

ORIGINAL ARTICLE

PRACTICES, ATTITUDES AND PERCEIVED BARRIERS IN COLORECTAL CANCER SCREENING AMONG PRIMARY CARE PHYSICIANS IN KUWAIT: INSIGHTS FROM A CROSS SECTIONAL STUDY

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ABSTRACT

Colorectal cancer (CRC) poses a significant public health challenge in Kuwait, ranking as the second most common cancer. Despite its prevalence, Kuwait lacks established CRC screening guidelines, and public awareness remains low. The study, conducted as a cross-sectional survey in 2017, aimed to assess Primary Care Physicians' (PCPs) practices, attitudes, and perceived barriers to CRC screening. It involved 564 PCPs from Kuwaiti governmental primary care facilities who completed 14-page self-administered questionnaires. The response rate was 45%, with most respondents being female (52%), non-Kuwaitis (90%), and registrars (62.7%), with an average age of 43.3 years. All PCPs endorsed CRC screening, with colonoscopy (88%) and fecal occult blood tests (FOBT) (52%) being the preferred methods. Around 44% recommended both tests in the past year. Most PCPs (92%) had positive attitudes toward CRC screening effectiveness and claimed to have adequate time for patient discussions, despite citing patient non-compliance as an issue. PCPs noted encountering health system-related barriers. Female PCPs were more likely to recommend FOBT and colonoscopy screenings compared to males [OR: 2.1, CI (1.2-3.7), $p=0.011$], and PCPs from specific governorates were less inclined to order screenings compared to others [OR: 0.5, CI (0.3-0.9), $p=0.028$]. Public primary health clinic PCPs predominantly endorsed colonoscopy and FOBT. Further investigation is needed to understand why certain subgroups are less likely to refer patients for CRC screening. These findings emphasize the importance of promoting shared decision-making and addressing healthcare-related barriers to CRC screening in Kuwait.

Keywords: Colorectal cancer screening, Primary Care Physicians, Colonoscopy, Arab World, Kuwait

INTRODUCTION

Colorectal cancer (CRC) is a global public health issue, being the third most common cancer and the second leading cause of cancer death in both men and women¹. In Kuwait, in 2020 CRC was the second most common cancer (10.7%) after breast cancer and the second most common cause of death (10.7%) also after breast cancer for both genders². Among females the age-standardized (ASR) (world) incidence rate in 2020 was the second highest after breast cancer (11.9 per 100,000 population) and among males was also the second highest (13.1 per 100,000 population) after prostate cancer². The ASR mortality rate for both genders was 6.6 per 100,000 population, equal to the one of prostate cancer and lower than the one for breast cancer (17 per 100,000 population)². According to the 2016 Kuwait Cancer Registry Annual Report, of the 309 CRC cases in 2016 about 28.1% presented regional extension while 25.7% presented distant metastasis³. Based on a recent epidemiological study in Kuwait, obesity,

excessive red meat consumption and infrequent consumption of fruits/vegetables are factors associated with increased CRC risk in Kuwait⁴.

The United States Preventive Services Task Force (USPSTF) recommends screening for CRC among asymptomatic adults using a range of methods. This includes a colonoscopy every ten years from age 45 until 75 years⁵. Flexible sigmoidoscopy, which is an alternative screening method, is recommended every 5 years from age 45 to 75 years⁵. Other alternative noninvasive screening methods currently used worldwide include the Immunochemical Fecal Occult Blood (iFOBT) or Fecal Immunochemical Test (FIT). Recent clinical guidelines suggest a tiered system approach to screening. First-tier options include colonoscopy every 10 years or annual FIT for screening persons at average-risk for colorectal neoplasia⁶. For patients refusing colonoscopy and FIT, the second tier includes flexible sigmoidoscopy

every 5-10 years, or FIT-fecal DNA every 3 years, or Computed Tomography (CT), colonography every 5 years⁶. No specific CRC screening guidelines are given for patients >76, but screening decisions should be individualized based on medical history. The American Cancer Society (ACS) has similar recommendations as the USPSTF, except that age of screening initiation is 45 instead of 50⁷.

To date, no standard CRC screening guidelines have been established in Kuwait or the Arab world⁸. However, since 2015, the Kuwait Ministry of Health (MOH) launched a National Program for Early Diagnosis of Colorectal Cancer (NPEDCC) targeting Kuwaiti adults. All eligible asymptomatic adults visiting the MOH Primary Healthcare Clinics (PHCs) for reasons other than CRC are identified through the PHC computer information system and are invited to the program. While this national program has substantially increased CRC screening in Kuwait, the current participation rate among eligible adults remains low (5-17%)⁹.

Primary Care Providers (PCPs) are considered the gatekeepers of CRC screening globally, as they represent the first level of contact in a national health care system for individuals and their families¹⁰. The resulting patient-physician relationship can build trust and assist the patient in making informed decisions regarding her/his welfare¹⁰. Research has consistently shown that PCPs' direct involvement and a physician recommendation can enhance the patient's participation in CRC screening¹¹⁻¹⁶. Studies have shown that patient reminder systems¹⁷, use of electronic medical records (EMR)¹⁷, physician audit and feedback methods¹⁸, and patient navigation¹⁹, can enhance CRC screening. Moreover, recent studies have shown that a combination of practice-based strategies along with multi-factor interventions outside the clinical setting are effective in enhancing CRC screening²⁰⁻²¹.

Nevertheless, recommendation for CRC screening by the PCPs remains at a low level^{19,22}, which could be due to lack of knowledge and training, or mistrust in the effectiveness of CRC screening²²⁻²³. In Kuwait, studies have shown that there is a low level of public awareness of colorectal cancer screening. One study²⁴ found that among the general public of Kuwait, 75% had some knowledge of CRC. In another study, 40% of the research participants had no knowledge of CRC, 52% had never heard of CRC screening and 67% were not up to date with the recommended CRC screening guidelines⁹. Reasons for not getting CRC screening include the absence of symptoms, fatalistic attitudes toward cancer, the belief that arranging an appointment for CRC screening takes a long time, and the lack of physician recommendation (58%)^{9,25}.

Given the absence of standard national CRC screening guidelines in Kuwait, this study aims to assess how often PCPs in Kuwait recommend CRC screening to their eligible patients, what screening modalities they recommend, and their practice, attitudes, perceived barriers towards CRC and CRC screening. The information derived from this study can assist Kuwait and GCC public health professionals in the development of related policies, programs and guidelines to empower local PCPs to promote CRC screening through counseling and shared decision-making processes.

METHODS

Study design and setting

Kuwait is a small country in the Arabian Peninsula divided into 6 governorates, each offering medical services ranging from PHCs to a public hospital. Additionally, a specialized cancer treatment hospital, the Kuwait Cancer Control Center serves all governorates. There are currently 105 government-run PHCs in Kuwait that include 351 care units that encompass general health care, dental care, maternal/ gynecological care and preventive care. Among the 351 care units, 33 are dedicated to preventive care. In 2017 almost 20 million visits took place at the PHCs providing preventive medical services. Of these, 66% were Kuwaiti patients and 34% were Non-Kuwaiti patients. Besides the PHCs, Kuwait offers health care services through its six general hospitals, 13 specialized hospitals, 85 diabetic clinics and a number of private hospitals and medical centers²⁶⁻²⁷. The majority (60%) of the physicians who work in the government are expatriates²⁷. Public medical services in Kuwait are free to citizens; all non-citizens have access to health care services with heavily subsidized fee structures²⁷.

Sampling, recruitment, and data collection

This cross-sectional study was conducted at 44 randomly selected PHCs from the six governorates in Kuwait with PHCs (i.e Capital, Jahra, Ahmadi, Hawalli, Mubarak Al kabeer and Farwaniya), using a stratified random cluster design (stratified proportionately by governorate). At each sequentially selected PHC clinic, all physicians were invited to enroll in the study. Enrollment continued at successive clinics (within each governorate) and 255 responding participants were enrolled. The survey was distributed to consultants, senior registrars, registrars, senior specialists, and specialists in each PHC. The study target population included all PHC physicians at the ranks of Registrar, Senior Registrar, Specialist, Senior Specialist, and Consultant; and excluded the lowest rank, Assistant Registrar, as they are in the initial stage of post-graduate training and do not make decisions regarding CRC screening procedures

independently. Data collection occurred between December 2015 and November 2017.

Survey development

The 14-page survey is an adaptation of a validated publicly available survey developed by the US Centers for Disease and Control and Agency for Healthcare Research and Quality (OMB control number 0925-0562)²⁸ on both colorectal and lung cancer screening intended for PCPs. Some questions on the standard survey that are not applicable in Kuwait were removed, and other questions relevant to medical practice in Kuwait were added. The survey was pretested among 20 participants, who reported that the questionnaire was clearly understood. A copy of the survey can be found in the Appendix.

The survey consisted of three domains: a) demographic and professional development b) colorectal cancer screening beliefs, recommendations and general practice, and c) current practice of specific colorectal cancer screening modalities [fecal occult blood test (FOBT), flexible sigmoidoscopy, colonoscopy]. The questionnaire also covered barium enema, virtual colonoscopy, and fecal DNA testing. Three additional scales focused on exploring the psychosocial or cognitive factors that influence the PCPs' decision-making process of CRC recommendation. Two dichotomous dependent variables were created based on the question "During the past 12 months indicate the one screening test or a test combination that you recommended over others to your patients- check one box" accompanied by a scale of six possible answers "FOBT", "Sigmoidoscopy", "Colonoscopy", "FOBT and Sigmoidoscopy", "FOBT and Colonoscopy" and "Other test combination-specific". The first dichotomous variable was defined by combining all responses that contained the "colonoscopy" (value= 1) versus the rest of the answers which were grouped together and labeled "other options" (value=0). The second dichotomous variable was defined by the option "FOBT and colonoscopy" (value=1) versus the rest of the options which were combined and labeled "Other than FOBT and colonoscopy" (value=0).

The independent variables consisted of demographics, professional background, recent education or training in CRC screening, and psychosocial or cognitive variables (perceived influences on decision-making process, perceived patient related barriers, perceived lack of time to discuss CRC screening, and perceived healthcare system barriers). Perceived influences on decision-making were measured with six statements on a 3-point Likert scale which ranged from "not influential" to "very influential." Because of the variability of the state-

ments, we treated each item independently. An example of these statements is "How influential is clinical evidence in the published literature?"

The second set of psychosocial independent variables included the perceived patient-related barriers, which were measured with six statements on a 4-point Likert scale, ranging from "strongly disagree to strongly agree." The six statements were treated as a group and the mean score of all scores across all six statements served as the measure of perceived patient-related variables. An example of these statements is "My patients do not want to discuss colorectal cancer." Another separate item measured whether the physician had time to discuss CRC screening with the patients. The last set of cognitive variables, perceived healthcare system barriers, was measured with four statements on a 4-point Likert scale which ranged also from "strongly disagree to strongly agree." The mean score of all scores across the four statements measured the construct of "perceived barriers related to the health care system." An example of these statements is "There is a shortage of trained providers in my geographic area of practice to conduct screening procedures other than FOBT."

Statistical analysis

Statistical analyses were conducted using SPSS version 21 (SPSS. IBM Corp. Released 2012. IBM SPSS Statistics for Windows, Version 21.0. Armonk, NY: IBM Corp.). Descriptive analyses were conducted first on the demographic and cognitive variables of interest. Chi-Square tests were used to test significance and odds ratios with 95% confidence interval were used to explore associations between categorical variables. Independent sample t-tests were used to explore differences between cognitive variables in relation to the dependent variables. The cognitive variables were "perceived health systems related barriers" (mean score of four items), "perceived patient related barriers" (mean score of six items), "perceived physician's lack of time to discuss CRC screening" (only one item), and "perceived influence of factors on the recommendation for colorectal cancer screening" (four items treated separately).

The crude bivariate analyses found that none of the independent variables were associated with the binary dependent variable "recommendation of colonoscopy only" and only gender and Farwaniya governorate were associated with the binary dependent variable "recommendation of colonoscopy and FOBT." Therefore, one multivariate binary logistic regression model including gender and Farwaniya governorate was constructed for the dependent variable "recommendation of colonoscopy and FOBT."

We also performed additional t-tests of independence to explore further the relationship of the above demographic characteristics with the cognitive variables “perceived health system related barriers”, “perceived physician’s lack of time” “perceived patient related barriers” and “perceived influences of factors on recommendation.” The statistical significance level was set to $\alpha = 0.05$ for all association analyses.

Ethical aspects

The study adhered to the principles of the Declaration of Helsinki and was approved by the Kuwait Ministry of Health Standing Committee for the Coordination of Health and Medical Research (Ethics Committee) (Approval # 2015/302). All participants provided written informed consent for participation in the study.

RESULTS

Demographic characteristics

Among the 564 PCPs who were employed at the selected PHCs at the time of data collection and were invited to participate, almost less than half (45%) completed the survey. About half of the participants (52%) were females, and 82.6% were in the age group 30-59 years, with a mean age of 43.3 ± 11.3 (SD) years (range 25 - 70 years) (Table 1). The majority of the sample were non-Kuwaiti Arab physicians (77.6%) and 10.2% were Kuwaiti. Physicians of other nationalities (12.2%) included Pakistani (n=12), Indian (n=7), other nationalities (n=8). The majority (75.9%) of the physicians received their medical doctor (or equivalent) degree from other Arab countries, while a minority received their medical degrees from Asia (11.43%), Kuwait (8.6%), and Europe/North America (4.1%). PCPs worked in all five governorates with PHCs, however, over one-third (36%) of respondents were practicing physicians in Jahra, followed by 29% in Farwaniya. In addition, the majority (62.8%) of the respondents were registrars, followed by senior registrars (19%). Most of the respondents (57%) were board certified; in family practice (20.8%), internal medicine (16.1%), other board certification (20%); and 43.1% had no board certification. Only 39% had completed continuing medical educational on CRC screening.

Finally, 72% of the respondents had attended a recent training on CRC screening sponsored by the Ministry of Health (MOH).

CRC screening recommendations and practices

Among all 255 participants, 91% indicated that in the past 12 months they referred asymptomatic average-risk patients for CRC screening using any modality. The PCPs’ preferred modality or combination of screening modalities recommended over the past 12 months for an asymptomatic average-risk patient included FOBT plus colonoscopy (44.3%), followed closely by colonoscopy alone (42.4%) among the 210 who answered this question (Figure 1). A minority of respondents preferred FOBT or sigmoidoscopy in combination or alone. None indicated any other preferred option (Figure 1). In addition, a majority of the PCPs (87.6%) indicated that they routinely recommend colonoscopy (every 5 years starting from approximately age 45) and more than half of them (52%) routinely recommend FOBT on an annual basis starting from the age 45 (Table 2). However, only 40.7% (100 of 246 respondents) stated that over the previous 12 months they “usually” present either single or multiple CRC screening test options to their eligible patients; while 30.8% stated they did so “sometimes,” and 19.5% stated they “rarely” or “never” did so.

Among the 72% of participants who received a targeted training course on CRC screening provided by the MOH within the year before the study, 93.8% indicated that they had referred average-risk patients for CRC screening, compared to 87% of participants who had not received the training ($p=0.078$). The PCPs refer cases for colonoscopy mostly to gastroenterologists (84%) followed by surgeons (16%). Among those who state that they recommend FOBT (n=188), the majority (65%) indicated that they ask the patient to submit three FOBT cards at the Primary Health Care Center laboratory. In the event the FOBT is positive then the most frequent initial follow-up test is colonoscopy (96%). Around one-third of the physicians who practice FOBT said that there is a reminder mechanism in place to ensure that patients do return for their colonoscopy appointment. The most frequent mechanisms used include a reminder phone call (58%), inserting a note in the medical record during the patient’s next visit (57%), and a reminder card given to the patient (41%).

Table 1. Participant demographic and practice-related information

Variable	Frequency	
	N	(%)
Age, years		
25-29	10	(4.0)
30-39	112	(43.8)
40-49	56	(21.9)
50-59	43	(17.0)
60-69	33	(12.9)
70 and above	1	(0.4)
<i>Mean age ± SD</i>	43.3 ± 11.3	
Gender		
Male	119	(46.7)
Female	136	(53.3)
Governorate		
Capital	8	(3.1)
Ahmadi	32	(12.6)
Hawalli	51	(20.0)
Farwaniya	73	(28.6)
Jahra	91	(35.7)
Nationality		
Kuwaiti	26	(10.2)
Non-Kuwaiti/ Arab	198	(77.6)
Other	31	(12.2)
Clinical Rank		
Consultant	5	(2.0)
Senior Registrar	50	(19.6)
Registrar	160	(62.8)
Senior Specialist	8	(3.1)
Specialist	32	(12.5)
Board Qualification		
Family Practice	53	(20.8)
Internal Medicine	41	(16.1)
Other	51	(20.0)
No board certification	110	(43.1)
Completion of CME on CRC Screening		
No		
Yes	155	(60.8)
	100	(39.2)
Attended training on CRC		
No	72	(28.2)
Yes	183	(71.8)

SD: standard deviation; CRC: colorectal cancer; CME: continuing medical education

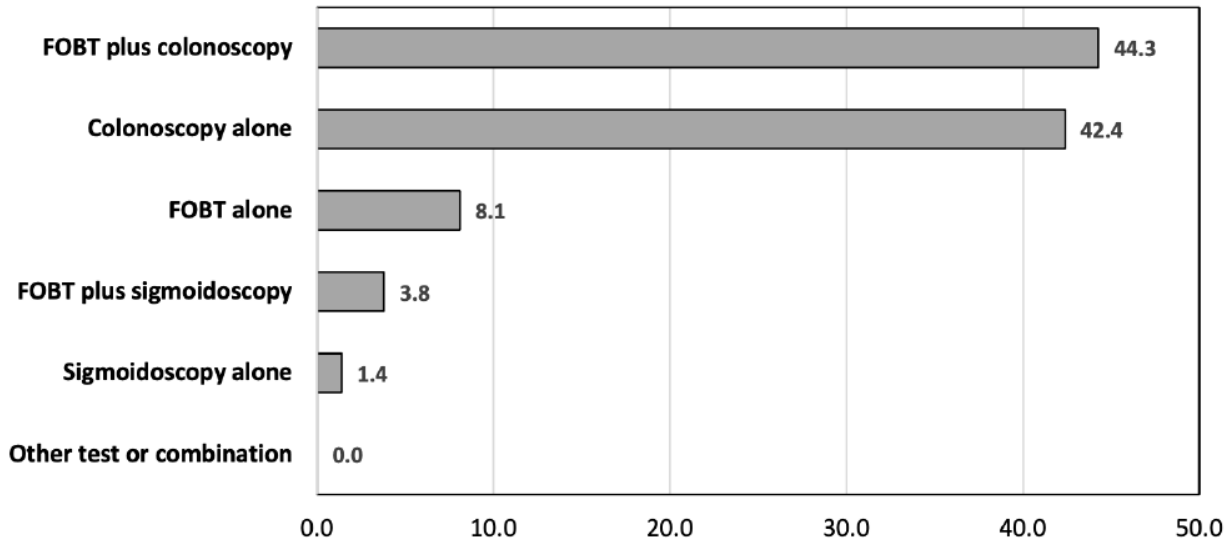


Fig. 1 Primary Care Physician Preferred Screening Modality or Combination (%)

Table 2. Screening Modalities (For Asymptomatic, Average Risk Patient) routinely recommended by governmental primary care physicians, 2017

Screening Modality	n with information	Modality Routinely Recommended N (%)	Recommended Starting Age (years) Mean \pm SD	Recommended Frequency (years) Median [IQR]
FOBT	255	133 (52.2)	45.1 \pm 4.5	1 [1, 4]
Flexible Sigmoidoscopy	253	79 (31.2)	45.3 \pm 5.0	5 [4, 5]
Colonoscopy	251	219 (87.6)	45.3 \pm 4.7	5 [5, 10]
Virtual colonoscopy	255	51 (20.0)	46.4 \pm 6.1	5 [3, 5]
Double-contrast barium Enema	255	35 (13.7)	46.7 \pm 4.9	5 [5, 5]
Fecal DNA testing	255	28 (11.0)	44.0 \pm 5.5	3 [1, 5]

SD: standard deviation; IQR: inter-quartile range [25th, 75th percentile]

PCPs’ beliefs regarding the effectiveness of CRC screening modalities

Most respondents (92%) believed that colonoscopy is a very effective screening tool for average-risk asymptomatic cases and average-risk patients ages 45 to 75 years (Figure 2). Guaiac-based FOBT and double-contrast barium enema were considered equally very or somewhat effective (both 69%). When asked specifically about colonoscopy, 77% strongly believed that it is the best available screening modality, and 55% of the respondents said that it is readily available for their patients (data not shown in Figure 2). The highest percentage of respondents indicated that they did not know the

effectiveness of fecal DNA testing (48.2%) and immunochemical FOBT (36.1%), and almost one-quarter reported that they did not know the effectiveness of the Guaiac-based FOBT (23.5%; Figure 2). In addition, when asked about the extent of several factors influencing their recommendations for CRC screening, the majority (80%) indicated that the Kuwait Ministry of Health’s policies and procedures was a very influential factor, followed by the ACS guidelines (60% stated this belief). The majority of the respondents (55%) also indicated that their patients’ preferences for colorectal cancer screening, was somewhat influential in their decision of CRC screening.

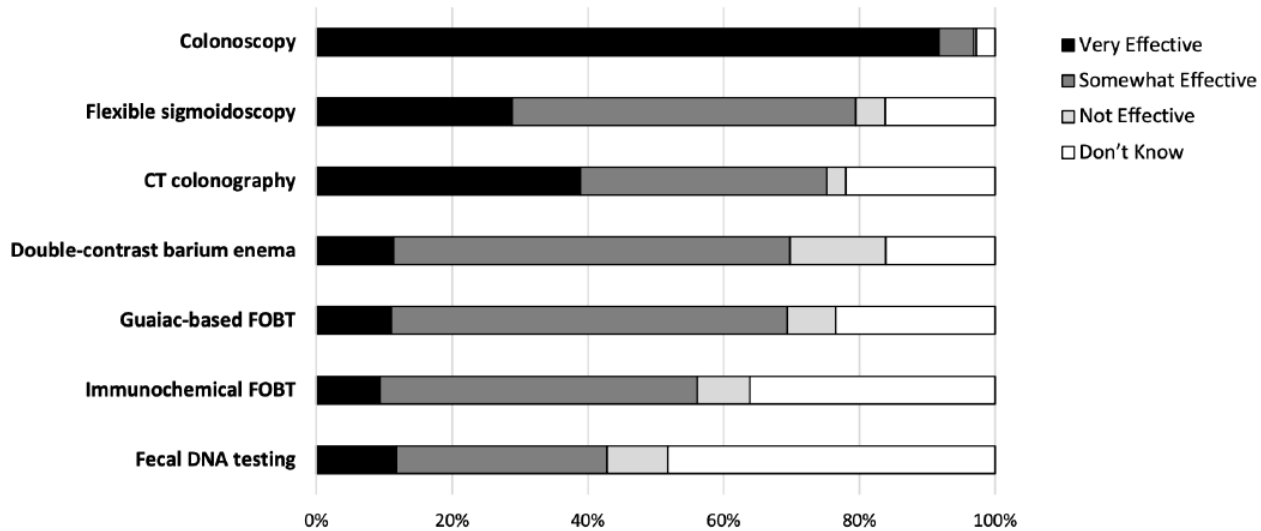


Fig.2 Primary Care Physician Perception of Effectiveness of CRC Screening Modality (%)

Perceived influences on CRC screening practices

The mean score for perceived influences on the PCPs’ screening practices on a scale from 1 (not influential) to 3 (very influential) was highest regarding the MOH policies and procedures (2.80), followed by the ACS guidelines (2.68) and clinical evidence in the medical literature (2.52; Table 3). Other influences such as availability of specialists, other colleagues’ practices and patient preferences ranked lower on the perceived influences of PCP screening practices.

PCPs’ perceived barriers toward CRC screening

The mean score for perceived barriers on a scale from 1 (strongly disagree) to 4 (strongly agree) was the highest regarding health care system related barriers (2.51), followed by patient related barriers (2.48) and physician’s lack of time to discuss CRC screening with their patients (2.32; Table 3).

Specifically, less than half of the respondents (40%) agreed with the statement they have insufficient time to discuss CRC screening with their patients. When asked about their patients’ views about CRC screening, the majority (62%) agreed with the statement that their patients are unaware of CRC screening, and that their patients do not complete the CRC screening tests they ordered for them (71 % agreed). There was a mixed response as to whether their patients perceive CRC as embarrassing or culturally unacceptable (52% agreed) and whether they perceive CRC as a serious threat (44% agreed). Only 40% agreed with the statement that their patients do not want to discuss the topic with them, and only 35% said that their patients have difficulty in understanding the information on CRC screening they present to their patients.

A majority of PCPs (71%) agreed with the statement that obtaining sigmoidoscopy or colonoscopy results

from the gastroenterologist was difficult, and that they experienced difficulty in ordering follow-up tests with invasive endoscopic procedures after a positive screening test (55%). About half agreed with the statement that there is a shortage of trained providers in their geographic area of practice to conduct screening other than the FOBT, whereas 47% agreed that it was difficult for them to obtain the FOBT results from the Public Health Center laboratory.

Relationship between certain demographics, cognitive variables and CRC recommendation

In a series of univariate logistic regressions between the dependent variable “recommendation of FOBT and colonoscopy” and each independent variable, none of the results were statistically significant besides those referring to gender and the Farwaniya governorate [OR: 1.99 CI (1.13-3.49), p-value=0.016; OR: 1.0.39 CI (0.16-0.940] respectively. Therefore, in a multivariate logistic regression model with the dependent variable “recommendation of FOBT and colonoscopy” only those two variables were included and according to the results the recommendation of FOBT and colonoscopy together was significantly more common among female PCP than male PCP [OR: 2.1 CI (1.2-3.7), p-value = 0. 011]. In addition, PCPs from the governorate Farwaniya were significantly less likely to order FOBT and colonoscopy as compared to PCPs who practice in other governorates [OR=0.5 CI (0.3-0.9), p-value = 0. 028]. Finally, no independent variables were associated on crude analyses with the dependent variable “recommendation of colonoscopy only.”

There was also a statistical significantly higher mean score for influence by the ACS on screening practice between those who recommend colonoscopy (mean score=2.79, SD=0.44) than those who

recommend other screening methods (mean score=2.60, SD=0.534; p=0.014). Regarding socio-demographic and professional factors associated with various barriers we found that registrars had a higher mean score for lack of time to discuss CRC screening with their patients (mean score=2.46, SD=0.78), compared with other physicians [(mean score=2.09, SD=0.78); p=0.001]. Moreover, physicians practicing in Farwaniya had a lower mean

score for perceived health system related barriers (mean score= 2.19, SD=0.80) as compared to physicians practicing in other governorates [(mean score=2.49, SD=0.70); p=0.004]. The combined patient-related or system barrier variables were not associated with other sociodemographic or PCP professional characteristics.

Table 3. Primary care physicians'perceived influences and barriers to CRC screening practices, Kuwait Ministry of Health (MOH).

Influences and Barriers	N with score information ^a	Variable Score		
		Mean	± SD	Median [IQR]
Perceived Influences^b				
Clinical evidence in the published literature	215	2.52	± 0.59	3 [2, 3]
Kuwait MOH policies and procedures	233	2.80	± 0.41	3 [3, 3]
American Cancer Society guidelines	193	2.68	± 0.50	3 [2, 3]
Availability of specialists to whom I can refer my patients for screening other than FOBT	221	2.46	± 0.66	3 [2, 3]
How colleagues in my practice or local community provide colorectal cancer screening for their patients	221	2.00	± 0.69	2 [2, 3]
My patients' preferences for colorectal cancer screening	220	2.18	± 0.62	2 [2, 3]
Perceived barriers^c				
Physician's lack of time	235	2.32	± 0.80	2 [2, 3]
Patient-related barriers (mean of six statements)	232	2.48	± 0.47	2.5 [2.2, 2.8]
Health system related barriers (mean of four statements)	231	2.51	± 0.50	2.5 [2.3, 3.0]

IQR: interquartile range (25th, 75th percentile). MOH: Ministry of Health. FOBT: fecal occult blood test. ^aThe option “not applicable” was coded as “missing” for calculation of influence scores. ^b Score range 1 to 3: 1, not influential; 2, somewhat influential; 3, very influential. ^c Score range 1-4: 1, strongly disagree; 2, disagree; 3, agree; 4, strongly agree.

DISCUSSION

Study aims to assess how often PCPs in Kuwait recommend CRC screening to their eligible patients, what screening modalities they recommend, and their knowledge, beliefs, and attitudes towards CRC and CRC screening. As the first level of contact in a national health care system, PCPs are considered the gatekeepers of CRC screening globally¹⁰. The natural patient-physician relationship in this setting can build trust and assist the patient in making informed decisions regarding her/his welfare, including CRC screening¹⁰. This study aims to shed

some light on how governmental PCPs in Kuwait practice CRC screening.

Over 90% of all PCPs who participated in the study at the Kuwait MOH Primary Care Clinics report that they have recommended CRC screening to their asymptomatic patients in the past 12 months with the majority utilizing the combination of colonoscopy and FOBT; but this was tempered with the finding that only 40.7% “usually” do so. Our findings are in contrast with a study of 130 physicians in

Saudi Arabia, which found that 56% were not practicing CRC screening at all²⁹. However, our findings were similar to a report among 171 physicians at a tertiary healthcare organization in Qatar, which found that 90.6% of physicians report that they recommend CRC screening to their patients, and 43.4% “always or often” do so³⁰. This variation in the results could be attributed to the methodological differences among these studies or the nature of the institutions and their patients.

The majority of the PCPs expressed a positive attitude toward the use of colonoscopy for CRC screening with almost all of them stating that colonoscopy is the most effective tool to diagnose colorectal cancer in asymptomatic patients, a finding supported by the literature²⁹. In addition, the fact that the MOH’s policies exerts the biggest influence on the PCPs’ decision-making underscores the important role that the MOH plays in the practice of CRC screening. Another influential factor appears to be the ACS guidelines, as PCPs who recommend colonoscopy were more likely to identify ACS guidelines as an influential factor, as compared with those recommending other modalities, a finding also supported by the literature²⁹. A majority of PCPs reported screening practices that generally adhere to the ACS recommendations, which include a FOBT test on an annual basis or a colonoscopy every 10 years from 45 to 75 years old. However, PCPs working in Farwaniya governorate were less likely to recommend CRC screening with the combination of FOBT and colonoscopy, compared to other governorates; whereas female physicians tend to recommend this combination more often than men, as supported by some other studies³¹. However, when the recommendation for “colonoscopy only” was considered, no difference by PCP gender or governorate was found. In comparison, a study in the nearby country Saudi Arabia²⁹, reported that male physicians order CRC screening more often than female physicians, providing a possible explanation that in Saudi Arabia female physicians are treating female patients almost exclusively, and they may tend to focus on the more common cancers among women such as breast and cervical cancer. More qualitative research, including observations and interviews, is needed to find out why physicians from these subcategories tend to recommend CRC screening more or less frequently.

Another encouraging finding is that the majority (60%) of the PCPs do discuss CRC screening with their patients. Interestingly enough, registrars are less likely to discuss CRC screening with their patients because of lack of time. This finding is supported by another regional study in Qatar that showed that there is a clear increase in the reported referrals for CRC screening as the training years or the years of experience of the physician increases³⁰.

However, the fact that over 90% of physicians reported that they refer patients for CRC screening while only 60% reported discussing CRC screening with patients, suggests that one-third of referrals are made without discussion with the patient. Focused qualitative research is needed to assess why the other 30% of the PCPs making referrals do not discuss CRC screening at all with their patients; and how the clinical rank of the physician might play a role in discussing CRC screening with patients. This finding reinforces the importance of PCPs as gatekeepers in promoting CRC screening. Studies in the US have clearly demonstrated the positive impact of physicians’ recommendation on CRC screening^{13,14,33}.

A plethora of evidence shows that by implementing shared decision-making patients gain more confidence in their decisions, and they are more active in implementing those decisions³⁴. Future research in Kuwait among PCPs - particularly qualitative research methods - can help us identify practical solutions in promoting shared decision-making including developing related trainings and by enacting health care policies that incorporate shared decision-making in the clinical workflow especially through the electronic health records system. Emphasis should also be put on providing related training to medical students in Kuwait. It will be difficult though to change the current cultural norms of a top-down approach in the clinical decision-making process, especially when the topic of discussion relates to cancer, which carries a substantial degree of stigma in the local culture.

Besides promoting shared decision-making other strategies can be used to enhance CRC screening participation. A combination of practice-based strategies such as the use of electronic medical records, patient reminders, generation of lists of patients overdue for CRC screening, audit and feedback reports are associated with CRC screening participation²¹. It will be interesting to find out which of the above strategies are currently being implemented or could be implemented at the governmental PCPs’ offices to assist them while recommending CRC screening to their patients. Regarding the perceived patient related barriers, most respondents believed that their patients are unaware of CRC screening, as supported by literature in Kuwait^{9,24}. Moreover, according to the PCPs some of their patients are reluctant to do CRC screening due to cultural or embarrassment-related issues, a finding also supported by literature²⁵. In addition, one in three patients according to the PCPs, do not understand the information they receive on CRC screening, and almost 3 out of the 4 PCPs agreed with the statement that patients do not complete the colorectal cancer screening tests for which they are re-

ferred to, despite the use of a patient reminder system. This avoidance behavior could be due to underlying fear toward colonoscopy. Future research is needed to assess the reasons for this observation by the physicians by asking the patients directly on their views regarding CRC screening.

Finally, most of the PCPs agreed that they experience difficulties in obtaining the colonoscopy results from the gastroenterologist, and in ordering follow-up tests. They also suggested that there is a shortage of trained PCPs who can do CRC screening besides the FOBT. This finding is not surprising since health care-system barriers in CRC screening have been reported in studies from other countries^{11,35}. More qualitative research is needed among PCPs and health care administrators to assess how to better strengthen the existing communication system especially though the use of electronic health records. It was also interesting to see that the PCPs from the Farwaniya governorate tended to agree that they experience less barriers than the PCPs from the other governorates. This finding is in contrast with an earlier finding that states that PCPs from Farwaniya were less likely to order FOBT and colonoscopy as compared to PCPs who practice in other governorates. More qualitative research is needed to find out about CRC screening practices in Farwaniya.

Study limitations

Although the study used a random cluster sample design, the response rate was low, therefore, some caution should be used when generalizing to all the population of MOH PCPs in Kuwait since a selection bias could have resulted. Additionally, the sample did not include PCPs who work in the private sector and therefore the results should not be generalized to that population. Lastly, the standard CDC/AHRQ questionnaire does not explore physician's knowledge and perceptions regarding the issues of potential harm from overdiagnosis, false-positive, and false-negative results. These issues also can be addressed in the follow-up qualitative research studies.

CONCLUSIONS

This study reveals a critical need for comprehensive colorectal cancer (CRC) screening guidelines and increased public awareness in Kuwait. Despite PCPs unanimously endorsing CRC screening and expressing positive attitudes towards its effectiveness, significant barriers such as patient non-compliance and systemic healthcare challenges persist. Disparities in screening recommendations based on gender and geographic location underscore the importance of targeted interventions to ensure equitable access to CRC screening services. Addressing these barriers and promoting shared decision-making are essential

for improving CRC screening rates and reducing the burden of CRC in Kuwait.

Consent for publication

No applicable in this section.

Availability of data and materials

The data that support the findings of this study are available from the Kuwait Ministry of Health, but restrictions apply to the availability of these data, and so are not publicly available. Data are however available from the authors upon reasonable request and with permission of the Kuwait Ministry of Health.

Competing interests

The authors declare that they have no competing interests.

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REFERENCES

1. Sung H, Ferlay J, Siegel RL, Laversanne M, Soerjomataram I, Jemal A, et al. Global Cancer Statistics 2020: GLOBOCAN Estimates of Incidence and Mortality Worldwide for 36 Cancers in 185 Countries. *CA Cancer J Clin.* 2021;71(3):209-49.
2. WHO: International Agency for Research on Cancer. Cancer tomorrow. 2022. <https://gco.iarc.fr/today/data/factsheets/populations/414-kuwait-factsheets.pdf>. (Accessed 17.3.2022).
3. El-Basmy A. Kuwait Cancer Registry: *Annual Report Kuwait Cancer Control Center.* 2016.
4. Alsheredah N, Akhtar S. Diet, obesity and colorectal carcinoma risk: results from a national cancer registry-based middle eastern study. *BMC Cancer.* 2018 Dec 7;18(1):1227.
5. Davidson KW, Barry MJ, Mangione CM, Cabana M, Caughey AB, Davis EM, et al.

- Screening for Colorectal Cancer: US Preventive Services Task Force Recommendation Statement. *JAMA*. 2021;325(19):1965-77.
6. Rex DK, Boland CR, Dominitz JA, Giardiello FM, Johnson DA, Kaltenbach T, et al. Colorectal Cancer screening: Recommendations for physicians and patients from the U.S. multi-Society Task Force on Colorectal Cancer. *Gastroenterology*. 2017 Jul;153(1):307-23.
 7. American Cancer Society. Colorectal Cancer Guidelines 2020. <https://www.cancer.org/cancer/colon-rectal-cancer/detection-diagnosis-staging/acs-recommendations.html>. (Accessed 28 October 2020).
 8. Guraya SY. The prevalence and evolving risk factors for colorectal cancer in the Arab world. *Biomed Pharmacol J*. 2018 Dec 28;11(4):1773-80.
 9. Albatineh A, Shuaibi S, Bouhamad M, Behbehani, A, Sabti, M, Al-Zuabi M. Knowledge, beliefs and barriers to colorectal cancer screening among older adults in Kuwait. Kuwait Cancer Control Center.2018. <https://kuwaitcancercenter.net/Screening/EarlyDiag.html>.(Accessed 11.1.2020).
 10. Hadjipetrou A, Anyfantakis D, Galanakis CG, Kastanakis M, Kastanakis S. Colorectal cancer, screening and primary care: A mini literature review. *World J Gastroenterol*. 2017;23(33):6049-58.
 11. Camilloni L, Ferroni E, Cendales BJ, Pezzarossi A, Furnari G, Borgia P, et al. Methods to increase participation in organised screening programs: a systematic review. *BMC Public Health*. 2013 May 13;13(1):464.
 12. Giorgi Rossi P, Camilloni L, Cogo C, Federici A, Ferroni E, Furnari G, et al. [Methods to increase participation in cancer screening programmes]. *Epidemiol Pref*. 2012 Jan;36(1 Suppl 1):1-104.
 13. Sarfaty M. How to increase colorectal cancer screening rates in practice: A primary care clinician's evidence-based toolbox and guide. Atlanta: *The American Cancer Society, & Washington DC: The Centers for Disease, Control and Prevention*. 2008.
 14. Zapka JG, Puleo E, Vickers-Lahti M, Luckmann R. Healthcare system factors and colorectal cancer screening. *Am J Prev Med*. 2002 Jul;23(1):28-35.
 15. Lafata JE, Cooper G, Divine G, Oja-Tebbe N, Flocke SA. Patient-physician colorectal cancer screening discussion content and patients' use of colorectal cancer screening. *Patient Educ Couns*. 2014;94(1):76-82.
 16. Laiyemo AO, Adebogun AO, Doubeni CA, Ricks-Santi L, McDonald-Pinkett S, Young PE, et al. Influence of provider discussion and specific recommendation on colorectal cancer screening uptake among U.S. adults. *Prev Med*. 2014;67:1-5.
 17. Shojania KG, Jennings A, Mayhew A, Ramsay C, Eccles M, Grimshaw J. Effect of point-of-care computer reminders on physician behaviour: a systematic review. *CMAJ*. 2010;182(5):E216-25.
 18. Sabatino SA, Lawrence B, Elder R, Mercer SL, Wilson KM, DeVinney B, et al. Effectiveness of interventions to increase screening for breast, cervical, and colorectal cancers: nine updated systematic reviews for the guide to community preventive services. *Am J Prev Med*. 2012;43(1):97-118.
 19. Holden DJ, Jonas DE, Porterfield DS, Reuland D, Harris R. Systematic review: enhancing the use and quality of colorectal cancer screening. *Ann Intern Med*. 2010 May 18;152(10):668-76
 20. Senore C, Inadomi J, Segnan N, Bellisario C, Hassan C. Optimising colorectal cancer screening acceptance: a review. *Gut*. 2015;64(7):1158-77.
 21. Baxter NN, Sutradhar R, Li Q, Daly C, Honein-AbouHaidar GN, Richardson DP, et al. Do Primary Care Provider Strategies Improve Patient Participation in Colorectal Cancer Screening? *Am J Gastroenterol*. 2017;112(4):622-32.
 22. Walsh JME, Posner SF, Perez-Stable EJ. Colon cancer screening in the ambulatory setting. *Prev Med*. 2002 Sep;35(3):209-18.
 23. Sahin MK, Aker S, Arslan HN. Barriers to colorectal cancer screening in a primary care setting in Turkey. *J Community Health*. 2017 Feb;42(1):101-8.

24. Saeed RS, Bakir YY, Alkhalifah KH, Ali LM. Knowledge and awareness of colorectal cancer among general public of Kuwait. *Asian Pac J Cancer Prev.* 2018 Sep 26;19(9):2455-60.
25. Akrama A, Aleinati R, Alhamar M, Al-Mutairi A, Al-Mutawa M, Al-Rajhi K, et al. Knowledge, Attitudes and Practices regarding Colorectal Cancer Screening in Patients attending Kuwait Ministry of Health Primary Healthcare Centers. 2018; Kuwait City, *Kuwait University Faculty of Medicine.*
26. Kuwait National Center for Health Information, Health and Vital Statistics Division *Kuwait Health Annual Report 2017.* Fifty fourth edition ed. Kuwait 2019.
27. London School of Economics and Political Science. Kuwait Health System Review. London,UK: LSE Consulting 2018
28. National Cancer Institute (2009) National Survey of Primary Care Physicians' cancer Screening Recommendations and Practices- Colorectal and Lung Cancer Screening questionnaire. https://healthcaredelivery.cancer.gov/screening_rp/screening_rp_colo_lung_inst.pdf . (Accessed 31.3.2022).
29. Demyati, E. Knowledge, Attitude, Practice, and Perceived Barriers of Colorectal Cancer Screening among Family Physicians in National Guard Health Affairs, Riyadh. *Int J Family Med.* 2014.<http://dx.doi.org/10.1155/2014/457354>
30. Mahmoud M, Parambil J, Danjuma M, Abubeker I, Najim M, Ghazouani H, et al. Knowledge, Attitude and Practice of Physicians Regarding Screening of Colorectal Cancer in Qatar: A Cross-Sectional Survey. *Advances in medical education and practice.* 2020;11:843-50.
31. Shokar NK, Nguyen-Oghalai T, Wu H. Factors associated with a physician's recommendation for colorectal cancer screening in a diverse population. *Fam Med.* 2009 Jun;41(6):427-33.
32. Walsh J, Nguyen T, Nguyen L, Pasick R, McPhee SJ. *Healthy Colon, Healthy Life (Ruột Lành, Sống Khỏe):* Patient and Physician Factors Associated with Colorectal Cancer Screening Among Vietnamese Americans in a County Medical Care System [Internet]. Vol. 20, *Journal of Health Care for the Poor and Underserved.* 2008. p. 74-89. Available from: <http://dx.doi.org/10.1353/hpu.0.0122>.
33. Lofters AK, Kopp A, Vahabi M, Glazier RH. Understanding those overdue for cancer screening by five years or more: A retrospective cohort study in Ontario, Canada. *Prev Med.* 2019 Dec;129(105816):105816.
34. Stacey D, Bennett CL, Barry MJ, Col NF, Eden KB, Holmes-Rovner M, et al. Decision aids for people facing health treatment or screening decisions. *Cochrane Database Syst Rev.* 2011 Oct 5;(10):CD001431.
35. Althobaiti A, Jradi H. Knowledge, attitude, and perceived barriers regarding colorectal cancer screening practices and risk factors among medical students in Saudi Arabia. *BMC Med Educ.* 2019 Nov 14;19(1):42