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MDPI

Review

Colorectal Cancer Screening in the Middle East and North Africa: Current Practices, Challenges, and Insights from the British Society of Gastroenterology (BSG) International Section

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Abstract

Colorectal cancer (CRC) is a significant public health issue, representing one of the greatest causes of both cancer diagnosis and mortality globally. While the incidence is highest in high-income countries, it is rising across the world, including in the Middle East and North Africa (MENA) region. Many countries have implemented national screening programmes to reduce the burden of CRC, utilising mostly stool tests and colonoscopy, but this has yet to occur across most MENA countries. Uptake of screening opportunities is generally poor. System-level barriers to establishing screening programmes include cost constraints and limited screening infrastructure. Patient-level barriers include embarrassment, fear of a cancer diagnosis, and limited awareness/education. Screening programmes across the MENA region would likely reduce the CRC incidence. These barriers must be overcome through patient education and government action to ensure appropriate patient uptake. This study aims to examine CRC screening practices across MENA, identify key barriers, and propose solutions for sustainable CRC management in the region, through a narrative review and expert input from the Middle East and North Africa Colorectal Cancer (MENA-CRC) Screening and Prevention collaborators.

Keywords: colorectal cancer; early detection; health disparities; Middle East and North Africa; colonoscopy

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1. Introduction

Colorectal cancer (CRC) is a significant global health issue, ranking as the second leading cause of cancer-related mortality (903,859 deaths annually) and the third most commonly diagnosed malignancy (1,926,118 cases annually) worldwide [1]. The incidence of CRC varies significantly across regions, with rates in high-income countries across North America, Europe, and Australasia approximately 10 times higher than in many parts of Sub-Saharan Africa and South and Central Asia [2]. Within the Middle East and North Africa (MENA) region, CRC incidence ranges from 15 to 36 per 100,000, with Jordan reporting the highest mortality rate at 16 per 100,000 [3].

This geographical disparity in CRC incidence and mortality is driven by various factors, including socioeconomic development, lifestyle behaviours, and the availability of screening [4]. High-income countries with elevated Human Development Index (HDI) scores, such as the United States, United Kingdom, and Australia, have seen a stabilisation or decline in CRC rates. These trends are largely attributed to widespread public health campaigns, effective screening strategies, and the early removal of precancerous polyps [5,6]. In contrast, countries with lower HDI scores are experiencing rising CRC incidence, a phenomenon linked in part to the adoption of Westernised dietary patterns, including increased consumption of red and processed meats [7,8]. If current trends persist, CRC incidence is projected to rise to 3.2 million new cases by 2040, representing a 63% increase from 2020 levels, with the largest relative increase anticipated in low- and medium-HDI countries [9].

Population screening of CRC is advantageous due to the cancer's high incidence, extended precancerous phase, substantial treatment costs of cancer, and the strong correlation between early detection and reduced mortality [10–12]. Meta-analyses indicate that CRC screening can lower mortality by 18–57%, depending on the modality used [13,14]. Screening methods are broadly categorised into non-invasive and invasive tests. Non-invasive methods are faecal occult blood tests (FOBT), such as traditional guaiac-based FOBTs (gFOBTs), which detect hidden blood in stool, faecal DNA tests, or faecal immunochemical tests (FIT), which have higher sensitivity, specificity, and accuracy by detecting human haemoglobin. However, positive FIT results require a follow-up colonoscopy to confirm diagnosis due to the risk of false positive results [3,15,16]. Colonoscopy, though invasive, is considered the gold standard for CRC diagnosis, as it allows direct visualisation of the colon and rectum and enables simultaneous polyp detection and removal. Other tests include flexible sigmoidoscopy, colon capsule, and Computed Tomographic Virtual Colonography (CTVC) [17–19].

Randomised controlled trials have provided the foundation for numerous international CRC screening guidelines [20–23]. The European Society of Gastrointestinal Endoscopy recommends organised population-based screening for those at average risk from the age of 50, using faecal immunochemical testing (FIT) [24]. In England, the Bowel Cancer Screening Programme (BCSP), introduced in 2006, now offers biennial FIT screening for individuals aged 54 to 74, with positive results followed by colonoscopy or CTVC, depending on patient fitness and preference [25–27]. This will eventually be reduced to 50 years of age. The United States Preventive Services Task Force (USPSTF) currently advocates CRC screening for adults aged 45–75, with screening options including annual stool-based tests, CTVC every five years, and colonoscopy every ten years [28]. In Japan, stool testing for screening is recommended starting at the age of 40, one of the earliest ages globally for such screenings [29].

The Eastern Mediterranean region faces a projected 1.8-fold increase in overall cancer mortality over the next 15 years [3,30]. CRC rates in MENA are expected to rise substantially by 2040, with studies already documenting increases in Jordan and other Arabic-speaking countries. Some rates have been reported as high as 9% in certain populations [9,31]. In Lebanon, CRC is the second most common cancer among women and fourth among men [32].

Several MENA countries have initiated CRC screening programs. This includes Turkey, which offers FOBT every two years and colonoscopy every ten years from the age of 50 [33] and the United Arab Emirates (UAE), which recommends an annual FIT or a colonoscopy every 10 years from the age of 40 [34]. Despite these efforts, many challenges persist with the programmes, including financial constraints, inadequate screening infrastructure, and underdeveloped health information systems [35]. Despite high rates of CRC in Jordan

compared to neighbouring countries, for instance, a formal national screening programme has yet to be introduced there. Patient-related barriers to screening include limited public awareness, fear of diagnostic results, and cultural stigmas and embarrassments [36].

Access to healthcare services, insufficient training for healthcare professionals, and limited resources create systemic barriers that further impede CRC screening efforts in the Middle East [37]. Addressing all of these challenges and mitigating the anticipated rise in CRC incidence will require health education, community engagement, and strategies to promote preventive behaviours and build public trust [38].

Implementing CRC screening programs in MENA necessitates a comprehensive evaluation of regional CRC incidence and mortality rates, as well as a cost–benefit analysis of various screening strategies. This study aims to examine CRC screening practices across MENA, identify key barriers, and propose solutions for sustainable CRC management in the region.

2. Results

2.1. CRC Screening Practices in MENA Region

CRC screening guidelines vary widely across countries in the MENA region, driven by key factors such as differences in cost and resource accessibility. However, poor participation in screening programs among the general population remains a significant challenge. Cultural barriers and a lack of education about CRC contribute to this low uptake.

The availability of epidemiological data on CRC in the Middle East is limited, as only a few cancer registries exist. Despite this, existing data indicates a rising incidence of CRC in the region, with a notable proportion of cases diagnosed at a younger age. According to the latest GLOBOCAN cancer mortality statistics, CRC (14%) is the leading cause of cancer-related deaths in Gulf Cooperation Council (GCC) countries, followed by breast cancer (9%). Projections estimate that CRC incidence across the region could increase significantly over the coming decades [39].

Hereditary or familial CRC now accounts for 10–15% of cases, a rate comparable to Western populations. The Hereditary CRC Network in the Middle East and Eastern Mediterranean countries has recommended focused screening of individuals with hereditary CRC, in particular those with Lynch syndrome, as the most cost-effective strategy [40]. Screening for affected family members is currently established in most MENA region countries [41]

In the following sections, we will examine country-specific data on CRC epidemiology, current screening program guidelines across the region, and the challenges associated with improving screening uptake (Table 1, Figure 1). This review does not cover the full MENA region; some countries such as Tunisia and Morocco also have initiatives.

Table 1. CRC incidence and screening uptake in the Middle East.

Country	Age-Standardised Rate (World) [2]	Study	Screening Uptake (%)-Initial Test	Screening Modality
Saudi Arabia	11.7 per 100,000	MoH Pilot Project (2017) [42] Al-Kharj CRC pilot (2023) [43] Almadi et al. (2015) [44]	57.6 72.8 6.7%	FIT, Colonoscopy gFOBT, Colonosocpy gFOBT, FIT, Sigmoidoscopy, Colonoscopy
UAE	11.5 per 100,000	Alsaad et al. (2023) [45]	9.1	FOBT, Colonoscopy
Egypt	6.4 per 100,000	Allam et al. (2024) [46]	2.3	Colonoscopy

Table 1. *Cont.*

Country	Age-Standardised Rate (World) [2]	Study	Screening Uptake (%)-Initial Test	Screening Modality
Jordan	16.5 per 100,000	Jadallah et al. (2023) [47]	17.2	Colonoscopy, Sigmoidoscopy, gFOBT, FIT
Turkey	19.8 per 100,000	Gulten et al. (2012) [48] Taş et al. (2019) [49]	12 17	FOBT, Colonoscopy, Sigmoidosocpy
Iraq	8.9 per 100,000	Alrubaiy et al. (2023) [50]	0	FIT, Colonoscopy

Abbreviations: FIT, faecal immunochemical test; FOBT, faecal occult blood test; gFOBT, guaiac faecal occult blood test; UAE, the United Arab Emirates.

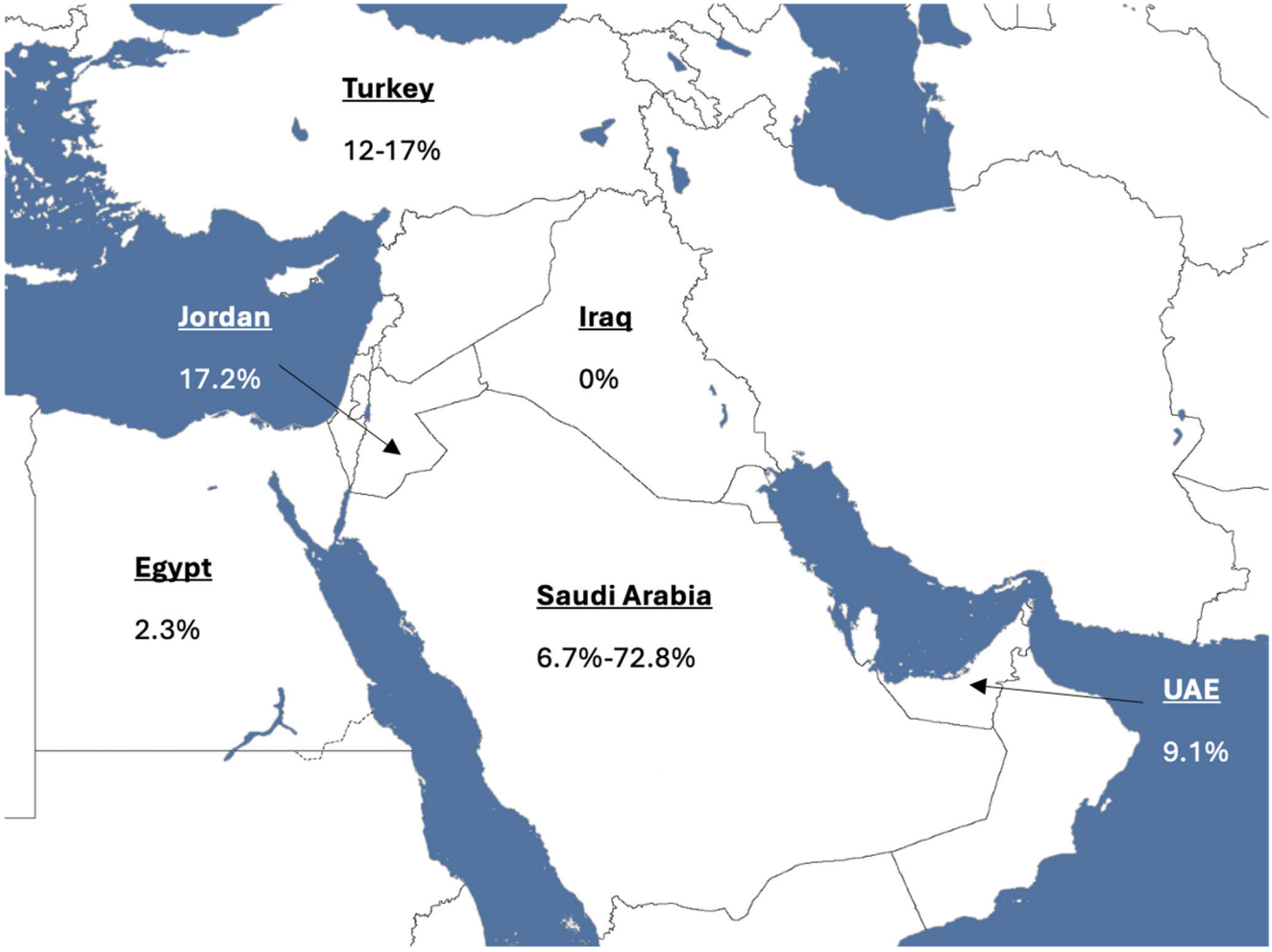

Figure 1. Uptake of bowel cancer screening in selected countries in the MENA region.

2.1.1. Saudi Arabia

CRC is the most prevalent cancer amongst men in Saudi Arabia, and the third amongst women. Almost one-third of patients with CRC are diagnosed at an advanced stage. The 10-year survival rate for CRC in Saudi Arabia is 44.6% [51]. Saudi Arabia does not have a national CRC screening program at present. There is a notable variation in detection rates of CRC between geographical regions in Saudia Arabia, in part due to health care availability [52].

However, several initiatives and programmes have been attempted. The Al-Kharj CRC screening program was conducted between 2017 and 2022 in Riyadh Province using

the gFOBT as the initial screening method and included 35,640 participants, among whom 4.8% were diagnosed with colon cancer [53]. Furthermore, the Saudi Ministry of Health pilot program was rolled out in 2017 to 417 centres across the country, using FIT. The study presented several challenges and had sub-optimal outcomes. While uptake of the initial FIT screening test was reasonable, only 20.4% subsequently underwent colonoscopy out of the 6.6% overall positive FIT tests [42]. A participation rate so low would render any screening programme inefficient.

Operational challenges have been widely reported, including supply–demand mismatch in FIT testing, limitations with health care facilities, and inadequate monitoring and feedback mechanisms for participating centres. Further studies purport to the lack of uptake of screening in Saudi Arabia, including a study in Riyadh city showing that only 6.7% of individuals aged 50–55 years old had undergone CRC screening [44]. There remains a significant gender disparity as well, with females far less likely than male participants to engage in CRC screening programs [54]. A national survey revealed that 43% of people felt it would be embarrassing [55].

2.1.2. United Arab Emirates (UAE)

The 2021 annual report by the National Cancer Registry of the Ministry of Health and Prevention (MOHAP) identified CRC as the most common primary cancer amongst men in the UAE, with a notable increase in early onset cases. It is also the 3rd most common primary cancer for women [56]. CRC screening was introduced in 2013 in UAE and subsequently revised in 2019. Current guidelines recommend beginning screening at the age of 40 years, with an annual FIT or a colonoscopy every 10 years [34]. Despite this, the Health Authority of Abu Dhabi (HAAD) report that 63% of cases usually present late [57].

Screening uptake among Emirati adults remains low. Alsaad et al. conducted a study aiming to elucidate factors contributing to screening uptake. They found CRC screening uptake as low as 9.1% [45]. Lack of recommendation by doctors was identified as a major barrier to uptake; this finding is similar to studies conducted in Saudi Arabia and Jordan [47]. Other significant factors were cost, embarrassment, fear of pain, lack of motivation, and the length of time required to complete the test [45].

2.1.3. Egypt

In Egypt, epidemiological data suggests that CRC is the eighth most prevalent cancer diagnosis [7]. The estimated incidence rate is reported at 9.8 per 100,000 cases [58]. Since the 1990s, there has been a reported increase in CRC incidence amongst young Egyptian adults, with a median age at diagnosis of 49 to 52 years, with an unclear main aetiology for this [59]. Mean overall survival has been reported as low as 2 years.

There is no national CRC screening programme in Egypt. However, CRC awareness was promoted as part of the 100 Million Healthy Lives campaign, which primarily focused on eradicating Hepatitis C [60]. The Ministry of Health and Population and National Cancer Institute (NCI) of Egypt have developed clinical guidelines for CRC screening, focusing on risk-based screening and use of FOBT or FIT as initial screening tests. The National Cancer Institute in Cairo has initiated pilot colonoscopy screening programs targeting high-risk groups [46,61].

Despite these efforts, there remains a lack of awareness and understanding amongst the general population. Allam et al. conducted a study of nearly 1500 participants, showing that only 3.2% of participants had good knowledge of CRC screening and that even less had undergone CRC screening. Interestingly, however, 66.7% had positive attitudes towards CRC screening, though financial concerns were highlighted as a key barrier to uptake [46].

2.1.4. Jordan

Jordan has amongst the highest rates of CRC incidence in the Eastern Mediterranean region, at 26 per 100,000, and the highest mortality rates. CRC is the most prevalent cancer in men (18%) and the second most common in women (12.4%) [47]. In Jordan, screening programmes for CRC are not widely available, although screening is recommended in agreement with the USPSTF. Adherence rates remain low however, which contributes to late presentation, CRC morbidity, and mortality [47].

Damsees et al. showed that female patients were three times more likely to present at later stages of the disease. Further outcomes of the study also highlighted that the absence of health insurance and a reluctance to seek medical care when ill are major predictors of late presentation [62].

2.1.5. Turkey

The Age-Standardised Rate (ASR) for CRC incidence in Turkey is 19.8 per 100,000, with an incidence rate of 5.9 per 100,000 for individuals under 50 years old, according to Globocan data. These figures rank among the highest globally [63]. Screening for CRC has been in existence since 2008, with an initial recommendation of annual FOBT and a colonoscopy every decade. The current national screening program advises that all individuals between the ages of 50 and 70 years old should have a FOBT every 2 years and a colonoscopy every 10 years. Screening is discontinued in 70-year-old individuals whose last two tests are negative. For high-risk individuals, screening is earlier from 40 years old, or from 5 years prior to the diagnosis age of a first degree relative with CRC [64].

Despite this, most CRC diagnoses are made at a late stage, indicating suboptimal implementation and uptake of screening programs. A study of over 600 Turkish women by Gulten et al. showed that a FOBT screening test had only been performed in 12% of the participants [48]. Similarly, a study by Taş et al. showed that only 23% had knowledge of CRC screening tests, and screening was only undertaken by 17% of the 235 participants [49]. A systematic review and meta-analysis further underscored these finding, revealing that only 13.2% underwent a FOBT and only 10% had a colonoscopy [33].

2.1.6. Iraq

There is no established bowel cancer screening programme in Iraq. The ASR of CRC incidence is 8.9 per 100,000, with evidence of an increasing proportion of CRC at an earlier age. A registry-based study showed an increase of CRC incidence in 20–50 year olds from 1.46 per 100,000 in 2000 to 4.36 per 100,000 in 2019 [65].

A study led by the British Society of Gastroenterology (BSG) highlighted significant barriers to CRC screening in Iraq, including the absence of national guidelines and ineffective allocation of resources. Despite the challenges posed by political conflict and damage to healthcare infrastructure, there is now growing momentum to establish screening programs [66].

Following on from this, Al-Rubaiy et al. conducted a study to understand screening practices across Southern Iraq [50]. This initiative consisted of studies investigating the current attitudes and knowledge of BCSP, a multi-disciplinary workshop, and initiatives to raise awareness of bowel cancer screening using televised interviews and leaflets. They found that initial screening in Basra is mainly performed using an occult blood based on the guaiac stool test, as FIT stool testing was only recently introduced. Colonoscopy surveillance remains ad hoc. Of participants, 50% were unaware of CRC screening tests, and only 10% would be happy to undergo screening if advised by their doctor. Despite the distribution of free stool FIT kits and offer of free colonoscopy, no patients were willing

to partake in screening in this pilot. Several challenges remain in Iraq in both setting up a programme and improving screening uptake [67].

2.2. The Increasing Cancer Burden in the MENA Region

The increasing cancer burden of the GCC countries is a complex and multifaceted concern. This may reflect enhanced health care initiatives leading to enhanced detection rates, longer life expectancy, and improvements in data reporting to cancer registries. There is however a growing prevalence of modifiable lifestyle risk factors. These include smoking, poor diet, obesity, sedentary lifestyle, and physical inactivity [68]. Obesity, in particular, is an escalating issue in the MENA region, with notable prevalence rates in Kuwait, Qatar, and Saudi Arabia, averaging 22.2% [69]. Beyond lifestyle factors, other patient-related barriers to cancer symptom recognition and awareness have been identified. Coutts et al. reported that education level, health literacy, and employment status are critical determinants of cancer awareness in Arabic-speaking countries [70].

The MENA region is host largely to low and middle income countries, many of which face significant political and financial instability [71]. Notably, human displacement will increase cancer burden in host countries, yet screening access to refugees remains challenging. Cultural factors, such as a distrust of Western medicine, religious objection and embarrassment were all factors affecting CRC screening uptake [71]. Additional region-specific risk factors include prolonged exposure to carcinogens from warfare. Lebanon and Kuwait have high rates of oil pollution, while Iraq faces soil contamination from chemical weapons. In Iran and Afghanistan, uranium production and deposits pose further carcinogenic risks [72].

2.3. MENA-CRC Screening and Prevention Collaborator Experts' Feedback

Seventeen gastroenterologists representing countries from the MENA region provided their feedback and real-world data on the CRC screening practice in their countries. This included the following countries: UAE, Egypt, Saudi Arabia, and Iraq, and Lebanon, Sudan, Morocco, and Kuwait (Table 2).

Table 2. MENA-CRC Screening and Prevention Gastroenterology Collaborators.

Demographics		
Question	**Answer**	**No. of Respondents**
Country of respondent	United Arab Emirates	7 (41.2%)
	Egypt	2 (11.8%)
	Saudi Arabia	2 (11.8)
	Iraq	2 (11.8%)
	Morocco	1 (5.9%)
	Lebanon	1 (5.9%)
	Sudan	1 (5.9%)
	Kuwait	1 (5.9%)
Type of Hospital	Public teaching hospital	8 (47.1%)
	Private teaching hospital	4 (23.5%)
	Private non-teaching hospital	2 (11.8%)
	Public non-teaching hospital	1 (5.9%)
	Military hospital	1 (5.9%)
	Private clinic	1 (5.9%)

Table 2. *Cont.*

Demographics		
Question	**Answer**	**No. of Respondents**
Guidelines		
Are there any local or national guidelines which are in use in your country for colorectal cancer screening?	Yes	8 (47.1%)
	No	9 (52.9%)
Do you use international guidelines?	Yes	12 (70.6%)
	No	2 (11.8%)
	Left blank	3 (17.6%)
Which international guidelines do you use? Select all that apply	American Gastroenterological Association	6 (35.3%)
	British Society of Gastroenterology	3 (17.6%)
	American College of Gastroenterology	2 (11.8%)
	American Society for Gastrointestinal Endoscopy	1 (5.9%)
	European Society for Medical Oncology	1 (5.9%)
Endoscopy quality parameters		
Do you maintain a logbook of colonoscopy procedures and outcomes?	Yes	13 (76.5%)
	No	4 (23.5%)
Are there endoscopy key performance indicators (KPI) set for endoscopists in your region/country?	Yes	10 (58.8%)
	No	7 (41.2%)
Do you have dedicated training lists in your unit?	Yes	6 (35.3%)
	No	11 (64.7%)
Is there a regional or national accreditation process for performing endoscopy independently?	Yes	2 (11.8%)
	No	14 (82.4%)
	Left blank	1 (5.9%)
Is there a regional or national accreditation process for endoscopists performing bowel cancer screening/diagnosis?	Yes	3 (17.6%)
	No	13 (76.5%)
	Left blank	1 (5.9%)
Screening		
Do you feel a bowel cancer screening programme would be helpful?	Very helpful	16 (94.1%)
	Slightly helpful	1 (5.9%)
	Not helpful or unhelpful	0 (0%)
	Slightly unhelpful	0 (0%)
	Very unhelpful	0 (0%)

Table 2. *Cont.*

Demographics		
Question	**Answer**	**No. of Respondents**
In your practice, is colorectal cancer screening run as an organised national screening programme or is it based on opportunistic screening?	Opportunistic	14 (82.4%)
	Organised national programme	3 (17.6%)
At what age do you stat screening for CRC in asymptomatic average risk patients (healthy adults with no family history of colon cancer)?	40	7 (41.2%)
	45	6 (35.3%)
	50	3 (17.6%)
	60	1 (5.9%)
What is the screening frequency for CRC using stool testing, if at all?	Yearly	8 (47.1%)
	Every 2 years	3 (17.6%)
	Every 3 years	1 (5.9%)
	Every 5 years	0 (0%)
	If they have symptoms	2 (11.8%)
	Whenever I see my patient	1 (5.9%)
	Never use stool testing	2 (11.8%)
What is the screening frequency for CRC using colonoscopy, if at all?	Yearly	0 (0%)
	Every 2 years	0 (0%)
	Every 3 years	1 (5.9%)
	Every 5 years	5 (29.4%)
	Every 10 years	8 (47.1%)
	If they have symptoms *	5 (29.4%)
	Whenever I see my patient	0 (0%)
	Never use Colonoscopy	0 (0%)
When receiving referrals for suspected bowel cancer, is there an assessment of patient suitability for colonoscopy?	Yes	15 (88.2%)
	No	2 (11.8%)
Do you have access to CT virtual colonoscopy services at your unit?	Yes	9 (52.9%)
	No	8 (47.1%)
What therapeutic procedures are performed at your unit?	Cold snare polypectomy	17 (100%)
	Thermocoagulation	14 (82.4%)
	Endoscopic mucosal resection	17 (100%)
	Endoscopic submucosal dissection	9 (52.9%)
What are the available options for CRC screening in your practice?	Colonoscopy	17 (100%)
	CT colonography	9 (52.9%)
	Stool testing	13 (76.5%)
	Flexible sigmoidoscopy	10 (58.8%)
Do you have a system for surveillance following initial discovery and removal of colorectal adenomas?	Yes	10 (58.8%)
	No	7 (41.2%)

Table 2. *Cont.*

Demographics		
Question	**Answer**	**No. of Respondents**
Do you have access to genetic testing for a suspected inherited susceptibility to colorectal cancer?	Yes	9 (52.9%)
	No	8 (47.1%)
Barriers to screening		
What barriers, if any, do you feel exist to setting up a colorectal cancer screening programme-Patient related?	Fear of finding cancer	9 (52.9%)
	Belief that screening is not necessary	15 (88.2%)
	Embarrassment or anxiety about screening tests	14 (82.4%)
	Unaware of screening programmes	13 (76.5%)
	Does not perceive CRC as a serious threat	5 (29.4%)
	Screening programme related to a few centres only	1 (5.9%)
	No barriers	0 (0%)
What barriers, if any, do you feel exist to setting up a colorectal cancer screening programme-System related?	Costs too much/insurance does not cover it	12 (70.6%)
	Primary care physician does not actively recommend screening to their patients	7 (41.2%)
	Shortage of trained providers to conduct screening other than stool testing	6 (35.3%)
	Shortage of trained providers to conduct follow up with invasive procedures	5 (29.4%)
	Administrative issues	1 (5.9%)
	No barriers	0 (0%)

Percentages represent the proportion of 17 respondents (denominator = 17) unless otherwise specified. 'Country of respondent' reflects respondents only; numbers approached per country are unknown due to open dissemination. Totals may not sum to 17 due to missing responses. * Responses such as 'if they have symptoms' refer to diagnostic rather than screening procedures.

Regarding adherence to guidelines, 47% followed local or national CRC screening guidelines, including six from the UAE, one from Saudi Arabia, and one from Lebanon, and 71% reported using international guidelines, with most using the American Gastroenterological Association (AGA) or the British Society of Gastroenterology.

Most members, 82%, indicated that their screening practices were opportunistic rather than organised. The most common starting age for CRC screening was 40 years (42%), followed by 45 years (35.3%), 50 years (17.6%), and 60 years (5.9%).

All collaborators reported access to colonoscopy. Other screening modalities included stool tests (88.2%), flexible sigmoidoscopy (58.8%), and CT colonography (47.1%). Among the fifteen who used stool tests, 53.3% conducted tests annually, 20% every two years, 6.67% every three years, 13.3% only for symptomatic patients, and 6.67% whenever the patient was seen.

For colonoscopy frequency, 5.9% of respondents performed the procedure every three years, 29.4% every five years, 35.3% every ten years, 17.6% for symptomatic patients, and 11.8% either every ten years or for symptomatic patients. Based on respondent feedback, future survey iterations will remove options that conflate diagnostic evaluation with screening intervals.

MENA-CRC collaborators universally recognised the value of CRC screening programs, 94% rating them as "very helpful" and 6% as "slightly helpful." However, key components of such programs were noted to be lacking. Only 11.7% reported the existence of national or regional accreditation for independently performing colonoscopies, and 17.6% noted an accreditation process for endoscopists conducting bowel cancer screening.

Surveillance protocols following adenoma detection were in place for 58.8%, and only 52.9% had access to genetic testing.

When asked about barriers to implementing CRC screening programs, patient-related challenges included fear of discovering cancer and the belief that screening for cancer was unnecessary (88.2%), embarrassment and anxiety about the tests (82.3%), and a lack of awareness about screening (76.5%). System-related barriers included insurance not covering costs or costs being too high (70.5%), primary care physicians not recommending screening to patients (41.8%), and a shortage of trained providers for tests beyond stool-based screening (35.3%).

3. Discussion

In more economically developed countries (MEDCs), CRC trends reveal decreasing incidence rates and declining mortality. In contrast, incidence and mortality rates are rising in MENA [73]. The increasing prevalence of CRC in MENA has been linked to many factors including improved life expectancy and the adoption of more Western lifestyles.

Despite the rising burden of CRC, most countries in the region, including Saudi Arabia and Egypt, lack national screening programs. Even in countries like the UAE, where programs exist, participation remains low [55]. Expert collaborators unanimously supported screening initiatives, indicating the potential for high physician buy-in, but most still relied on opportunistic screening. This may be in part due to the absence of standardised guidelines or national policies. Physicians generally utilised international guidelines, mostly American and British. While thoroughly researched, these may not be suitable for local contexts. Local or regional guidelines should therefore be created that are based on these contexts and societal attitudes, as well as available resources. Where variability exists in available resources, screening options could be ranked as seen in the World Gastroenterology Organisation's (WGO) screening cascade, which ranks screening tests based on available resources [74]. Particularly in contexts where uptake is poor, individual preferences of patients may also be taken into account, to ensure optimal adherence [75].

Practice varied significantly in screening methods, with the use of both stool tests and colonoscopy, and frequency of screening. The most common frequencies were every one or two years.

National screening programmes in MENA countries are currently limited to a few countries such as Turkey and UAE via a population-based FIT screen, while other countries like Jordan have taken up an opportunistic screening approach [71]. Unfortunately, however, uptake generally remains very poor, at less than 10% in UAE and up to 17% in Turkey. This compares unfavourably to 60% in Canada [76], 69% in the UK [77], and 73% in the USA [78]. Some of the pilot studies performed in Saudi Arabia have shown excellent uptake, though this may be due to heavy input from tertiary centres and primary care physicians. Clearly significant work is needed in general to identify and work on barriers to uptake.

The most common patient-related barriers from the expert panel include fear of cancer diagnosis, embarrassment, misconceptions about the necessity of screening, and lack of awareness about CRC's severity or screening programmes. Cultural and religious factors further hinder participation [47]. Many of these factors can be traced to a relative lack of awareness of CRC screening in MENA countries when compared to other regions [71,79]. A nationwide survey in Saudi Arabia revealed low knowledge levels about CRC screening, yet a majority of patients expressed willingness to participate when informed [54]. The participants revealed positive attitudes to both screening and endoscopy when given more information. More generally, those who felt that CRC was common, preventable, and

curable were more likely to undergo screening [54]. Educating patients in public health campaigns about CRC screening has been shown to have a positive impact on screening uptake rates and this must therefore form a pillar of any future screening programmes [80].

Localised community campaigns, such as community health awareness programmes, can play a part in this. For example, culturally tailored education combined with tools like videos and pamphlets significantly increased FOBT uptake in an American study [81]. Similar approaches across the MENA region may therefore be looked at by policy makers. Knowledge alone may not ensure adherence however, and structural factors must be taken into account [54].

Practicing gastroenterologists from the MENA region contributed to the study and outlined system-related obstacles, such as high costs for patients, administrative challenges, limited physicians to perform testing, lack of recommendation from primary care physicians, and insufficient infrastructure, findings which are mirrored in other studies [71]. In Riyadh, more than half of physicians did not recommend CRC screening for asymptomatic, average-risk patients, despite holding generally positive attitudes toward screening [82]. Barriers there included time, a perception of the unwillingness of patients to participate in screening, lack of national policy, and infrastructure such as a system to remind physicians of the need for screening [82]. The involvement of primary care physicians (PCPs) is crucial, with many guidelines emphasising their importance, as they can help coordinate screening efforts with preventative care [83,84]. Moreover, increased levels of knowledge from physicians, as well as positive attitudes towards screening from them, have been shown to improve CRC screening uptake [25,82]. Studies show that patients are more likely to participate in CRC screening after being invited by a physician, even if they had previously disagreed, reinforcing the importance of physician engagement [54]. Adequate education of all stakeholders, including primary care physicians and endoscopists, would therefore be vital to the success of any screening programme in MENA countries.

It is important that physicians are supported in the implementation of CRC screening through adequate infrastructure. Only 59% had a system in place for surveillance of colorectal adenomas once found, while almost half have no access to genetic testing. Only two and three respondents said that there was an accreditation process for performing endoscopy independently and for being a bowel cancer screening endoscopist, respectively. The lack of a formal structure for quality accreditation and follow up makes an organised screening programme more difficult and efforts will need to be made to implement such systems across the region to facilitate CRC screening programmes, including the associated initial infrastructure investments needed.

Access to modalities is another barrier for physicians. Although our experts outlined that all Gastroenterologists had access to colonoscopy, some lacked access to stool testing or CT colonography. This may affect adherence due to a lack of options available to patients.

It is likely that variation among MENA countries with regard to guidelines and practices will continue, due to socioeconomic disparities. Differences exist in the recommended screening modalities even among the European and North American guidelines. Many refer to colonoscopy as the gold standard, while others such as the Canadian Task Force on Preventive Health Care (CTFPHC) recommend gFOBT and flexible sigmoidoscopy [85]. Close collaboration within the region may be helpful to create shared guidelines based on regional data.

A structured screening programme has been cited as a preference by physicians over an opportunistic screening approach and is the most effective way of implementing CRC screening locally [82]. Although the uptake rate in organised and opportunistic programs can be similar, reduction of incidence and mortality, cost-effectiveness, and reduction in the harmful effects of screening are more likely with organised screening [86]. The

implementation of a programme will require research into feasibility and local preference as well as the cost-effectiveness of the programme. Although cost may seem like a barrier, studies have shown that screening in all modalities are still cost-effective when compared to no screening [87]. This review does not cover the full MENA region; countries with limited accessible data or outside the respondent network (e.g., Tunisia, Morocco) were not analysed in depth.

Many countries across the MENA region are also unfortunately experiencing political instability, which results in the displacement of people. Regional and international initiatives will be necessary to ensure that refugees would still be captured in any screening programme of their host country.

4. Methods

This study employed a two-pronged approach, combining a narrative literature review and expert input from Middle East and North Africa Colorectal Cancer (MENA-CRC) Screening and Prevention collaborators to evaluate current practices and challenges in CRC screening.

The narrative review summarises the existing evidence on CRC screening practices and challenges. Key scientific databases, including PubMed, Scopus, and Web of Science, were searched for relevant peer-reviewed articles published in English up to October 2024 (Table 3). The search strategy included terms such as "colorectal cancer screening," "Middle East," "North Africa," "Barriers," and "MENA." Articles were included if they reported on CRC screening programs, guidelines, barriers, or facilitators, whether general or specific to the region. This was a focused narrative review rather than a systematic review. Articles were selected based on relevance to colorectal cancer screening in the MENA region, including national programmes, guidelines, barriers, and facilitators. Seminal papers were included regardless of publication date, while irrelevant studies (e.g., paediatric or obstetric populations) were excluded. References were selected based on relevance to CRC screening in MENA, with preference given to national registry data, guidelines, and large-scale or recent studies. Seminal studies outside the five-year window were included where no updated equivalent existed.

Table 3. Search strategy summary.

Items	Specifications
Date of search	Initial search: 1 October 2022, most recent update: 10 October 2024
Databases and sources searched	PubMed, MEDLINE, Cochrane Library, and EMBASE databases
Search terms	"colorectal cancer screening," "Middle East," "North Africa," "Barriers," "MENA," and "colorectal cancer"
Time frame	No specific time limitation on publishing date, but recent studies sought
Inclusion/exclusion criteria	The inclusion criteria for publications were clinical trials, adult human participants, English language, papers within five years, and seminal papers (no date limit). Papers excluded were those addressing paediatrics and obstetrics
Selection process	Author directed
Guidelines	National Institute for Health and Care Excellence (NICE), British Society of Gastroenterology (BSG), World Gastroenterology Organisation (WGO), and local societies guidelines

Additionally, experts from across the MENA region provided their feedback as part of the MENA-CRC Screening and Prevention group to complement the findings of the narrative review. The collaborators provided feedback based on real world clinical practice and the Gastroenterology societies in MENA countries, including Egypt, Saudi Arabia, and Lebanon, among others. The full questionnaire used in the survey is provided in Table 2. Invitations to participate in the survey were circulated widely to gastroenterologists across the MENA region via professional networks and gastroenterology societies. Because the survey was distributed through open mailing lists, the total number of experts approached could not be determined, and therefore, a formal response rate could not be calculated. In addition, targeted invitations were sent to recognised leaders in the field, including experts holding national or regional roles within gastroenterology societies, to ensure authoritative input.

The information collected aimed to gather information on the availability of CRC screening programs, adherence to guidelines, perceived barriers to implementation at both system and patient levels, and recommendations for improving screening uptake. Responses were collected electronically over a three-month period using a secure online platform, ensuring respondent anonymity.

The data were analysed both quantitatively and qualitatively to extract key insights.

5. Conclusions

CRC screening is crucial for reducing incidence and mortality. To replicate these outcomes in MENA countries, research is needed to evaluate the cost effectiveness of screening programmes at a regional level, region-specific barriers, and acceptability of different screening tests. Pilot programmes in countries yet to implement screening would be important to determine feasibility and effectiveness of the programme as well as to determine the rates of uptake of investigations across different demographics. Gender for example has been shown to determine willingness in the uptake of screening, and appropriate public health campaigns should be undertaken that take into account different cultural and gender sensitivities in the region [53]. For countries that have already implemented programmes but are yet to see significant uptake, further studies should be conducted to assess the reasons for this, as well as potential mitigating strategies. Guidance should be sought from other countries with successful long-term outcomes from CRC screening to help with setting up local and regional programmes, to help improve patient outcomes and save on healthcare costs long-term.

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