

AWARENESS OF SYMPTOMS, RISK FACTORS AND COMMON SCREENING TESTS
OF COLORECTAL CANCER AMONG PATIENTS ATTENDING PRIMARY HEALTH
CARE CENTERS, BAGHDAD CITY, 2020

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ABSTRACT

Background: Awareness of colorectal cancer symptoms, risk factors and screening may support early detection and informed screening decisions. **Objective:** To assess awareness, perceived screening barriers and future screening intentions among primary health care attendees in Baghdad. **Methods:** A cross-sectional study recruited a convenience sample of 375 adults aged 30 years or older at five primary health care centers between April and September 2020. Interviewer-administered questionnaires assessed symptoms, risk factors and screening. Awareness scores were categorized as poor, fair or good. Associations were examined using chi-square tests. **Results:** Good awareness of symptoms and risk factors was recorded in 36 (9.6%) and 96 (25.6%) participants, respectively. Awareness levels were associated with age, sex and socioeconomic status. None reported previous screening. Overall, 269 (71.7%) had not heard of screening, and 87 (23.2%) recognized its role in early detection. Among 102 participants aged 50 years or older, lack of physician recommendation was the most frequently reported barrier (36; 35.3%). After a brief explanation, 240 (64.0%) expressed willingness to undergo screening while asymptomatic; 135 (56.3%) of these preferred stool testing. **Conclusion:** Awareness was limited in this clinic sample. Physician-led education and discussion of screening barriers may help address these gaps. Stated willingness after explanation should not be equated with subsequent screening uptake.

KEYWORDS: Colorectal cancer; awareness; screening; primary health care; Baghdad; Iraq.

INTRODUCTION

Colorectal cancer (CRC) is a major contributor to the global cancer burden. Global cancer estimates and epidemiological analyses describe substantial incidence, mortality and disability associated with this disease.^[1,2,3] Cancers of the colon and rectum are commonly considered together because they share important biological and clinical characteristics.^[4] Many arise through gradual progression of precursor lesions, providing an opportunity for prevention and early detection.^[5] Adenocarcinoma is the predominant histological type.^[6] Stool-based screening and structural examinations can identify occult disease or precursor lesions before symptomatic presentation.^[7]

In the 2016 Iraqi Cancer Registry, CRC accounted for 5.89% of newly diagnosed cancers and ranked fourth overall.^[8] Iraqi reports have described changes in its incidence and demographic distribution.^[9,10,11] Research among Iraqi American women has also highlighted gaps in screening knowledge and practice.^[12] Regional studies in Jordan, Saudi Arabia, Iran and Kuwait provide additional evidence of the importance of CRC and the need to assess public awareness.^[13,14,15,16,17] Differences in cancer registration and population coverage should be considered when interpreting geographical comparisons.^[18]

Awareness and knowledge are related concepts, but their measurement requires clear definitions.^[19] Recognition of CRC risk factors and symptoms has been associated with screening intentions and participation.^[20] Lifestyle modification offers opportunities for prevention.^[21,22] Age and personal history of colorectal neoplasia contribute to risk,^[23,24] while clinical and morphological characteristics influence prognosis.^[25] Long-standing inflammatory bowel disease and a family history of CRC are also relevant.^[26,27] Potentially modifiable factors include obesity, physical inactivity and dietary patterns; diabetes has likewise been associated with CRC risk.^[28,29,30,31]

Recognizing warning symptoms may encourage timely medical consultation.^[32] Rectal bleeding can be accompanied by delays in seeking advice,^[33,34] and changes in bowel habit, abdominal symptoms and iron-deficiency anemia are relevant to assessment in primary care.^[35,36,37] Screening, in contrast, is intended for eligible people without symptoms. Demographic characteristics, education, income and family history may influence knowledge and screening behavior.^[38,39]

International reports have described changes in cancer outcomes over time,^[40] and screening can facilitate detection and removal of premalignant lesions.^[41] Survival varies substantially with disease stage.^[42] At the time of this study, recommendations differed regarding the starting age for average-risk screening: the 2016 United States Preventive Services Task Force recommendation began at age 50, whereas the 2018 American Cancer Society guideline recommended initiation at age 45.^[7,43] These historical recommendations provide context for the study's age categories. Screening programs and access vary internationally, and regional reports have called attention to earlier-age CRC and prevention needs.^[44,45]

Family physicians can assess personal and family history, identify increased risk and support appropriate referral.^[46,47] Health-system factors and physician recommendations may influence screening behavior.^[48,49] Reported barriers include limited knowledge, fear, embarrassment and the belief that screening is unnecessary without symptoms.^[50,51] Iraqi and international studies have described limited screening uptake or awareness,^[52,53] including work from Kirkuk.^[54] Evidence specific to primary health care attendees in Baghdad was limited when this study was undertaken.

This study assessed awareness of CRC symptoms, risk factors and screening among patients attending primary health care centers in Baghdad in 2020. It also examined associations with sociodemographic characteristics, perceived barriers among participants aged 50 years or older, and intentions to undergo screening after a brief explanation.

MATERIALS AND METHODS

Study design and setting

A descriptive cross-sectional study with analytical components was conducted from 1 April to 30 September 2020 at five primary health care centers belonging to the Al-Karkh Health Directorate in Baghdad: Hitten, Al-Mansour, Al-Adil, Al-Ameryia and Al-Dakhilyia. Centers were selected according to the researcher's ability to access them during coronavirus disease 2019 restrictions.

Participants and sampling

A convenience sample of 375 Iraqi patients attending the selected centers for primary health care services participated. Eligible patients were aged 30 years or older and physically and mentally able to answer the questionnaire. Patients with inflammatory bowel disease or a personal history of CRC or colorectal polyps were excluded.

Questionnaire and data collection

Data were collected through direct interviews using a questionnaire developed after a review of related literature. Its content was reviewed and approved by the committee of postgraduate doctors in the Department of Family and Community Medicine, Al-Kindy College of Medicine, University of Baghdad. The questionnaire contained four parts: sociodemographic characteristics; awareness of symptoms and risk factors; screening awareness and barriers; and future screening intentions and preferred methods.

Sociodemographic variables included age, sex, marital status, education, occupation, house and car ownership, and family history of CRC. Socioeconomic status was calculated using the index developed by Omer and Al-Hadithi.^[55] The index combines education and occupation scores, house ownership (1 point), car ownership (0.5 points), an age adjustment of (age – 20)/100, and a deduction of 1 point for retirement or unemployment. Scores of 0–4, >4–8, >8–12 and >12 were categorized as poor, fair, good and excellent, respectively.

The awareness component included nine symptom items and twelve risk-factor items derived from relevant Cancer Awareness Measure modules.^[56] Responses were “yes,” “no” or “do not know”; “yes” was scored as correct for each item. Symptom and risk-factor scores were calculated separately as the number of correct answers divided by 9 or 12, respectively, multiplied by 100. Scores <50% indicated poor awareness, 50–75% fair awareness and >75% good awareness, based on Tfaily et al. and Bidouei et al.^[41,39]

Screening questions assessed previous screening, whether respondents had heard of screening, its role in early detection and recognition of screening tests. The barriers component was informed by Tfaily et al. and Galal et al.^[41,57] Participants aged 50 years or older could

select all applicable barriers. This subgroup comprised 102 respondents; its size was used as the denominator for every barrier percentage.

Before the two questions on future screening intentions and method preference, the researcher briefly explained the available screening tests and their goals. Participants then indicated whether they would undergo screening despite having no symptoms. Those accepting screening selected a preferred method. After completing the questionnaire, all respondents received information about the correct answers concerning symptoms, risk factors and screening.

The researcher attended the centers twice weekly from 09:00 to 14:00. Physical distancing, masks and avoidance of crowding were used during data collection. A pilot study involving ten patients, excluded from the final sample, assessed clarity and interview duration. Interviews took approximately 15–20 minutes, and questions were adjusted in response to the pilot findings.

Approvals and consent

Official agreement and permission were obtained from the Council of the Iraqi Board of Medical Specialization and the Baghdad Health Directorate of Al-Karkh before data collection. Verbal informed consent was obtained after explaining the study purpose. Participants were assured that their information would remain confidential and be used only for research.

Statistical analysis

Data were entered into Microsoft Excel 2016 and analyzed using SPSS version 24. Categorical variables were summarized as frequencies and percentages, and age as mean and standard deviation. Pearson's chi-square test assessed associations between sociodemographic characteristics and awareness categories. Pearson's correlation coefficient assessed the relationship between symptom and risk-factor scores. Statistical significance was set at $P < 0.05$. Percentages are reported to one decimal place, using the full sample, the relevant row total or the specified subgroup as the denominator.

Table 2: Recognition of colorectal cancer symptoms (N = 375).

Symptom	Yes, n (%)	No, n (%)	Do not know, n (%)
Rectal bleeding	108 (28.8)	78 (20.8)	189 (50.4)
Persistent abdominal pain	111 (29.6)	69 (18.4)	195 (52.0)
Change in bowel habit over several weeks	96 (25.6)	96 (25.6)	183 (48.8)
Incomplete bowel emptying	87 (23.2)	99 (26.4)	189 (50.4)
Blood in stool	144 (38.4)	99 (26.4)	132 (35.2)
Pain in the back passage	93 (24.8)	129 (34.4)	153 (40.8)
Abdominal lump	174 (46.4)	84 (22.4)	117 (31.2)
Tiredness or anemia	96 (25.6)	144 (38.4)	135 (36.0)
Unexplained weight loss	174 (46.4)	96 (25.6)	105 (28.0)

"Yes" was scored as the correct answer for each questionnaire item.

Symptom awareness categories were associated with age ($P = 0.001$), sex ($P = 0.001$), socioeconomic status ($P < 0.001$) and family history of CRC ($P < 0.001$), but not

RESULTS

Participant characteristics

The study included 375 participants with a mean age of 43.49 ± 10.46 years. Of these, 273 (72.8%) were younger than 50 years and 102 (27.2%) were aged 50 years or older. Women comprised 222 (59.2%) participants, 291 (77.6%) were married, and 36 (9.6%) reported a family history of CRC. None reported previous CRC screening (Table 1).

Table 1: Sociodemographic characteristics and previous screening (N = 375).

Characteristic	n	%
Age, years: <50	273	72.8
Age, years: ≥ 50	102	27.2
Gender: Male	153	40.8
Gender: Female	222	59.2
Marital status: Single	33	8.8
Marital status: Married	291	77.6
Marital status: Other	51	13.6
Socioeconomic status: Poor	114	30.4
Socioeconomic status: Fair	118	31.5
Socioeconomic status: Good	107	28.5
Socioeconomic status: Excellent	36	9.6
Family history of CRC: Yes	36	9.6
Family history of CRC: No	339	90.4
Prior CRC screening: Yes	0	0.0
Prior CRC screening: No	375	100.0

Socioeconomic status was assessed using the Omer and Al-Hadithi index. "Other" marital status was retained as recorded in the source data.

Awareness of symptoms

Abdominal lump and unexplained weight loss were the most frequently recognized symptoms, each identified by 174 (46.4%) participants. Incomplete bowel emptying was the least frequently recognized symptom (87; 23.2%) (Table 2). Overall, 282 (75.2%) had poor symptom awareness, 57 (15.2%) fair awareness and 36 (9.6%) good awareness.

marital status ($P = 0.190$). Good awareness was more frequent among participants aged 50 years or older, men, those with excellent socioeconomic status and those with

a family history of CRC (Table 3). These are unadjusted associations across the three awareness categories.

Table 3: Sociodemographic characteristics and symptom awareness (N = 375).

Characteristic	n	Good, n (%)	Fair, n (%)	Poor, n (%)	P value
Age: <50 years	273	21 (7.7)	33 (12.1)	219 (80.2)	0.001
Age: ≥50 years	102	15 (14.7)	24 (23.5)	63 (61.8)	
Sex: Male	153	24 (15.7)	27 (17.6)	102 (66.7)	0.001
Sex: Female	222	12 (5.4)	30 (13.5)	180 (81.1)	
Marital status: Single	33	5 (15.2)	6 (18.2)	22 (66.7)	0.190
Marital status: Married	291	25 (8.6)	39 (13.4)	227 (78.0)	
Marital status: Other	51	6 (11.8)	12 (23.5)	33 (64.7)	
SES: Poor	114	3 (2.6)	10 (8.8)	101 (88.6)	<0.001
SES: Fair	118	7 (5.9)	12 (10.2)	99 (83.9)	
SES: Good	107	11 (10.3)	22 (20.6)	74 (69.2)	
SES: Excellent	36	15 (41.7)	13 (36.1)	8 (22.2)	
Family history of CRC: Yes	36	11 (30.6)	6 (16.7)	19 (52.8)	<0.001
Family history of CRC: No	339	25 (7.4)	51 (15.0)	263 (77.6)	

Percentages are within each row. P values are Pearson chi-square results for each characteristic across all three awareness categories. SES: socioeconomic status.

Awareness of risk factors

A personal history of colorectal polyps or CRC (216; 57.6%), heavy smoking (210; 56.0%) and inflammatory bowel disease (189; 50.4%) were the most frequently

recognized risk factors. A low-fiber diet was the least frequently recognized (123; 32.8%) (Table 4). Risk-factor awareness was poor in 195 (52.0%), fair in 84 (22.4%) and good in 96 (25.6%) participants.

Table 4: Recognition of colorectal cancer risk factors (N = 375).

Risk factor	Yes, n (%)	No, n (%)	Do not know, n (%)
Being 70 years old	183 (48.8)	69 (18.4)	123 (32.8)
Alcohol consumption	177 (47.2)	69 (18.4)	129 (34.4)
Heavy smoking	210 (56.0)	90 (24.0)	75 (20.0)
Not eating fruit and vegetables	150 (40.0)	120 (32.0)	105 (28.0)
Low-fiber diet	123 (32.8)	84 (22.4)	168 (44.8)
Diet high in meat	126 (33.6)	99 (26.4)	150 (40.0)
Family history of colorectal cancer	171 (45.6)	96 (25.6)	108 (28.8)
Obesity	126 (33.6)	126 (33.6)	123 (32.8)
Physical inactivity	171 (45.6)	96 (25.6)	108 (28.8)
Personal history of inflammatory bowel disease	189 (50.4)	54 (14.4)	132 (35.2)
Diabetes mellitus	132 (35.2)	87 (23.2)	156 (41.6)
Previous colorectal polyps or colorectal cancer	216 (57.6)	48 (12.8)	111 (29.6)

“Yes” was scored as the correct answer for each questionnaire item; labels preserve the concepts used in the original instrument.

Risk-factor awareness categories were associated with age, sex and socioeconomic status (all $P < 0.001$), but not marital status ($P = 0.144$) or family history of CRC ($P = 0.119$). Good awareness was more frequent among older

participants, men and those with excellent socioeconomic status (Table 5). Symptom and risk-factor scores were positively correlated ($r = 0.601$; $P = 0.001$).

Table 5: Sociodemographic characteristics and risk-factor awareness (N = 375).

Characteristic	n	Good, n (%)	Fair, n (%)	Poor, n (%)	P value
Age: <50 years	273	54 (19.8)	60 (22.0)	159 (58.2)	<0.001
Age: ≥50 years	102	42 (41.2)	24 (23.5)	36 (35.3)	
Sex: Male	153	54 (35.3)	42 (27.5)	57 (37.3)	<0.001
Sex: Female	222	42 (18.9)	42 (18.9)	138 (62.2)	
Marital status: Single	33	9 (27.3)	7 (21.2)	17 (51.5)	0.144
Marital status: Married	291	69 (23.7)	62 (21.3)	160 (55.0)	
Marital status: Other	51	18 (35.3)	15 (29.4)	18 (35.3)	
SES: Poor	114	14 (12.3)	16 (14.0)	84 (73.7)	<0.001
SES: Fair	118	33 (28.0)	33 (28.0)	52 (44.1)	

SES: Good	107	27 (25.2)	27 (25.2)	53 (49.5)	
SES: Excellent	36	22 (61.1)	8 (22.2)	6 (16.7)	
Family history of CRC: Yes	36	5 (13.9)	12 (33.3)	19 (52.8)	0.119
Family history of CRC: No	339	91 (26.8)	72 (21.2)	176 (51.9)	

Percentages are within each row. *P* values are Pearson chi-square results for each characteristic across all three awareness categories. SES: socioeconomic status.

Screening awareness

Overall, 106 (28.3%) had heard of CRC screening, whereas 269 (71.7%) had not. Only 87 (23.2%) recognized that screening can help detect CRC early; 213 (56.8%) answered “no” and 75 (20.0%) did not know (Table 6). When asked to identify screening tests, 174 (46.4%) did not know, and 66 (17.6%) selected all three listed tests (Table 7).

Table 6: Awareness of colorectal cancer screening (N = 375).

Item and response	n	%
Heard of screening: Yes	106	28.3
Heard of screening: No	269	71.7
Screening helps early detection: Yes	87	23.2
Screening helps early detection: No	213	56.8
Screening helps early detection: Don't know	75	20.0

Table 7: Responses to the screening-test identification question (N = 375).

Response	n	%
Stool test (FOBT)	15	4.0
Colonoscopy	105	28.0
Sigmoidoscopy	15	4.0
All of the above	66	17.6
Don't know	174	46.4

FOBT: fecal occult blood test. Responses represent the selected option, not the proportion recognizing each test across all response options.

Table 9: Future screening intentions and preferred methods.

Response	n	%
Future screening intention: Yes	240	64.0
Future screening intention: No	72	19.2
Future screening intention: Uncertain	63	16.8
Preferred method: Stool test	135	56.3
Preferred method: Colonoscopy or sigmoidoscopy	105	43.8

Intention percentages use *N* = 375; preference percentages use *n* = 240 willing participants. Both questions followed a brief explanation of screening. Rounded preference percentages sum to 100.1%.

DISCUSSION

This study identified limited awareness of CRC among primary health care attendees in Baghdad during 2020. Only 9.6% had good symptom awareness and 25.6% had good risk-factor awareness. These findings are consistent with the general pattern of knowledge gaps reported in Saudi Arabia and Lebanon, although the instruments, thresholds and populations differ and the reported proportions are not directly interchangeable.^[57,41]

Perceived barriers and future intentions

Among participants aged ≥ 50 years (*n* = 102), the leading barriers were lack of physician recommendation (36; 35.3%), never having heard of screening (33; 32.4%), absence of symptoms (24; 23.5%) and fear of results (21; 20.6%) (Table 8).

Table 8: Screening barriers among participants aged ≥ 50 years (n = 102).

Barrier	n	%
Not recommended by physicians	36	35.3
Never heard of it	33	32.4
Have no symptoms	24	23.5
Fear of results	21	20.6
Fear of painful procedure	12	11.8
There is no benefit	9	8.8
Embarrassment	6	5.9
Costly	6	5.9
No time	6	5.9

Multiple responses were allowed. Each percentage uses 102 as the denominator; percentages therefore do not sum to 100%.

After receiving a brief explanation of screening and its purpose, 240 (64.0%) participants indicated that they would undergo screening while asymptomatic, 72 (19.2%) declined and 63 (16.8%) were uncertain. Among the 240 willing participants, 135 (56.3%) preferred a stool test and 105 (43.8%) preferred colonoscopy or sigmoidoscopy (Table 9).

Older age, male sex and excellent socioeconomic status were associated with awareness categories. Older adults may have more contact with health services, but this explanation was not tested. Bidouei et al. and Galal et al. also reported higher knowledge among older participants.^[39,57] The socioeconomic pattern is consistent with the findings of Su et al.,^[58] although Tfaily et al. found no significant association with education or employment.^[41] These differences may reflect population and measurement characteristics. The

present analyses were unadjusted and cannot establish independent effects of age, sex or socioeconomic status.

Family history of CRC was associated with symptom awareness but not risk-factor awareness. Al Wutayd et al. reported related findings for awareness,^[15] whereas Bidouei et al. did not identify a significant relationship with risk-factor knowledge.^[39] Only 36 participants in the current sample reported a family history, which limits interpretation of this subgroup. Men had higher awareness than women in this sample; this differs from Taha et al., who found no significant sex difference,^[59] and McCaffery et al., who reported higher awareness among women.^[32] Educational or health-service differences are possible explanations, but were not evaluated as mediators in this analysis.

Abdominal lump and unexplained weight loss were the most frequently recognized symptoms, whereas fewer than one-third recognized rectal bleeding. Saeed et al. and Su et al. described different patterns, with blood in stool or abdominal pain among commonly recognized symptoms.^[17,58] Power et al. reported substantially greater recognition of rectal bleeding in a United Kingdom population survey.^[60] Confusion with benign gastrointestinal conditions may contribute to delayed consultation, although this mechanism was not measured here. Education should distinguish the need to assess symptoms from the purpose of screening in asymptomatic people. Rectal bleeding, abdominal pain and altered bowel habit remain relevant features in the clinical presentation literature.^[61]

Previous colorectal polyps or CRC, smoking and inflammatory bowel disease were recognized as risk factors by more than half of participants, broadly consistent with the pattern reported by Tfaily et al.^[41] In contrast, low-fiber diet, high meat intake and obesity were identified by approximately one-third. Su et al. also reported limited recognition of dietary and obesity-related risks.^[58] These findings support discussion of established risk factors in primary care while retaining the distinction between questionnaire responses and an individual's measured risk.

Screening awareness was limited: 71.7% had not heard of screening, and only 23.2% recognized its role in early detection. Studies elsewhere have examined screening awareness and barriers,^[62] and low knowledge has also been reported in Jordan and among higher-risk individuals in Iran.^[14,63] Tfaily et al. reported greater awareness of the need for screening in Lebanon.^[41] Differences in access, population selection and the wording of questions may partly explain variation between studies.

No participant reported previous CRC screening. Low screening uptake was also described in work from the Kurdistan center for gastroenterology and hepatology.^[52] Previous studies reported screening participation of

approximately 4.2% in Iran, 8.6% in Saudi Arabia, 9% in Jordan, 15% in Lebanon and 17% in Turkey.^[39,57,14,41,64] Historical United States surveillance reported much higher use of CRC tests among adults aged 50 years or older.^[65] These figures concern different populations, age ranges, periods and definitions and should not be interpreted as directly comparable national rates. The present sample also included adults below routine screening ages, so absence of screening among all 375 participants cannot by itself be classified as nonadherence.

Among respondents aged 50 years or older, lack of physician recommendation (35.3%) and never having heard of screening (32.4%) were the most frequently selected barriers. Absence of symptoms and fear of results were also reported. The Kirkuk study by Abdulhusain and Othman emphasized absence of symptoms and fear or embarrassment,^[54] while studies in Jordan and Saudi Arabia reported related but differently ranked barriers.^[14,57] The current findings are compatible with the importance of provider communication described in reviews of screening participation.^[66,50] However, the survey did not directly assess physicians' knowledge, recommendations or service availability, and perceived barriers cannot establish their causes.

Following a brief explanation, 64.0% expressed willingness to undergo screening without symptoms, and 56.3% of willing respondents preferred stool testing. Studies in Kirkuk, Lebanon and Jordan also examined screening intentions, with differing results.^[54,41,14] This response indicates potential receptiveness to discussion, but the study did not measure intentions before the explanation or subsequent screening uptake. It therefore cannot demonstrate that education increased willingness or that stated willingness would translate into participation. Provider-supported counseling and evaluation of practical access remain relevant subjects for further research.

Limitations

Convenience sampling and selection of accessible centers during COVID-19 restrictions limit generalizability to Baghdad or Iraq as a whole. The cross-sectional design does not establish causality. Previous screening and intentions were self-reported. Screening eligibility was not established for each participant, and barriers were collected only from those aged 50 years or older. Intentions were assessed after an explanation, without a pre-explanation comparison or follow-up. The questionnaire underwent content review and pilot testing, but reliability estimates for the modified instrument were not reported.

CONCLUSION

Awareness of CRC symptoms, risk factors and screening was limited among the primary health care attendees studied in Baghdad in 2020. Awareness categories were associated with age, sex and socioeconomic status. Lack

of physician recommendation and limited knowledge of screening were the most frequently reported barriers among participants aged 50 years or older. The willingness expressed by many respondents after explanation supports further evaluation of physician-led education, discussion of benefits and harms, and accessible screening pathways for eligible patients. Larger community-based studies and follow-up of actual screening uptake are needed.

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Conflict of interest

The author declares no conflict of interest.

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