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Barriers to Colorectal Cancer Screening in Jordan: Current State and Future Directions

Mohammad Balaw¹, Mohammed Al-Aquily¹, Majd M. AlBarakat^{2a}, Nooraldeen Abdeljalil³, Ala Abdel-Jalil, MD, FACP⁴

¹ Hashemite University, ² Jordan University of Science and Technology, ³ University of Jordan, ⁴ Department of Medicine, Case Western Reserve University

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Background

Colorectal cancer (CRC) is the third most common global cancer and the second leading cause of cancer-related deaths. Despite screening effectiveness, barriers such as misconception, cultural beliefs, cost, and disparities hinder widespread adoption.

Methods

In this review, we searched for relevant articles using PubMed and Cochrane Library databases. Studies had to be published in English to be considered. We examined global, regional, and local barriers to CRC screening in Jordan.

Results

The general population demonstrated limited knowledge about CRC and screening effectiveness, in contrast to healthcare workers who exhibited acceptable level of knowledge, reflecting a gap in communicating the importance of CRC screening between physicians and patients. Minority of the general population in Jordan (11%) had undergone CRC screening, 20% reported having heard of one of the several screening tests available for CRC, and two-thirds underestimated the risk of CRC. Though, a good proportion of Jordanians were willing to pay for a colonoscopy out of pocket if it was recommended by their physician.

Conclusion

It is crucial to address the lack of physician guidance, pinpointing whether this issue stems from poor patient-physician communication or insufficient knowledge among healthcare providers regarding the significance of CRC screening. Moreover, tackling social and gender disparities is vital, given that men are both more susceptible to CRC and less likely to pursue screening.

INTRODUCTION

Colon cancer, also known as colorectal cancer (CRC), involves the colon and the rectum. It is the third most prevalent cancer worldwide and the second leading cause of cancer-related mortality.¹ It usually presents in elderly patients with blood in the stool, weight loss, changes in bowel habits, and symptoms of anemia.² Most CRC cases are sporadically caused by genetic and environmental factors, including obesity, lack of physical activity, low fiber intake, tobacco use, and alcohol consumption. The two most important familial causes are Lynch syndrome and Fa-

miliar Adenomatous Polyposis (FAP). Both syndromes and several other hereditary syndromes are associated with 5-10% of all colon cancer cases.³ In addition, a personal history of inflammatory bowel disease (Crohn's disease and Ulcerative Colitis) is associated with a higher chance of developing colon cancer.^{4,5} CRC usually develops from a polyp through several pathways that are well established.⁶ These primary lesions aid in the diagnosis and treatment of colon cancer.

The diagnosis of CRC can be performed by either invasive or simple non-invasive methods.⁷ Non-invasive methods include rectal examination, which has a sensitivity of

a Corresponding author:
Majd AlBarakat, Email: Mmalbarakat20@med.just.edu.jo

almost 70% for rectal tumors.⁸ A fecal occult blood test is another non-invasive test that detects hemoglobin from a stool specimen which indicates bleeding in the Gastrointestinal tract. It has a sensitivity of 50%.⁹ Immunohistochemical fecal occult blood test (FIT) detects globin protein in a stool sample with a sensitivity of 85%.¹⁰ A more recent test is stool DNA, which detects several mutations from the DNA of the stool sample and has higher sensitivity compared to the conventional fecal occult blood tests.¹¹ Imaging modalities, including endorectal ultrasonography (USG), computed tomography, and nuclear magnetic resonance imaging are all modalities that can aid in the diagnosis of CRC.¹²

Regarding Invasive methods of diagnosis, the two major methods are flexible sigmoidoscopy and colonoscopy.¹³ Colonoscopy is the gold standard screening tool for CRC due to its high sensitivity which ranges from 75% to 93% and a specificity of 94%.^{13,14} It allows the physician to visualize the colon, excise the lesions, and take biopsies across the whole colon. As a result, it is found to decrease mortality from CRC by 29% and distal CRC (rectum, sigmoid, and descending colon) by 47%.¹⁵ One setback of colonoscopy is that it requires full sedation and full bowel prep. On the other hand, flexible sigmoidoscopy requires far less bowel preparation compared to colonoscopy but is used to detect tumors in the distal colon. Furthermore, studies have shown that it decreases the mortality of distal CRC by 46%.¹⁵

This review aims to investigate and analyze the various barriers to CRC screening in Jordan, including but not limited to misconceptions, cultural beliefs, economic factors, and healthcare disparities.

SCREENING ACCORDING TO CURRENT GUIDELINES

Numerous prominent organizations provide guidelines to support healthcare professionals in effectively managing colon cancer and its screening.

In the United States, the American Cancer Society (ACS) plays a pivotal role by offering comprehensive recommendations for colon cancer screening, prevention, and treatment. Similarly, the National Comprehensive Cancer Network (NCCN) provides evidence-based guidelines that cover various facets of colon cancer management, including diagnosis, staging, and treatment options. In Europe, the European Society for Medical Oncology (ESMO) and the European Society of Coloproctology (ESCP) are significant bodies that offer guidelines specifically focused on colon cancer. The ESMO provides a comprehensive framework for diagnosing and treating colorectal cancer, providing recommendations for surgical procedures, chemotherapy, targeted therapy, and immunotherapy. In contrast, ESCP concentrates on the surgical aspects of colon cancer, offering guidelines for surgical procedures, preoperative staging, and postoperative management.

Moreover, the World Health Organization (WHO) and the International Agency for Research on Cancer (IARC) have made valuable contributions to the global understand-

ing of colon cancer. These organizations contribute evidence-based guidelines and recommendations to enhance prevention efforts, early detection, and treatment strategies worldwide.

- American Cancer Society (ACS): The ACS recommends that individuals with an average risk of colorectal cancer start regular screening at the age of 45. This can include either a high-sensitivity stool-based test or a structural (visual) examination, depending on patient preference and test availability.¹⁶ The high-sensitivity stool-based tests are yearly FIT, yearly guaiac fecal occult blood test (FOBT), and multitargeted stool DNA test (mt-sDNA) performed every 3 years. On the other hand, structural exams include colonoscopy every 10 years, flexible sigmoidoscopy every 5 years, and CT colonography every 5 years. Regarding patients who are at higher risk, earlier screening may be warranted.¹⁶
- United States Preventive Services Task Force (USPSTF): As of May 2021, the USPSTF recommends screening for CRC starting at age 45 and continuing until age 75. Screening tools and intervals are identical to what's recommended by ACS but USPSTF adds the possibility to combine flexible sigmoidoscopy with FIT which could be done every 10 years.^{17,18}
- National Comprehensive Cancer Network (NCCN): The NCCN suggests a more individualized approach, with a variety of screening options starting from the age of 45 years for average-risk individuals. They also recommend earlier and more frequent screening for high-risk individuals.¹⁹
- European Society for Medical Oncology (ESMO): The ESMO recommends CRC screening for men and women aged 50 and older using either a fecal immunochemical test every two years or a colonoscopy every 10 years.²⁰
- World Health Organization (WHO): While the WHO does not have specific age guidelines, it endorses colorectal cancer screening programs with a preference for tests that have been proven to reduce CRC mortality. The recommended age to start screening may vary depending on the country's specific circumstances, including the burden of the disease, available resources, and cost-effectiveness.
- American College of Gastroenterology ACG: As per the latest ACG guidelines, screening is strongly recommended from the age of 50-75 years old in people with moderate risk for CRC by either yearly FIT or colonoscopy every 10 years.²¹ It also suggested CRC screening in average-risk individuals between ages 45 and 49 years to reduce the incidence of advanced adenoma, CRC, and mortality from CRC. Screening modalities can be classified as either a one or a two-step tool. One-step screening tools such as colonoscopy are both diagnostic and therapeutic hence the name. In contrast, the two-step screening tool is similar to a stool-based test (FOB and FIT) which requires colonoscopy if the test yields a positive result. According to previous studies, screening

colonoscopies were associated with a significant reduction in CRC incidence by 69% and mortality by 68%.²² This shows the successful story of how the United States decreased CRC by implementing this screening protocol. There are no strong recommendations for screening patients aged > 75 or < 50 years. However, this is still applicable in some cases.

Regarding patients with IBD, the American Gastroenterology Association (AGA) recommends screening for CRC after 8-10 years of the diagnosis or immediately after a primary sclerosing cholangitis diagnosis is made.²³ Other screening modalities that could be used for patients unwilling to undergo colonoscopy or FIT include flexible sigmoidoscopy, colon capsule, CT colonography, and multitarget stool DNA test. Each method has its screening protocol regarding frequency. In addition, ACG has recommend against using Septin 9 for screening and daily aspirin as a substitute for screening.

OBSTACLES TO IMPLEMENTING A COLORECTAL CANCER (CRC) SCREENING PROGRAM

Data on CRC screening in Jordan are lacking. Although CRC remains a major cancer burden in the country, no clear data on the use of any screening protocol. To measure the gap, a survey was conducted on the public, which showed that 68% of the respondents underestimated the risk of CRC.²⁴ Surprisingly, 66% of Jordanians stated that they were willing to pay out of pocket nearly 700 US dollars for a colonoscopy if their doctor recommended it.²⁴

Despite the proven utility of colon cancer screening in decreasing morbidity and mortality,²⁵ the number of people who undergo screening according to the guidelines has not reached the target of 65% or more, both globally and in Jordan.^{26,27} In the US, for example, only about 60% of adults over 45 are adequately screened for CRC.²⁸ In Jordan and worldwide, the number of up-to-date screened individuals remains largely unclear and is expected to be much worse. The lack of screening can be attributed to several factors which can be subdivided into:

- Individual-level Barriers such as misconceptions about CRC screening, cultural or religious beliefs, fear and worry about possible diagnosis, embarrassment of the procedure, or apathy towards the whole concept of screening. Financial restrictions, lack of public awareness regarding the importance of CRC screening, and social and demographic factors related to colonoscopy also play a prominent role in inhibiting individuals from undergoing screening.²⁹
- Healthcare Provider-level Barriers such as the lack of time spent with each patient, insufficient knowledge or skills, lack of referral, or a negative provider attitude like assuming that patients are unwilling to participate in CRC screening.³⁰
- System-level Barriers include the cost of implementing screening programs which primarily consist of physician pay and facility charge to carry out the screening process. Other system-level factors include

access to healthcare facilities, lack of screening policies, and logistical issues. Other factors that are less researched are racial and gender disparities. Usually, these factors overlap to prevent the patient from screening.³¹

When viewing the barriers to CRC screening based on the country, we saw a common theme with some slight differences. The US was not very different from the global situation and barriers there included a lack of referral from the providers and financial difficulties.³⁰

A study from the National Opinion Research Center at the University of Chicago examined the responses of 1595 participants about their barriers to CRC screening, and the results were following the global literature. Lack of knowledge and physician advice were the primary causes of lack of screening in general, but particularly for FOBT and other stool tests.³⁰ However, a study from southeastern Missouri with 483 participants who completed a paper-based survey found that fear and worry from the possible diagnosis or from the procedure itself were the most common barriers.²⁸

Globally, in addition to the previously mentioned barriers, poverty, as well as cultural aspects, play a more prominent role. For example, in Malaysia, a study found that a lack of knowledge about CRC and concerns about the logistics of sending stool samples are of significant importance.³²

In the Middle East, particularly the KSA, a cross-sectional survey with 448 responses demonstrated that lack of physician recommendation was reported as the biggest barrier 77.1% followed by the perceived pain caused by colonoscopy without knowing that there are less invasive alternatives like FOBT.³³

In Jordan, despite being affected by the same global barriers, not all factors seem to play an equal role.

A study conducted on 713 patients aged ≥ 50 years from gastroenterology outpatient clinics in Jordan found only 22.3% identified colon cancer as the most common cancer among the options given. On the other hand, about 65.5% of the same sample were willing to pay over 700 US dollars out of pocket for a colonoscopy if their physician recommended it.²⁴ This puts into perspective that the main issue in Jordan is a lack of awareness rather than financial burden.

Another study that collected data from 921 Jordanian individuals living in Jordan about their perceived barriers to CRC screening found that answers like “feeling well” and “my physician never told me about screening” were the first and second most common reasons for not getting CRC screening.³⁴ The most common incentivizing factor for those patients to be screened was physician recommendation which solidifies the fact that the biggest issue is the lack of discussion between physicians and patients about the importance of CRC screening.

One possible last category of barriers can be the modality of screening, although colonoscopy is linked to more barriers, quantitative fecal immunochemical test (FIT) has also been faced with obstacles. In Scotland, 2387 participants identified procrastination and anxiety about possible cancer as limiting factors for undergoing FIT.³⁵

STATE OF KNOWLEDGE OF CRC SCREENING AMONG THE GENERAL POPULATION

There is a general shortage of data on the knowledge, attitudes, and practices related to CRC screening in Jordan. However, the available research suggests there may be gaps in knowledge and awareness regarding CRC screening among Jordanians. Furthermore, attitudes and practices related to CRC screening were also suboptimal.

A cross-sectional study conducted in Jordan on 600 individuals using a semi-structured questionnaire to assess knowledge, practice, and attitudes toward CRC screening found that only 24% knew the different tests used to screen for CRC.³⁶ In the same study, 61% of those over 50 years said that not feeling ill was the main reason for not being screened. On the bright side, 90% of them said that they would do FOBT every one or two years if it was provided by the government under the umbrella of a national screening program. Alarming, this study found no association between CRC screening knowledge and family history of CRC, which should direct future efforts to target this subset of the population in any awareness-raising programs about CRC.³⁷

In a study conducted with convenience sampling, 197 average-risk Jordanians between the ages of 50 and 75 participated. The results indicated that there was a low level of knowledge among the participants, as only a quarter perceived themselves as susceptible to CRC, and only one-third had a comprehensive understanding of the seriousness of CRC. However, after the implementation of an educational intervention, there was a significant improvement in the participant's level of knowledge, as measured by Kelly and Green's Colorectal Cancer Knowledge, Perceptions, and Screening Survey. Additionally, there was an increase in the participants' perceived susceptibility to CRC four weeks after the intervention. These findings highlight the effectiveness of educational interventions for enhancing knowledge and awareness of CRC among the general population in Jordan.³⁶

These studies validate older studies that demonstrated a lack of awareness towards CRC screening, for instance, a study conducted in 2010 with a sample size of 160 participants demonstrated that only half of the participants had a comprehensive understanding of the seriousness of CRC, and less than half perceived themselves as susceptible to it.³⁸

In a more extensive study involving 3,196 participants aged 18 years or older, the findings revealed that only 11% of the respondents had undergone screening for any type of cancer. Despite CRC having the second highest recommended screening rate of 12.6%, only 20% of the participants reported having heard of one of the several screening tests available for CRC. These results highlight a significant gap in the knowledge and utilization of CRC screening methods among the population.³⁹

STATE OF KNOWLEDGE OF CRC SCREENING AMONG HEALTHCARE WORKERS

The knowledge, attitudes, and practices (KAP) of physicians and other healthcare workers in CRC screening remain largely unknown. To date, no study has assessed KAP among healthcare workers in Jordan. Since almost all studies conducted on the general population point out that lack of physician recommendation is the biggest reason for not being screened, future studies should be conducted to assess KAP about CRC screening among health care providers in Jordan to see if the problem lies there.

To estimate KAP among Jordanian physicians, we can look at neighboring countries.

In Kingdom of Saudi Arabia (KSA), for example, the issue of CRC screening seems to be studied more. A study conducted in 2017 surveyed 127 primary healthcare physicians to assess their level of knowledge found that 95% believed in the utility of CRC screening, but only 45% followed such practice, which demonstrates a lack of adherence by physicians.⁴⁰ A slightly older study conducted in 2013 among family physicians practicing in family medicine clinics within the National Guard Health Affairs (NGHA) located in Riyadh had similar outcomes as more than half of the 130 respondents did not practice CRC screening despite having acceptable knowledge scores and high attitude scores for CRC screening.

Studies on other healthcare providers are also deficient in Jordan; however, one study that analyzed the responses from 352 pharmacists in Jordan found that 90% did not know that carcinoembryonic antigen CEA was an inaccurate method to diagnose colon cancer.⁴¹ Although the pharmacists in this study showed positive attitudes towards CRC screening, they also demonstrated moderate and sometimes inadequate levels of knowledge about colon cancer.⁴¹

FUTURE DIRECTIONS

Although several studies have been conducted in Jordan to identify the barriers to CRC screening, further evaluation should be performed to elicit more conclusive lists from the patients. Additionally, the lack of physician advice should be addressed to assess where the gap lies, whether it is poor communication within the patient-physician relationship or a lack of knowledge about the importance of CRC screening among health care providers.

Additionally, the social and gender disparities should be addressed since men are more likely to have CRC and are less likely to initiate screening while being asymptomatic; awareness-raising initiatives should be directed toward them.

Forming a national screening program with proper funding and strict supervision is of absolute importance to obtain the numbers of adequately screened individuals, which can in part decrease the financial burden of colon cancer in Jordan.

CONFLICT OF INTEREST

We hereby declare that the disclosed information is correct and that no other situation of real, potential or apparent conflict of interest is known to us. We undertake to inform

you of any change in these circumstances, including if an issue arises during the course of the meeting or work itself.

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