International Journal of Advances in Medicine
Aljemeeli FA et al. Int J Adv Med. 2022 Mar;9(3):221-228
http://www.ijmedicine.com
pISSN 2349-3925 | eISSN 2349-3933
DOI: https://dx.doi.org/10.18203/2349-3933.ijam20220423

Original Research Article

Survey on physician attitudes and knowledge toward colorectal cancer screening in primary health care centers, Qassim, Saudi Arabia

Feras A. Aljemeeli[1]*, Abdulrahman Alfadda[2]

[1]Department of Medicine, Unayzah College of Medicine, Qassim University, Unayzah, Qassim Region, Kingdom of Saudi Arabia
[2]Department of Medicine, Section of Gastroenterology, King Faisal Specialist Hospital and Research Center, Riyadh, Kingdom of Saudi Arabia

Received: 05 February 2022
Revised: 20 February 2022
Accepted: 21 February 2022

***Correspondence:**
Dr. Feras A. Aljemeeli,
E-mail: feras.aljemeeli@ucm.edu.sa

ABSTRACT

Background: Colorectal cancer (CRC) is one of the leading causes of cancer incidence worldwide. In Saudi Arabia, it is ranked first most common cancer in males and second most common in females. CRC is an ideal for prevention because of the high incidence rate and the relative slow progression into an adenocarcinoma. Primary health care (PHC) setting is the ideal place where CRC screening should take place. This study was intended to evaluate awareness, knowledge and attitude towards CRC screening.
Methods: A survey was performed among PHC physicians in Qassim province, Saudi Arabia. An electronic questionnaire adopted from the national cancer institute was formulated. Demographic data, specialty, qualifications, years of experience, knowledge and attitudes towards CRC screening, and perceived barriers regarding CRC screening were obtained.
Results: A total of 94 physicians were recruited. 39.4% from the sample are females, and 60.6% are males. 99% of physicians agree that colorectal cancer screening is needed when age appropriate. However, 68% were very compliant in CRC screening in clinical practice. Only 52% of physicians were familiar with national CRC cancer screening guidelines. 53% of physicians scored correct on the age appropriate to initiate CRC screening for average risk patients.
Conclusions: More efforts should be given to improve knowledge of primary healthcare providers regarding CRC prevention. More funding and planning are needed to provide primary health care providers with the required tools and systems in order to make CRC prevention more efficient.

Keywords: Colorectal cancer prevention and screening, Primary health care center, Qassim, Kingdom of Saudi Arabia

INTRODUCTION

CRC is one of the leading causes of cancer incidence ranking 3rd worldwide. In Saudi Arabia, CRC is the leading cause of cancer new diagnoses in males and second most common in females. Risk factors associated with increase CRC included sedentary life-style, cigarette smoking, overweight and obesity; diet including the high consumption of alcohol, processed and red meat and the low consumption of fruits, vegetables, dietary fibers and calcium.

CRC is considered ideal for screening because of the relative high incidence rate and the relatively slow progression of precancerous colonic adenomas into an adenocarcinoma. Preventive measures including effective screening programs with early detection and management of pre-cancerous and cancerous lesions, effective and time appropriate management can significantly improve its

incidence and prognosis. Most of developed countries has adopted national CRC screening programs and this step has been reflected in the CRC cancer incidence and mortality in these countries.

PHC setting was the ideal place where CRC screening should take place. Programmatic screening for CRC has been favored over other tools such as opportunistic screening for CRC, patient education and financial incentives.[2] Moreover, in USA, it had been found that people aged seventy-five years or more with multiple comorbidities and a relatively shorter life expectancy were nearly twice as much likely to be screened for CRC compared to their peers from the same age group without significant comorbidities and better life expectancy. This finding was likely related to the more prevalence of opportunistic screening compared with programmatic screening.

Based on previous literature, CRC screening adherence were below wanted levels in developed countries like USA and Europe.[2] Similar findings have been reported in studies conducted in Riyadh and Jeddah, Saudi Arabia.[5] This study was intended to evaluate awareness, knowledge and attitude towards CRC screening among PHC clinicians in Qassim province, Saudi Arabia. This study was aimed to evaluate awareness and attitudes of physicians in PHCs in Qassim Region, Saudi Arabia.

METHODS

A cross-sectional study was performed on primary health care physicians practicing in PHCs under the supervision of Qassim health cluster, Ministry of Health, Qassim province, Saudi Arabia. A pilot study involving 10 samples was performed after which feedback from participants revised by study investigators resulted in changes and editions to the questionnaire. Data were later collected from the targeted population in the period from June 2019 till march 2020. We included all physicians practicing in primary health care settings, Qassim region, Saudi Arabia. We excluded physicians practicing in secondary or tertiary care hospitals, physicians outside Qassim region and practicing interns or sub-interns.

The first phase of the research proposal included identifying and defining the problems and establishment of objectives of the study and development research plan. The second phase of the research included a summary of the comprehensive literature review. Literatures on claim management were reviewed. The third phase of the research included a field survey which was conducted with survey on physician attitudes and knowledge toward CRC screening in primary health care centers, Qassim, Saudi Arabia. The fourth phase of the research focused on the modification of the questionnaire design, through distributing the questionnaire to pilot study. The purpose of the pilot study was to test and prove that the translated questionnaire questions were clear to be answered in a way that helped to achieve the target of the study. The questionnaire was modified based on the results of the pilot study. The fifth phase of the research focused on distributing questionnaire. This questionnaire was used to collect the required data in order to achieve the research objective. The sixth phase of the research was data analysis and discussion. Statistical package for the social sciences, (SPSS v26) was used to perform the required analysis. The final phase included the conclusions and recommendations. 94 electronic questionnaires were distributed to the research population and all questionnaires were received.

Informed consent was obtained from participants at the start of the questionnaire. There were no interventions planned in this study. Approval from Qassim region ethical committee was granted prior to data collection.

Demographic data, specialty, qualifications, years of experience, questions about knowledge and attitudes towards CRC screening, and perceived barriers regarding CRC screening were obtained from study participants using google form electronic questionnaire. We presented summary statistics for continuous data as mean and for categorical data as percentages. We constructed 95% confidence interval to summarize the uncertainties. In case we needed subgraph analyses arose, a t test, Chi square test. In all analyses set the type I error rate at 5%, with an adjustment for multiplicity if needed.

RESULTS

Among 94 study participants, Table 1 shows that 39.4% were females and 60.6% were males. 54.3% from the sample were Saudi nationals, while 45.7% were non-Saudi. 44.7% of the study sample ranged in age between 20-30 years, 44.7% aged between 31-50 years and 10.6% aged between 50-60 years. 94.7% from the sample subjects work in PHC while the remaining work in diabetic center. 61.7% from the sample have the qualification of MD or MBBS or equivalent, while 18.1% have family medicine diploma or master, while 8.5% have family medicine board or PHD. Internal medicine and pediatrics diploma or board were less frequent. 17.0% from the sample experience was less than 2 years, 36.2% between 3-5 years, 24.5% between 5-10 years and 23.3% are greater than 10 years. 69.1% from the samples were classified as per Saudi counsel for health specialties as residents, 16.0% were registrars, 11.7% were senior registrars and 3.2% were consultants.

Regarding knowledge and attitudes toward CRC screening. 98.9% from the sample agree that CRC screening for asymptomatic patients should be performed when age appropriate for CRC screening and 1.1% disagree. 78.7% from the sample are very compliant in performing CRC screening for asymptomatic average-risk adults because of any reason and when age was appropriate for CRC screening, 8.5% were moderately complaint and 12.7% were not complaint.

Table 2 shows perceived effectiveness of different CRC screening modalities among study subjects as following. 98.3% assumed that fecal occult blood test (FOBT) is effective for CRC screening. 96.7% assumed colonoscopy is effective for CRC screening. 90% assumed that CT colonography is effective for CRC screening. 84% assumed that sigmoidoscopy is effective for CRC screening. 83% assumed that multitarget stool DNA test was effective as CRC screening test. And, 79.7% assumed that colon capsule is effective as CRC screening test.

Table 1: Characteristics of demographic data.

Variables	Categories	Frequency	Percent
Gender	Female	37	39.4
	Male	57	60.6
Nationality	Saudi	51	54.3
	Non-Saudi	43	45.7
Age (years)	20-30	42	44.7
	31-50	42	44.7
	51-60	10	10.6
Work	Primary health care center	89	94.7
	Diabetic center	5	5.3
Medical qualifications	MD or MBBS or equivalent	58	61.7
	Family medicine diploma or master	17	18.1
	Family medicine board or PHD	8	8.5
	Internal medicine diploma or master	1	1.1
	Internal medicine board or PHD	5	5.3
	Pediatric diploma or master	1	1.1
	Other	4	4.3
Years of experience (years)	<2	16	17.0
	3-5	34	36.2
	5-10	23	24.5
	>10	21	22.3
Professional classification as per Saudi counsel for health specialties	Consultant	3	3.2
	Senior registrar	11	11.7
	Registrar	15	16.0
	Resident	65	69.1

Table 2: How effective do you believe the following screening tests are in reducing CRC mortality in average-risk patients when age appropriate for screening?

S. No.	Effectiveness	Effective		I don't know		Not effective		Mean	Weight mean	P value	Rank
		Frequency	Percent	Frequency	Percent	Frequency	Percent				
1.	FOBT	90	95.7	3	3.2	1	1.1	2.95	98.3	<0.01	1
2.	Colonoscopy	88	93.6	3	3.2	3	3.2	2.90	96.7	<0.01	2
3.	CT colonography	70	74.5	20	21.3	4	4.3	2.70	90.0	<0.01	3
4.	Flexible sigmoidoscopy	57	60.6	29	30.9	8	8.5	2.52	84.0	<0.01	4
5.	Multitarget stool DNA test	52	55.4	37	39.4	5	5.3	2.49	83.0	<0.01	5
6.	Colon capsule	40	42.6	51	54.3	3	3.2	2.39	79.7	<0.01	6
7.	All items	397	70.4	143	25.4	24	4.3	2.66	88.7	<0.01	

Table 3 shows study participants' perceived factors influencing CRC screening decisions, 98.7% reported being influenced by literature. 94.3% reported being influenced by the availability of endoscopist or radiologist to whom they can refer positive FOBT patients. 93.3%

reported being influenced by their patients' decisions. While 92% reported being influenced by the availability of FOBT and 82.7% reported being influenced by national guidelines for the prevention of CRC. 56.4% of participants reported appropriate age to start CRC screening in asymptomatic average risk adults at the age of (45-50 years), 19.1% at (55-60 years), 12.8% at (50-55 years), 10.6% at (40-45 years) and 1.1% at (60-65 years). 4.3% of participants perceived age after 65 years beyond which CRC screening is not recommended, while 21.3% reported age after 75 years, 38.3% after age of 85 years and 36.2% from the sample were not sure. Participants who discuss CRC screening reported they discuss FOBT 92.6% of the time, 34.0% for colonoscopy, 10.6% for flexible sigmoidoscopy, 1.1% for CT colonography and 1.1% for others.

Table 3: How strong are you influenced by the following factors in deciding about CRC screening.

S. No.	Parameters	Influenced		Not applicable or not familiar		Not influenced		Mean	Weight mean	P value	Rank
		Frequency	Percent	Frequency	Percent	Frequency	Percent				
1.	Clinical evidence in published literature	91	96.8	2	2.1	1	1.1	2.96	98.7	<0.01	1
2.	Availability of endoscopist and radiologist to whom you can refer positive FOBT patients	83	88.3	6	6.4	5	5.3	2.83	94.3	<0.01	2
3.	American cancer society Guidelines	80	85.1	9	9.6	5	5.3	2.80	93.3	<0.01	3
4.	Availability of FOBT kit in your center	78	83	10	10.6	6	6.4	2.77	92.3	<0.01	4
5.	My patients' preferences for CRC screening	81	86.1	4	4.3	9	9.6	2.76	92.0	<0.01	5
6.	US preventive services taskforce	53	56.4	38	40.4	3	3.2	2.53	84.3	<0.01	6
7.	Saudi national guidelines for CRC screening	52	55.3	35	37.2	7	7.4	2.48	82.7	<0.01	7
8.	All items	518	78.7	104	15.8	36	5.5	2.73	91.0	<0.01	

Table 4: Which of the following strategies of conducting CRC screening do you prefer?

Which of the following strategies of conducting CRC screening do you prefer?	Frequency	Percent
Opportunistic screening (the issue is brought up by the physician or the patient when they had the chance)	9	9.6
Structured screening program	42	44.7
Patient education programs	41	43.6
Financial incentives for CRC screening	2	2.1
Other	94	100.0

The preferred strategies by participants of conducting CRC screening shown in Table 4 as follows. Structured screening program with 44.7%, patient education programs with 43.6%, opportunistic screening (the issue was brought up by the physician or the patient when they had the chance) with 9.6% and financial incentives for CRC screening with 2.1%.

Table 5 shows that when planning for counseling patients about CRC screening, participants often encountered unavailability of tests in clinic with weight mean 91.5%. Patients do not perceive CRC as a common preventable cancer with weight mean 73.1%. Endoscopy or radiology options are not available with weight mean 66.0%. The patient is not interested with weight mean 65.2%. No enough time for discussion in the clinic with weight mean 63.3%. The patient is having difficulty understanding with weight mean 56.6%. In general, the weight means for all items equal 69.3% and the $p<0.05$.

Perceived barriers by study participants were shown in Table 6 and reported as follows. No reminder system in workplace with weight mean 89.9%. No policy and procedure in my healthcare setting with weight mean 88.0%. Patients do not follow up after initiation of screening with weight mean 77.1%. No available or hard to refer endoscopist when encountering positive FOBT with weight mean 62.8% with fourth rank. No knowledge on using FOBT and interpretation in participant's setting with weight mean 48.1% with fifth rank. For general the weight mean for all items equal 73.2% and the p<0.05.

Table 5: When planning for counseling patients about CRC screening, how often you encounter the following?

S. No.	Parameters	Never		Rarely		Sometimes		Usually		Mean	Weight mean	P value	Rank
		Frequency	Percent	Frequency	Percent	Frequency	Percent	Frequency	Percent				
1.	Tests are not available in my clinic	3	3.2	5	5.3	13	13.8	73	77.7	3.66	91.5	<0.01	1
2.	Patients do not perceive CRC as a common preventable cancer	6	6.4	15	16	53	56.4	20	21.3	2.93	73.1	<0.01	2
3.	Endoscopy or radiology options are not available	21	22.3	20	21.3	25	26.6	28	29.8	2.64	66.0	0.240	3
4.	The patient is not interested	5	5.3	36	38.3	44	46.8	9	9.6	2.61	65.2	0.165	4
5.	No enough time for discussion in the clinic	7	7.4	39	41.5	39	41.5	9	9.6	2.53	63.3	0.689	5
6.	The patient is having difficulty understanding	8	8.5	55	58.5	29	30.9	2	2.1	2.27	56.6	<0.01	6
7.	All items	50	8.85	170	30.2	203	36.0	141	25.0	2.77	69.3	<0.01	

Table 6: How often you encounter the following barriers when planning for CRC screening?

S. No.	Parameters	Never		Rarely		Sometimes		Usually		Mean	Weight mean	P value	Rank
		Frequency	Percent	Frequency	Percent	Frequency	Percent	Frequency	Percent				
1	No reminder system in my workplace	5	5.3	5	5.3	13	13.8	71	75.5	3.60	89.9	<0.01	1
2	No policy and procedure in my healthcare setting	10	10.6	3	3.2	9	9.6	72	76.6	3.52	88.0	<0.01	2
3	My patients do not follow up after initiation of screening	5	5.3	5	5.3	61	64.9	23	24.5	3.09	77.1	<0.01	3
4	No available or hard to refer endoscopist when encountered	18	19.1	27	28.7	32	34	17	18.1	2.51	62.8	0.918	4
5	No knowledge on using FOBT and interpretation in my setting	55	58.5	7	7.4	16	17	16	17	1.93	48.1	<0.01	5
6	All items	93	19.8	93	10.0	93	27.9	93	42.3	2.93	73.2	<0.01	

Perceived appropriate frequency of FOBT is every one year by 69.1% of participants, every three years by 13.8%, every two years by 8.5% and 8.5% participants reported that they were not sure. 12.8% of study participants reported performing complete a single FOBT card in the office during a digital rectal exam. 88.3% asked patients to give stool sample to the laboratory for FOBT with percent 88.3%. While 12.8% reported that they do not use FOBT routinely in their practice. 22.3% of participants perceived one sample is adequate for CRC screening, while 12.8% reported 2 samples, 51.1% reported 3 samples, and 13.8% were not sure. 58.5 % of participants were for preparations prior to FOBT, while 41.5% were not sure. 57.4% of participants recommended withholding NSAIDs/aspiring prior to FOBT.

On initial follow up step to a positive FOBT, 34.0% recommended repeat FOBT, 8.5% recommended sigmoidoscopy, 55.3% recommended colonoscopy and 2.12% recommended CT colonography. 85.1% of participants reported that they lack follow up mechanisms for patients whom started CRC screening while. 73.4% of participants perceived every 5-year sigmoidoscopy as appropriate for CRC screening for asymptomatic average risk patients. 70.2% of participants reported every 10-year colonoscopy as appropriate for CRC screening for asymptomatic average risk patients, while 18.1%, 7.4%, 4.3% reported frequency of 5-year, 3-year and every 1 year respectively. 85.1% reported that they refer patients who need colonoscopy to gastroenterologist while 9.6% refer to internist and 5.3% to surgeons. 94.7% of participants reported colonoscopy as the best available screening test for CRC screening. 61.7% of participants reported that colonoscopy is readily available for their patients while 24.5% reported that performing specialist is often busy or can’t accept referral for screening purposes.

DISCUSSION

Ooi et al 2019 revealed that less than 40% of medical care physicians were ready to properly assessed the CRC risk. The mean degree of data in screening for CRC was about 50% and was positively related to a postgraduate educational qualification and use of guidelines. The examination practice was low in our study compared to other countries. Educating primary health care physicians with the newest evidence and guidelines will make sure that the best clinical practice was available to patients. However, knowledge doesn't necessarily translate into practice. The right resources were needed for a successful CRC screening. Knowledge and practice for detecting CRC was insufficient among primary care physicians. Knowledge of the examination wasn't translated into its practice. The perceptions of primary care physicians about the cost-effectiveness of the examination and adequate resources were important determinants of the examination practice. Cho et al 2017 reported that colonoscopy preferred choice for colorectal cancer screening compared to fecal occult blood screening, although fecal occult blood testing was provided free from charge through the National cancer screening program. Most doctors reported more favorable beliefs and an attitude in performing a colonoscopy test than fecal occult blood test. We also noted differences in behaviors of the screening for CRC, knowledge, beliefs and attitudes toward screening for CRC (fecal occult blood examination and colonoscopy) among primary care physicians. Although colonoscopy had typically a high detection rate, it's a more costly test that needed more resource allocation. Therefore, colonoscopy tests relied heavily on endoscopy skills and on the availability of endoscopy units. Even with the idea that colonoscopy can be offered to each age-appropriate asymptomatic average risk adult, caution had been praised in promoting colonoscopies for CRC screening test. It's suggested that providing balanced information and academic programs designed around evidence-based guidelines were essential for improving clinical decision-making for screening for CRC.

Althobaiti et al 2019 indicated in their study that the knowledge of risk factors for CRC, screening methods and attitude to screening was poor in 52.47 and 57.83% of medical students surveyed, respectively. A better level of medical education (OR=3.23; 95% CI: 2.01-5.18) and a positive attitude toward screening for CRC (OR=2.74; 95% CI: 1.86-4.03) were independent predictors of upper levels of data. Lack of awareness of CRC, screening methods among participants and a scarcity of specialized healthcare providers were independently associated barriers with lower levels of data. Mastrokostas, et al 2018 indicated that differences in perceived barriers clearly indicated the necessity for more focused additions in this area. However, primary care professionals should consider that their concerns might not coincide with the concerns of their patients, even when they recommend a CRC screening test. This suggested that there must be a shift in understanding and professionalism in primary health care around the barriers perceived by the patient, taking into consideration the particular needs of the general public and their views about detecting CRC, being impartial with personal assumptions. Any interventions that were specifically designed to dealt with patient-aware barriers, should be within the concept of patient-centered health promotion and identify barriers and facilitators to form informed decisions. Taking into consideration the patient's opinions and expectations are often the primary critical step to extend the likelihood of CRC being prevented. Our study agreed with Mastrokostas et al 2018, Althobaiti et al 2019, Ooi et al 2019 and Cho et al 2017.

Tfaily et al 2019 presented a similar study linking awareness of CRC risk factors, warning signs and attitudes toward screening guidelines and methods, also as detection factors which will present obstacles to undergoing colorectal cancer screening. The results that were created were of great importance because they supplied an appropriate vision to extend the impact of future efforts to extend the rates of colorectal cancer detection nationwide. Since awareness of the risk factors for CRC was positively related to the preparation for the screening, it's important

to stress the risk factors for colorectal cancer in any context during which CRC screening is promoted. It's especially important to spread awareness about risk factors for CRC and warning signs where population were less conscious of, like lack of physical activity, diabetes, anemia or fatigue. Secondly, there should be a rise in public awareness campaigns that confirmed that screening for CRC was suggested for everybody and not just for those with a case history because of the examination results in early detection and prevention of disease progression and thus a decrease in morbidity and mortality from colorectal cancer. Correcting misinformation was predicted to assist overcoming fear and stigma towards CRC. On the statistical method, the higher education level of the treating physician was related to higher degrees of knowledge. Our findings were in concordance with findings by a similar study by Demyati et al.[5] Our study agreed with Tfaily et al 2019.[13]

In our study, 85% of physicians were familiar with American cancer society guidelines, 56% were familiar with US preventive services taskforce guidelines and 55% were familiar with national guidelines for CRC screening in Saudi Arabia. These findings were in concordance with findings of two similar studies in Saudi Arabia by Demyati et al and Mosli et al.[5,8] 68% of physicians reported compliance in implementing guidelines recommendations in their practice while 44% were found to be compliant in a study by Demyati et al. It was important to note though that a nationwide CRC prevention program was launched by Saudi ministry of health right after our study has been performed and therefore, attitudes and knowledge by primary health care workers were expected to be positively affected towards colorectal cancer prevention. A 53% of physicians scored correct on the age appropriate for initiation of CRC screening. 51% of physicians scored correct on the number of samples needed for fecal occult blood test. 57% recommended to hold aspirin three days prior to test. Based on study results, we thought that more efforts should be given to improve primary health care providers knowledge and attitudes towards CRC prevention in Qassim area. Also, more funding especially with allocation of screening resources as well as an advocation and implementation of national guidelines will likely improve attitudes toward colorectal cancer screening.

The study design was appropriate in evaluating current awareness and attitudes of physicians in PHCs. A total sample of 227 was initially planned based on previous literature reporting on CRC screening compliance rate of 67-97%. However, only 94 primary health care were recruited likely due to noncompliance.

CONCLUSION

More efforts should be given to improve knowledge of primary healthcare providers regarding CRC prevention. More funding and planning are needed to provide primary health care providers with the required tools and systems in order to make CRC prevention more efficient.

Funding: No funding sources
Conflict of interest: None declared
Ethical approval: The study was approved by the Institutional Ethics Committee

REFERENCES

1. WHO. Fact sheet: Latest global cancer data: Cancer burden rises to 18.1 million new cases and 9.6 million cancer deaths in 2018. Available at: https://www.who.int/cancer/PRGlobocanFinal.pdf. Accessed on 15 January 2022.
2. WHO. Fact sheet: Cancer country profiles, Saudi Arabia 2014. Available at: https://www.who.int/cancer/country-profiles/sau_en.pdf?ua=1. Accessed on 15 January 2022.
3. Alsanea N, Almadi MA, Abduljabbar AS, Alhomoud S, Alshaban TA, Alsuhaibani A, et al. National guidelines for colorectal cancer screening in Saudi Arabia with strength of recommendations and quality of evidence: Tripartite task force from saudi society of colon & rectal surgery, Saudi gastroenterology association and Saudi oncology society. Ann Saudi Med. 2015;35(3):189-95.
4. Abdel-Aziz SB, Amin TT, Al-Gadeeb MB, Alhassar AI, Al-Ramadan A, Al-Helal M, et al. Perceived barriers to breast cancer screening among Saudi women at primary care setting. J Prevent Med Hyg. 2018;59(1):20.
5. Demyati E. Knowledge, attitude, practice, and perceived barriers of colorectal cancer screening among family physicians in National Guard Health Affairs, Riyadh. Int J Fam Med. 2014.
6. Maratt JK, Calderwood AH, Saini SD. When and how to stop surveillance colonoscopy in older adults: five rules of thumb for practitioners. Am J Gastroenterol 2018;113(1):5.
7. Kahi CJ, Boland CR, Dominitz JA, Giardiello FM, Johnson DA, Kaltenbach T, et al. Colonoscopy surveillance after colorectal cancer resection: recommendations of the US multi-society task force on colorectal cancer. Gastroenterology. 2016;150(3):758-68.
8. Mosli M, Alnahdi Y, Alghamdi A, Baabdullah M, Hadadi A, Khateery K, et al. Knowledge, attitude, and practices of primary health care physicians toward colorectal cancer screening. Saudi J Gastroenterol. 2017;23:330-6.
9. Ooi CY, Hanafi NS, Liew SM. Knowledge and practice of colorectal cancer screening in an urban setting: cross-sectional survey of primary care physicians in government clinics in Malaysia. Singap Med J. 2019;60:596.
10. Cho YH, Kim DH, Cha JM, Jeen YT, Moon JS, Kim J, et al. Patients' preferences for primary colorectal cancer screening: A survey of the national colorectal

cancer screening program in Korea. Gut Liver. 2017;11(6):821-7.
11. 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;19(1):421.
12. Mastrokostas A, Gavana M, Gkrizioti M, Smyrnakis E, Cholongitas E, Benos A, et al. Discrepancies and misconceptions of perceived colorectal cancer screening barriers between primary health professionals and unscreened population. A comparative study in Greece. J Buon. 2018;23(7):67-76.
Tfaily MA, Naamani D, Kassir A, Sleiman S, Ouattara M, Moacdieh MP, et al. Awareness of colorectal cancer and attitudes towards its screening guidelines in Lebanon. Ann Glob Health. 2019;85(1):75.

Cite this article as: Aljemeeli FA, Alfadda A. Survey on physician attitudes and knowledge toward colorectal cancer screening in primary health care centers, Qassim, Saudi Arabia. Int J Adv Med 2022;9:221-8.