

RESEARCH ARTICLE

Public awareness of colon cancer screening among the general population: A study from the Western Region of Saudi Arabia

Yasir Mohammed Khayyat^{1,2}, Ezzeldin Mostafa Ibrahim³

Address for Correspondence:

Yasir Mohammed Khayyat

¹Faculty of Medicine, Umm al-Qura University, Makkah, Saudi Arabia

²Department of Internal Medicine, International Medical Centre, Jeddah, Saudi Arabia

³Oncology Centre of Excellence, International Medical Centre, Jeddah, Saudi Arabia

Email: ykhayyat@imc.med.sa

<http://dx.doi.org/10.5339/qmj.2014.3>

Submitted: 22 October 2013

Accepted: 21 April 2014

© 2014 Khayyat, Ibrahim, licensee Bloomsbury Qatar Foundation Journals. This is an open access article distributed under the terms of the Creative Commons Attribution license CC BY 4.0, which permits unrestricted use, distribution and reproduction in any medium, provided the original work is properly cited.

Cite this article as: Khayyat YM, Ibrahim EM. Public awareness of colon cancer screening among the general population: A study from the Western Region of Saudi Arabia, Qatar Medical Journal 2014;3 <http://dx.doi.org/10.5339/qmj.2014.3>

ABSTRACT

Background: Screening for colon cancer aims at early detection and prompt treatment of the disease. Prior knowledge of the disease will contribute to increased participation. However, barriers to performing screening are not known.

Methods: A survey using a questionnaire was presented to patients attending the Outpatient Department of a tertiary hospital in the Western Region of Saudi Arabia, to evaluate the background knowledge of colon cancer screening, the diagnostic methods used for that purpose, and the barriers that may resist the implementation of screening.

Results: Six hundred and nineteen questionnaires were distributed. Completed questionnaires that were included in the final analysis numbered 321 (51.9%). Age and gender had no statistically significant association with increased awareness of screening options ($p = 0.526$ and $p = 0.2$). However, education played a significant role ($p = 0.045$). Among the group that agreed to undergo screening, there were 55.3% who were willing to undergo colonoscopy or sigmoidoscopy. Contrary to that, among the group that did not agree to undergo screening, 77.4% of them would undergo radiological screening using barium enema and/or a computed tomography (CT) scan of the abdomen.

Conclusion: There is a deficiency of knowledge of colorectal cancer (CRC) screening influenced by an individual's level of education, yet unrelated to age or gender. The endoscopic modality was usually chosen by individuals who were aware of CRC screening. However, the fear of undergoing this investigation, for the same reason, would likely make them decide to choose less invasive testing, using barium enema or a CT of the abdomen.

الوعي العام بفحوصات الكشف عن سرطان القولون بين عامة السكان دراسة من المنطقة الغربية في المملكة السعودية العربية

الملخص

الأهداف: يهدف الكشف المبكر عن سرطان القولون إلى التعرف على المرض وعلاجه مبكرًا. وتسهم المعرفة المسبقة بالمرض في تحسين المشاركة في الفحص وزيادة فاعليته. ولكن العوائق التي تمنع مشاركة الناس في الفحص المبكر غير معلومة.

الطريقة: أجريت استبانة للمرضى في قسم العيادات الخارجية بأحد المستشفيات المرجعية في المنطقة الغربية من المملكة العربية السعودية لتقييم معلوماتهم العامة حول الفحص المبكر عن سرطان القولون، وطرق التشخيص المستخدمة لهذا الغرض، وكذلك معرفة العوائق التي قد تمنعهم من المشاركة فيه.

النتائج: وزعت 619 استبانة، ولم يتضمن التحليل النهائي سوى الاستبانات المكتملة بشكل يتوافق مع متطلبات البحث و عددها 312 (51,9%). لم يكن للعمر أو الجنس أي دلالة إحصائية مرتبطة بزيادة الوعي ($p = 0.2$ و $p = 0.526$)، وذلك بعكس المستوى التعليمي الذي أظهر ارتباطًا وثيقًا بزيادة الوعي والاهتمام بإجراء الفحص المبكر للقولون ($p = 0.045$). اتضح أنه من بين المجموعة التي وافقت على المشاركة في إجراء الفحص، أبدى 55,3% استعدادهم لإجراء منظار القولون أو المستقيم. بينما أظهرت النتائج أن 77,4% من المجموعة التي رفضت المشاركة في الفحص، يفضلون إجراء الفحص الإشعاعي باستخدام حقنة الباريوم و/أو التصوير المقطعي للبطن كوسيلة للفحص المبكر.

خاتمة: يوجد نقص في الوعي والمعرفة العامة بفكرة الفحص المبكر لسرطان القولون والمستقيم، ويرتبط ذلك بالمستوى التعليمي ولكن لا صلة له بعامل العمر أو الجنس. المعرفة المسبقة بالفحص المبكر ترتبط إيجابًا باختيار التنظير كوسيلة للفحص، إلا أن الخوف من الخضوع لذلك الفحص، رغم المعرفة المسبقة به، قد يجعل المرضى يختارون وسائل أقل توسعًا، مثل حقنة الباريوم أو التصوير المقطعي للبطن.

Keywords: colonoscopy, early detection of cancer, health knowledge, attitudes, practice, colon neoplasm

INTRODUCTION

Colorectal cancer (CRC) has become an increasingly recognized disease entity and is mostly labeled as a disease that will lead to death or one that will have unbearable side effects with chemotherapy. The general population of Saudi Arabia have become more aware of its increased incidence among different ages, due to the improved modalities of diagnosis. Interestingly, diagnosis at a younger age is noted in old epidemiological reports,^(1,2) as well as in the most recent ones,⁽³⁻⁶⁾ published from different regions of Saudi Arabia. Unusual presentation of CRC on the right side of the colon has become increasingly

recognized. Reports from the Saudi Cancer Registry showed that the incidence of CRC in males and females are 51% and 62% versus the incidence of CRC in the world in general, with mortality reported between 1993 - 2003 in males and females as 65% and 77% respectively.⁽⁷⁾ Both genders are vulnerable to CRC, and in fact, Saudi females have a higher incidence and mortality rate, as compared to other populations in less developed areas of the world.⁽⁷⁾ Colonoscopy is available in different tertiary medical centers in the major cities of Saudi Arabia in governmental and private sectors. Despite its availability there is no direct access to perform colonoscopy for screening purposes in an organized program. Furthermore, for an average income individual, performing screening colonoscopy privately would be costly. There are no screening programs on a national level in Saudi Arabia that conduct organized colon cancer screening using endoscopic or non-endoscopic methods. Early detection is based on an individualized effort from the government or the private sector or, it is based on an individuals interest to visit an endoscopist asking for a procedure or a test that can detect early colon cancer. If the individual's interest to pursue screening is intended, there is no apparent explanation for the barriers of early detection or organized screening programs, except that the internal motives of the individual(s) may hinder the intent to do so for many reasons. A Middle Eastern study from Palestine that was conducted as a population-based study to survey individuals who had performed screening using colonoscopy or fecal occult blood testing (FOBT), recognized several factors that were attributed as barriers to this, namely demographic, health, resource-related and personal reasons.⁽⁸⁾ Our study intended to explore some of those barriers of early detection with the help of a survey conducted among the Saudi general population.

METHODS

The study consisted of a survey that was distributed to patients or their companions attending the Internal Medicine Centre Outpatient Clinics, a tertiary hospital in Jeddah, the Western Region of Saudi Arabia, for the period of January 2012 to December 2012.

The questionnaire: It was self-administered, designed by the principal author, and the responses were kept simple and limited to a maximum of three choices

(Appendix 1). Its aim was to evaluate the respondent's current knowledge about the idea of early detection of CRC, by using the simple recollection of knowledge. The options of diagnosis mentioned were not chosen based on any particular guidelines, rather they were given in the questionnaire to critically examine the respondents best choice based on their actual knowledge whether it was correct or incorrect. The questionnaire was handed out to participants of the study by eight female medical students, who participated both in their distribution and collection. They were final year medical students who had knowledge about the contents of the questionnaire and the diagnostic tests within its contents. They helped to assure the completeness of answers and for clarification of questions, without interfering with or influencing the respondents' answers. The questionnaire comprised of a single page of questions, presented in the Arabic language, and related to age, gender, background, education, the individual's desire to participate in a screening program for colon cancer -if available- their choice of screening method, and the reason behind this choice. Every participant's identity was kept anonymous and the questionnaire was reviewed for completeness when handed back to the students. It had one main criterion to examine and therefore, it was decided that validation was not needed.

Inclusion criteria: Adults over the age of 18 years. This age was chosen to represent individuals who could participate in providing sensible discussion about the benefits of early screening for colon cancer, independently agree to participate in the study, and have the ability to complete the questionnaire form.

Exclusion criteria: This was refusal to participate in the study, lack of the basic ability to read or write (illiteracy), and the absence of 1 – 2 complete answers making the questionnaire invalid for inclusion in the final study. More emphasis was put on completing the questions on age and educational background. The study protocol was approved by the Institutional Review Board of the International Medical Center.

Sample size: Type 1 error was set at 5% with a power set at 80%. The primary outcome was the awareness of colon cancer and knowledge of screening, in which there is no established rate in Saudi Arabia. From local studies of cancer screening awareness, it was found that awareness of prostate cancer screening was reported in 12 – 22% of the population and 50 – 55%

for breast cancer.^(9,10) Based on these studies that identify the attitude of the population towards screening similar to in our own study, the sample size was calculated as 314 with a 5% margin of error. Therefore, 600 questionnaires were planned to be distributed upon initiation of the study.

Statistical tests: The statistical tests used to summarize the demographics were frequency, distribution and simple descriptive statistics. They were used to show the central tendency of a continuous variable using mean, range, and standard deviation. To establish the difference between categorical variables, this study used the chi-square test and a two-tailed *p*-value was considered. This study used an orthodox alpha level *p*-value of <0.05 to define the statistical significance. IBM SPSS Statistics version 20.0 (SPSS Inc., Chicago, Illinois, USA) was used for data analysis.

RESULTS

Six hundred and nineteen questionnaires were distributed to attendees of the Internal Medicine Centre Outpatient Clinics. Due to missing values collectively from all the variables of demographics and the critical awareness questions, only 313 samples (a response of 50.6%) were considered as having complete responses that addressed the objectives of the study, and were admissible for analysis (Table 1). Among the group of respondents who had complete

Table 1. Basic demographics of the study respondents.

Demographics		Counts	%
Inclusion	Excluded	306	49.4
	Included	313	50.6
	Total	619	100.0
Age	≤ 45 yrs.	222	70.9
	> 45 yrs.	91	29.1
	Total	313	100.0
Gender	Male	128	40.9
	Female	185	59.1
	Total	313	100.0
Education	Elementary	92	29.4
	High school	88	28.1
	University/ above	133	42.5
	Total	313	100.0
Age	Min	18	
	Max	73	
	Mean	39.01	
	SD	12.48	

Table 2. Methods of colon cancer screening known to the study respondents.

Heard of colon cancer?	Counts	%
Yes	117	37.4
No	196	62.6
Total	313	100.0
	Counts <i>n</i> = 117	%
Colonoscopy	66	56.41
Sigmoidoscopy	33	28.21
Barium enema	25	21.37
CT scan of abdomen	30	25.64
Others	1	0.85

responses, 117 individuals (37.4%) had previously heard about screening, while 196 individuals (62.6%) had not. Furthermore, those who had previously heard about colon cancer screening were questioned on their awareness of five screening options: colonoscopy, sigmoidoscopy with a fecal occult blood test, barium enema, CT scan of the abdomen, and any other method that was not mentioned but was known to the respondent. Since the last choice had no responses detected in the analysis, it was omitted altogether. Colonoscopy and sigmoidoscopy were the two most commonly heard methods of screening (56.4% and 28.2% respectively), followed by CT scan of the abdomen (25.64%) and barium enema (21.37%) (Table 2).

On direct questioning of the respondents regarding their own willingness to undergo a chosen method of screening, 116 responses were collected. Of these, 73 were not willing to undergo screening, while 43

affirmed their willingness to undergo such screening. Two options were offered to evaluate their choice, which were invasive testing by endoscopy versus noninvasive radiological testing. Their choices were further analyzed to check if their choice was made based on prior knowledge (50 respondents, 45.5%), fear of performing the test (56 respondents, 50.9%) or whether they were not convinced of the idea of screening (four respondents, 3.6%) (Table 3). The item related to "not believing in doing these tests" was broad and was not further categorized to examine if it was due to personal, cultural or religious justifications.

FACTORS ASSOCIATED WITH INCREASED AWARENESS OF COLORECTAL CANCER SCREENING

Further analysis to identify the factors related to increased awareness of CRC showed that age and gender (Table 4) had no statistically significant association with increased awareness ($p = 0.526$ and $p = 0.221$). However, education played a significant role in increased awareness of CRC screening ($p = 0.045$).

Upon directly questioning the respondents whether they would consider using invasive endoscopy (colonoscopy or sigmoidoscopy with fecal occult blood testing) or the noninvasive radiological methods (barium enema or CT scan of the abdomen) for screening, 55.3% of the group who chose to be screened preferred colonoscopy and sigmoidoscopy compared to 77.4% of those who preferred not to be screened, choosing barium enema and a CT scan of the abdomen instead (Table 5). Additionally, the group having previous knowledge of CRC screening was more statistically significant in favor of colonoscopy

Table 3. Direct questions related to choice and reason for CRC screening.

Variables		Counts	%
Do you consider screening for yourself?	Yes	43	37.4
	No	72	62.6
	Total	115	100.0
Do you prefer?	Colonoscopy/sigmoidoscopy	35	35.0
	Barium enema	65	65.0
	Total	100	100.0
Answer is based on?	Prior knowledge	50	45.5
	Fear	56	50.9
	Not convinced of its value	4	3.6
	Total	110	100.0

Table 4. Factors that influence the knowledge of colon cancer screening.

Demographics vs Awareness			Heard of Colon Cancer?			X ²	P-value
			Yes	No	Total		
Age	18 – 25 yrs.	Count	15	31	46	2.23	0.526
		%	32.6%	67.4%	100.0%		
	26 – 35 yrs.	Count	39	54	93		
		%	41.9%	58.1%	100.0%		
	36 – 45 yrs.	Count	33	50	83		
		%	39.8%	60.2%	100.0%		
	> 45 yrs.	Count	30	61	91		
		%	33.0%	67.0%	100.0%		
Total		Count	117	196	313		
		%	37.4%	62.6%	100.0%		
Gender	Male	Count	53	75	128	1.5	0.221
		%	41.4%	58.6%	100.0%		
	Female	Count	64	121	185		
		%	34.6%	65.4%	100.0%		
Total		Count	117	196	313		
		%	37.4%	62.6%	100.0%		
Education	Elementary	Count	25	67	92	5.83	0.045*
		%	27.2%	72.8%	100.0%		
	High school	Count	36	52	88		
		%	40.9%	59.1%	100.0%		
	University/above	Count	56	77	133		
		%	42.1%	57.9%	100.0%		
Total		Count	117	196	313		
		%	37.4%	62.6%	100.0%		

*significant using chi-square test @ 0.05 level

and sigmoidoscopy (61%), as compared to those who were fearful of using this screening method, choosing instead barium enema and CT abdomen (90.4%), Table 5.

DISCUSSION

Screening strategies for cancer prevention are not always limited by the resources available. It is rather the factors of recipient and provider that help in making this process successful such as personal attitude towards screening and availability of the appropriate screening methods. Individuals who are candidates for undergoing CRC screening may have prior knowledge to influence their decision, whether it is based on the experiences of family and friends, or as learned knowledge. Both are crucial elements that may be sufficient to have a strong influence for availing healthcare. Although Saudi Arabia has the available resources for diagnostic and therapeutic procedures, there is lack of a consistent organized

screening program for CRC screening. Overall, the knowledge of the population is less than expected to encourage the spread of screening behavior. This is not a local phenomenon. Arab immigrants to the USA were also noted to have a low rate of screening.⁽¹¹⁾ A study by Qumseya et al., in the West Bank of Palestine conducted an evaluation of this screening obstacle in a population-based study that resembled our study in a few domains. It surveyed a population for their knowledge and experience with CRC screening using colonoscopy or a fecal occult blood test.⁽⁸⁾

Our study explored three main points through a survey, which was applied using a cross-sectional method. Firstly, awareness of CRC screening at the time of the survey was questioned, whether any related information was previously heard of, and if it was known, what factors influenced that knowledge. Age and gender were not sufficient to explain the differences in knowledge, however, different

Table 5. Choice of CRC screening based on personal choices.

Preference vs Decision			Do you prefer?			Total	X ²	P-value
			Colonoscopy/ sigmoidoscopy	Barium enema				
<i>Do you consider screening for yourself?</i>	Yes	Count	21	17	38	11.06	0.001*	
		%	55.3%	44.7%	100.0%			
	No	Count	14	48	62			
		%	22.6%	77.4%	100.0%			
	<i>Total</i>	Count	35	65	100			
%		35.0%	65.0%	100.0%				
<i>Answer is based on?</i>	Prior Knowledge	Count	25	16	41	27.90	<0.001*	
		%	61.0%	39.0%	100.0%			
	Fear	Count	5	47	52			
		%	9.6%	90.4%	100.0%			
	Not convinced of value	Count	2	2	4			
		%	50.0%	50.0%	100.0%			
	<i>Total</i>	Count	32	65	97			
%		33.0%	67.0%	100.0%				

*significant using chi-square test @ 0.05 level

educational levels had an influence on the general awareness of this topic. Ethnic differences were not investigated in our study. However, studies on ethnic minorities in the United States showed that significant ethnic differences existed in risk perception with regard to the different types of cancer after controlling several factors, such as education, income, employment, and others. In that study, the most important factors that accounted for the high odds of screening colonoscopy were African women, family history of cancer, and a moderate-to-very-high risk of perception.⁽¹²⁾ McAlearney confirmed the same findings, showing that under-recognition of the endoscopic methods of screening was associated with poor access to getting screened.⁽¹³⁾ Medicare data, a US medical insurance body, showed that 30.9% of African American women were diagnosed with colon cancer at an age of above 80 years compared to 39.8% of Caucasian women. This was translated into a three-year overall survival rate of 56% and 62%, respectively.⁽¹⁴⁾ Qumseya et al., reported education below secondary school level was associated with a lower probability of accepting colonoscopy as a screening method and increased age was associated with decreased probability of accepting FOBT as a

screening method. Secondly, after posing a direct question to the study respondents about their personal decision to undergo screening versus not undergoing screening, their responses were examined in relation to their choice of whether it was an invasive method or a less invasive method. It was shown significantly that among the people who agreed to be screened, colonoscopy or sigmoidoscopy with fecal occult blood testing was chosen as a screening method. Those who did not agree to be screened chose a less invasive method, which was barium enema or CT scan of the abdomen. Thirdly, the decisions based on previous questions were further analyzed and showed that prior knowledge of the screening types of endoscopic and radiological methods as well as personal fear of doing the test in general, contributed to the decisions made. This study also identified equal utilization of FOBT as a screening method for both genders and the trend that colonoscopy would be embarrassing to perform was identified. Males were found to be more willing to do colonoscopy and to be involved in colon cancer screening. Overall in Qumseya's study, a larger amount of people were willing to undergo CRC screening ($n = 1138, 84\%$) compared to the participants of our

own study ($n = 43$, 37.4%). Several factors that minimized individual participation in CRC screening, included lack of physician referrals to perform screening, distrust in Western medicine, and a fatalistic belief based on the notion that an individual's destiny is God's plan for them. Contrary to that, our study reported a lower rate of individuals not being in favor of screening due to lack of belief in the value of the test ($n = 4$, 3.6%). Living setting was also examined and showed that urban area residents were more likely to choose screening via colonoscopy over other methods.

To promote screening for CRC with colonoscopy, mailed brochures and videotapes explaining the procedure have been found to be effective to enhance screening in asymptomatic individuals going for a general physical examination.^(15,16) These efforts to reinforce the ultimate target of a better screening method by using a conventional, fully completed colonoscopy, were associated with a lower death rate. This was documented in the Canadian study by Rabeneck et al., which stated that for every 1% increase in the complete colonoscopy rate, the hazard of death decreased by 3%.⁽¹⁷⁾ However, a large population study from USA estimated that twice as many CRC deaths remained attributable to the non use of colonoscopy, after controlling several factors such as gender, age, and ethnicity.⁽¹⁸⁾

Our study was limited by its small sample size and lack of assessment of confounders that arose due to variable understanding of the questions in the questionnaire, which affected the choice of screening modalities. Another limiting factor of note was a predominant contribution of female respondents in

the study due to cultural barriers felt by the female medical students who distributed the questionnaires, minimizing a more balanced contribution of respondents from both genders. The hospital setting where the survey was conducted may have also played influential decisions on choices of screening.

Taken together as an initiative in Saudi Arabia, to raise the overall awareness of this growing burden, great effort is needed to publicize and give guidance on the screening of CRC using general media, public schools, and universities.

CONCLUSION

Motivation to perform a diagnostic procedure in order to diagnose CRC at an early stage is of paramount importance. This can be achieved by enhancing the overall knowledge of the stage of development of colon cancer, in conjunction with the procedure of choice. There seems to be a deficiency of knowledge with regard to CRC screening that is unrelated to age or gender. A collective effort is needed to broadcast this knowledge through media and public schools, with a hope that it will alter the current aggressive disease presentation in Saudi Arabia.

ACKNOWLEDGEMENTS

The authors would like to acknowledge the great efforts of Drs. Dalia Al-Hafdhi, Hanoof Al-Barakati, Mashaeel Sakhakhni, Ohoud Al-Rabei, Afnan Al-Ghamdi, Hanan Al-Malki, Alaa Al-Sharef, and Maryam Al-Harbi, for their contribution in collecting questionnaires from the participants. Mr. Kalvin Balucanag's effort in statistical analysis is greatly appreciated.

REFERENCES

1. Isbister WH. Colorectal cancer below age 40 in the Kingdom of Saudi Arabia. *Aust N Z J Surg.* 1992;62(6):468–472.
2. Sinnatamby CS, Al-Breiki H, Al-Freih H, Al-Idrissi H, Al-Quorain A, Al-Hamdan A, et al., Alimentary malignancies in Arabs in the Eastern Province of Saudi Arabia. *Trop Geogr Med.* 1986;38(1):79–83.
3. Guraya SY, Eltinay OE. Higher prevalence in young population and rightward shift of colorectal carcinoma. *Saudi Med J.* 2006;27(9):1391–1393.
4. Aljebreen AM. Clinico-pathological patterns of colorectal cancer in Saudi Arabia: younger with an advanced stage presentation. *Saudi J Gastroenterol.* 2007;13(2):84–87.
5. Amin TT, Suleman W, Al Taissan AA, Al Joher AL, Al Mulhim O, Al Yousef AH. Patients' profile, clinical presentations and histopathological features of colorectal cancer in Al Hassa region, Saudi Arabia. *Asian Pac J Cancer Prev.* 2012;13(1):211–216.
6. Mansoor I, Zahrani IH, Abdul Aziz S. *Colorectal cancers in Saudi Arabia.* *Saudi Med J.* 2002;23(3):322–327.
7. Ibrahim EM, Zeeneldin AA, El-Khodary TR, Al-Gahmi AM, Bin Sadiq BM. Past, present and future of colorectal cancer in the Kingdom of Saudi Arabia. *Saudi J Gastroenterol.* 2008;14(4):178–182.

8. Qumseya BJ, Tayem YI, Dasa OY, Nahhal KW, Abu-Limon IM, Hmidat AM, Al-Shareif AF, Hamadneh MK, Riegert-Johnson DL, Wallace MB. Barriers to colorectal cancer screening in palestine: a national study in a medically underserved population. *Clin Gastroenterol Hepatol.* 2014;12(3):463–469.
9. Arafa MA, Rabah DM, Wahdan IH. Awareness of general public towards cancer prostate and screening practice in Arabic communities: a comparative multi-center study. *Asian Pac J Cancer Prev.* 2012;13(9):4321–4326.
10. Radi SM. Breast Cancer awareness among Saudi females in Jeddah. *Asian Pac J Cancer Prev.* 2013;14(7):4307–4312.
11. Al-Omran H. Measurement of the knowledge, attitudes and beliefs of Arab-American adults toward cancer screening and early detection: development of a survey instrument. *Ethn Dis.* 2005;15(1 Suppl 1): S1-15–S1-16.
12. Kim SE, Perez-Stable EJ, Wong S, Gregorich S, Sawaya GF, Walsh JM. Association between cancer risk perception and screening behavior among diverse women. *Arch Intern Med.* 2008;168(7):728–734.
13. McAlearney AS, Reeves KW, Dickinson SL, Kelly KM, Tatum C, Katz ML. Racial differences in colorectal cancer screening practices and knowledge within a low-income population. *Cancer.* 2008;112(2):391–398.
14. Du XL, Fang S, Vernon SW, El-Serag H, Shih YT, Davila J. Racial disparities and socioeconomic status in association with survival in a large population-based cohort of elderly patients with colon cancer. *Cancer.* 2007;110(3):660–669.
15. Shankaran V, McKoy JM, Dandade N, Nonzee N, Tigue CA, Bennett CL, Denberg TD. Costs and cost-effectiveness of a low-intensity patient-directed intervention to promote colorectal cancer screening. *J Clin Oncol.* 2007;25(33):5248–5253.
16. Zapka JG, Lemon SC, Puleo E, Estabrook B, Luckmann R, Erban S. Patient education for colon cancer screening: a randomized trial of a video mailed before a physical examination. *Ann Intern Med.* 2004;141(9):683–692.
17. Rabeneck L, Paszat LF, Saskin R, Stukel TA. Association between colonoscopy rates and colorectal cancer mortality. *Am J Gastroenterol.* 2010;105(7):1627–1632.
18. Stock C, Knudsen AB, Lansdorp-Vogelaar I, Haug U, Brenner H. Colorectal cancer mortality prevented by use and attributable to nonuse of colonoscopy. *Gastrointest Endosc. Mar.*; 2011;73(3): 435.e5–443.e5.

Appendix

- 1) Are you: Male patient , Female patient
(1) هل انت: مريض رجل , مريضة امرأة
- 2) Educational level: Elementary, Intermediate, High school, University and above
(2) المستوى الدراسي: ابتدائي, متوسط, ثانوي, جامعة
- 3) Have you ever heard about early screening for colon cancer: Yes, No
(3) هل سبق ان سمعت عن الكشف المبكر لأورام الأمعاء الغليظة نعم, لا
- 4) If your answer to the previous question is Yes, please continue the questionnaire.
(4) اذا كانت اجابتك نعم عن السؤال السابق اعلاه الرجاء اكمال البحث
- 5) Methods of early screening for colon cancer that you know about is/are: Colonoscopy, Sigmoidoscopy and Fecal occult blood testing, Barium enema, CT scan of the abdomen, Other method that you may know of (write it down)
(5) وسائل الكشف المبكر لأورام الأمعاء الغليظة التي تعرفها هي: منظار القولون, منظار المستقيم والقناة الشرجية بالإضافة لأختبار الدم في عينة البراز, اشعة بصيغة الباريوم للأمعاء الغليظة, اشعة البطن المقطعية, وسيلة تشخيصية غير التي سبق ذكرها (الرجاء كتابتها)
- 6) Have you ever considered screening yourself for colon cancer: Yes, No
(6) هل سبق لك التفكير بعمل كشف مبكر لك شخصيا: نعم, لا
- 7) Would you consider screening yourself for colon cancer using: Colonoscopy or sigmoidoscopy, Barium enema or CT scan of the abdomen.
(7) هل تفضل بعمل كشف مبكر لك شخصيا بأستعمال: منظار للقولون او المستقيم, اشعة صبغة أو اشعة مقطعية
- 8) Did you choose your answer to the previous question based on: Previous knowledge of the test, Fear of doing Endoscopy, Not convinced of the idea of screening.
(8) هل كان اختيارك لأجابة السؤال اعلاه بناء على: معرفة سابقة بالفحص, الخوف من عمل المنظار, عدم الأقتناع بالموضوع