	2.0	19	12.7	9	6.0	27	18.0
Recommended Starting Age								
<40y	28	20.6	17	17.7	10	9.4	7	15.9
40-49y	14	10.3	8	8.3	7	6.6	7	15.9
50y and more [c]	94	69.1	71	74	89	84	30	68.2
Range	30-60		35-70		30-65		30-70	
Mean±SD	48.0 ±5.7		48.8±5.8		50.4±5.7		49.4 ±7.3	
Recommended Frequency of Testing								
Yearly [d]	71	52.3	8	8.3	17	16.0	4	9.1
2-5y[e]	40	29.5	24	24.7	20	18.9	13	29.6
6-9y	23	16.7	62	65	23	21.7	23	52.3
10 y and more[f]	2	1.5	2	2.0	46	43.4	4	9.1
Quartile	1-3		3-5		2-10		2-5	
Median	1		5		5		5	

A:the right answere for the three tests (FOBT,Flexible sigmoidoscopy and colonscopy).
B: the right answer for Double contrast barium enema.

c: the right answere for the three tests (FOBT,Flexible sigmoidoscopy and colonscopy).
d: the right answere for FOBT test.
E:the right answere for flexible sigmoidoscopy test.
F: the right answere for thecolonscopy test.

Table3:- other recommendations for (CRC) Screening (n=150)

Variables	N	%
According to your knowledge, What is a reasonable age to stop CRC screening?		
75y and more	76	50.7
Range	25-80	
Mean±SD	66.8±13.5	
If you recommend a fecal occult blood test as a screening test for CRC ,How many samples require for guaiac fecal occult blood test?		
3 Samples	52	34.7
Which of the following is recommended to an otherwise healthy patient as an initial follow-up for a positive FOBT?		
Colonoscopy	83	55.3
in a patient with apositive flexibleSigmoidoscopy ,which of the following tests you recommend as an initial follow-up?		
Colonoscopy	105	70.3
in a patient with apositive colonoscopy, which of the following tests you recommend as an initial follow-up?		
Repeat Colonoscopy	48	32.0
If you decide to refer your patient to the hospital for further assessment of CRC, to which physician you will refer ?		
Internist (Gastroenterologist)	55	36.7

Table 4:-knowledge score for CRC screening (n=150)

Knowledge		N	%
Poor (less than 50%) Score (0-8)		78	52
Good (50-75%) Score (9-14)		47	31.3
Very good (more than 75%) Score (15-18)		25	16.7
Total		150	100.0
Mean±SD		7.8±3.4	
Chi-square	**X^2**	28.4	
	P-value	<0.001**	

Data are presented as number &percentage(%)
Comparison as done using Chi square test
**: p value significant less than 0.05

Table5:-Association between physicians` demographic and Knowledge about CRC screening

Variables		N	Knowledge			test value	P-value
			Mean	**±**	**SD**		
Gender	**Male**	67	7.746	±	3.723	T (0.320)	0.750
	Female	83	7.928	±	3.095		
Age	**20 - 40**	98	7.826		3.343	F(0.394)	0.130
	41 - 60	46	7.543		3.297		
	>60	6	10.50		4.037		
Nationality	**Saudi**	64	8.172	±	3.667	T(0.994)	0.322
	Non-Saudi	86	7.605	±	3.148		
Medical degree	**Family medicine board certified or equivalent**	36	10.417	±	3.138	F(13.788)	<0.001**
	Family medicine	24	8.458	±	3.599		

	diploma						
	General Practice MBBS	81	6.617	±	2.782		
	Others	9	7.000	±	2.828		
Years of experience in primary health care	**<5**	42	7.976	±	3.503	F(0.630)	0.597
	5-10.	39	7.231	±	3.207		
	11-15.	38	8.237	±	3.332		
	>15	31	7.968	±	3.535		

Data presented as number &percentage(%)
Comparison as done using independent t test (T) or one way ANOVE test (F)
**: p value significant less than 0.05

Table6:-potential barriers to CRC screening (n=150)

potential barriers	Major Barrier		Minor Barrier		Not Barrier	
	N	**%**	**N**	**%**	**N**	**%**
1. Patient fear of finding cancer	94	62.7	40	26.7	16	10.7
2. Patient beliefs screening is not effective	36	24.0	68	45.3	46	30.7
3. Patient embarrassment or anxiety about screening tests	60	40.0	76	50.7	14	9.3
4. Primary care physicians do not actively recommend screening to their patients because they think screening is not important	43	28.7	45	30.0	62	41.3
5. Shortage of trained providers to conduct screening other than FOBT	98	65.3	46	30.7	6	4.0
6. Shortage of trained providers to conduct follow-up with invasive endoscopic procedures	95	63.3	44	29.3	11	7.3
7. Lack of physician knowledge about CRC screening	67	44.7	62	41.3	21	14.0
8. No clear policy or national guideline for CRC screening	92	61.3	41	27.3	17	11.3
9. Lack of time	46	30.7	64	42.7	40	26.7

Table7:- CRC Screening test &Follow-up &Clinical practice history of the participants (n=150). (n=150)

Variables	N	%
Do you have periodic health examination screening in your center?		
Yes	29	19.3
Is it includeCRCscreening?		
Yes	3	10.3
Do PHCPs get any incentive for CRC screening?		
Yes	15	10.0
Number of physicians in the primary practice arrangement		
<5	37	24.7
5-10.	85	56.7
>10	28	18.7
Range	2-10	
Mean±SD	7.0 ±2.0	
Number of patients seen during a typical Week		
<50	93	62.0
50 and more	57	38.0
Range	10-100	
Mean±SD	45.0 ±17.0	

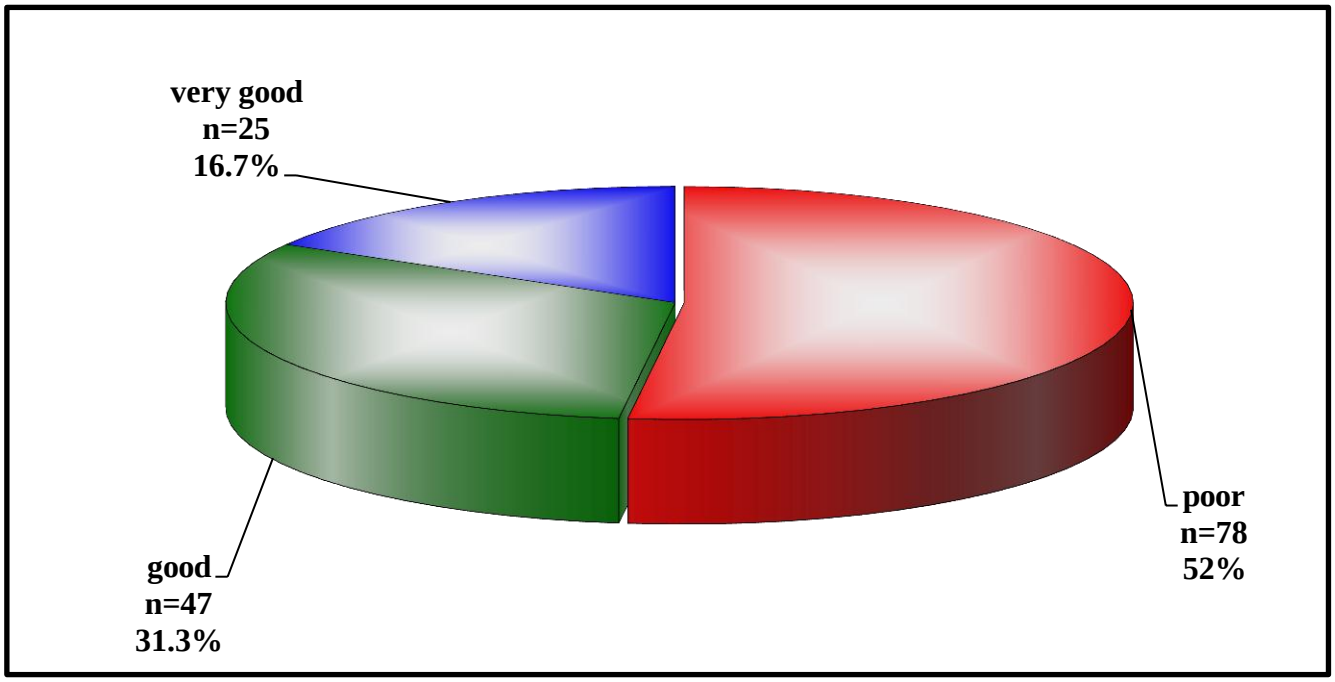

Figure 1:-knowledge score for CRC screening(n=150).

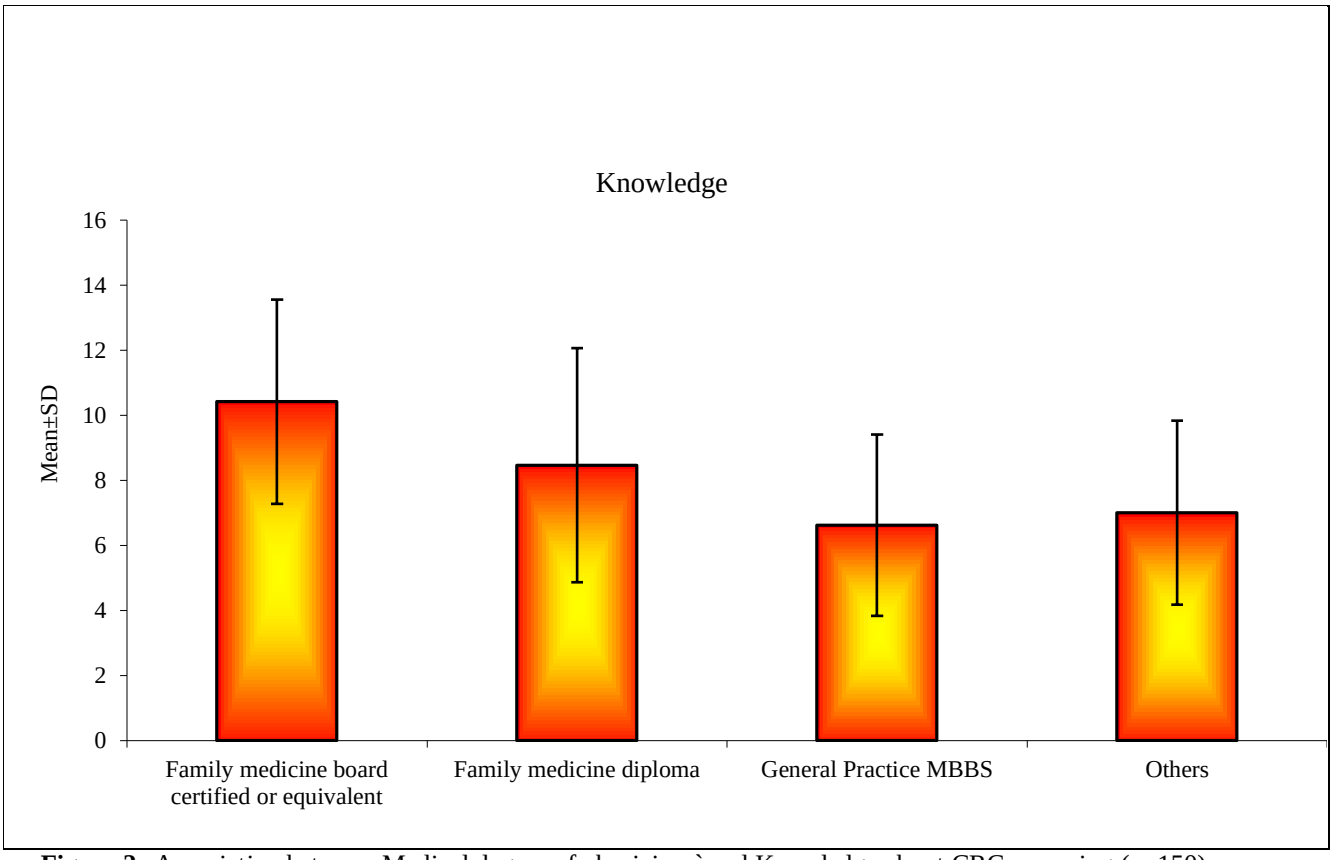

Figure 2:-Association between Medical degree of physicians` and Knowledge about CRC screening (n=150).

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