

Review Article

Bowel screening: a mini literature review

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ABSTRACT

Bowel cancer is a global health issue with more than 500,000 yearly new cases and a 12.6% mortality of all cancer cases. Studies suggest the financial burden of bowel cancer in Europe in 2015 was estimated at 19.1 billion Euros. Effective bowel screening promotes prevention and early detection of bowel cancer. There is a variation in bowel screening uptake across the globe, trials and pilot studies in the UK suggest uptake is around 50-60% in the UK, compared to much lower uptake in lower income countries. This mini literature review aims to shed some light on the magnitude of the problem, global variations in screening uptake, barriers to bowel screening uptake and explore ways to improve bowel screening uptake. Personal beliefs, social taboo and lack of knowledge are some of the barriers identified in this review, healthcare professionals have a pivotal role in opportunistic health promotion and encouraging patients to utilize bowel screening services, furthermore health educational campaigns targeting school children, students and other groups in the wider community may help increase bowel cancer awareness and the importance of bowel screening. A national recall system for bowel screening is an important step in improving uptake in low-income countries who have not achieved such a service yet.

Keywords: Bowel cancer, Bowel screening, Colorectal cancer, Barriers, Health burden, Fecal occult blood

INTRODUCTION

Colorectal cancer (CRC) is a global health burden accounting for 1.9 million new cases per year and a mortality rate of 10%, furthermore CRC is the 3rd most common cancer in the world and the 2nd leading cause of cancer related mortality.^{1,2}

According to GLOBOCAN the world health organization database, in 2024 there were approximately 1.1 million newly diagnosed cases of CRC and around 600,000 deaths worldwide.

CRC incidence varies widely across the globe, lowest incidence rates have been reported in Africa and highest incidence in New Zealand and Australia with an estimated incidence of 3.5 per 100,000 in men and 3.0 in

women and 44.8 per 100,000 population in men and 32.2 in women respectively.^{3,4}

Global incidence and mortality rates seem to be higher in males compared to females, reports suggest 17.6 new cases and 9.2 deaths per 100,000 population in females compared to 21 new cases and 10.5 deaths in males.³

Cancer research UK suggests that bowel cancer is the 4th most common cancer in the UK, accounting for 11% of all new cancer cases, furthermore 56% of bowel cancer cases in the UK are in males, and 44% are in females.⁴

Data from Qatar suggests that CRC is the second most common cancer and is projected triple by 2035.^{5,6}

Although majority of CRS's are sporadic influenced by environmental factors such as smoking, alcohol

consumption and dietary habits however around 25% of reported bowel cancer cases have a genetic predisposition while 5% have inherited genes directly linked to development of bowel cancer.^{6,7}

Most CRCs are slow growing; hence bowel screening has a crucial role in reducing CRC morbidity and mortality by detecting and removal precursor lesions and early cancer during this window, in addition advances in cancer management have decreased CRC incidence and mortality rates.⁴

Incidence trends of CRC in the past few decades revealed that in countries like the USA CRC incidence has declined since the introduction of the screening program.⁸

While in Europe CRC incidence trends have varied widely mainly due to variations in risk factors and differences in screening policies, studies suggest that incidence of CRC has increased mainly in central east Europe.⁹

Evidence suggests that CRC incidence increases with age, hence screening programs target people over 50 years old, however recent evidence suggest an increase in CRC incidence in people between 40-44 years of age which prompts a need screen people in their forties.¹⁰

Diversity in effectiveness of screening programs, service accessibility and development largely vary between higher and lower income countries, hence mortality rates from CRC have declined in economically developed countries in contrast with lower income countries.¹¹

Faecal immunochemical testing (FIT) is one of the commonest CRC screening modalities used worldwide however, multitarget stool DNA (mtsDNA) test, blood tests such as septin 9; and imaging-based tests such as CT colonography (CTC), colon capsule, flexible sigmoidoscopy and colonoscopy are also used.⁹

CRC screening guidance varies worldwide according to resources, social values, and population risk.

LITERATURE SEARCH

We conducted a literature search in PubMed database, the terms bowel cancer, CRC, bowel screening, early detection of cancer, barriers and health burden were used. The search was limited to English language articles published in the last 10 years. Search was limited to systemic reviewed, metanalysis and randomized control trials. Articles from the past 10 years that were considered eligible were included in the review.

Incidence of bowel cancer cases and deaths in 2024 were abstracted from GLOBOCAN database. Incidence was age standardized and mortality rate was calculated per 100,000 by country. Predicted cases and deaths were calculated based on the global projections for 2040.

RISK FACTORS FOR CRC

CRC is widely recognized as an environmentally influenced disease that involves various cultural, social, and lifestyle factors, however research suggests genetic and socioeconomic factors also contribute to CRC.

Age is the most significant risk factor for CRC, as incidence of CRC increases with age with 90% of all CRC's diagnosed after the age of 50.¹⁷ The surveillance, epidemiology and end results program from the national cancer institute suggests that incidence rate of CRC in the United States increased after the age 40 years.¹²

Various studies suggest that smoking increases the risks for CRC both in males and females. Results from a large Norwegian cohort study including 600000 men and women suggested an increased risk of left colon cancer in current and ex male smokers while female smokers may be more at risk of colon cancer but not rectal cancer.¹³

Those who started smoking at a younger age and who smoke more than 30 cigarettes per day were found to have a greater risk of CRC, furthermore individuals consuming food high in fat and red meat were also at a higher risk of developing CRC.¹⁴

Alcohol consumption is associated with increased risk of CRC. A study from Japan suggested that risk of CRC is dose dependent leading to cancer in the distal colon and rectum but not in the proximal colon.¹³

Furthermore, research suggests that Patients with Inflammatory bowel disease and those with adenomas have a doubled risk of CRC.¹⁴

A research study from Hong Kong looked at the prevalence of advanced CRC within asymptomatic siblings of CRC patients with siblings of people with no family history of CRC found a 3-fold difference between CRC prevalence between the case and control groups.¹⁵

A meta-analysis involving Nine million individuals revealed that the increase in relative risk of CRC attributed to family history was more noticeable in younger individuals.¹⁶

Research has suggested a link between lower socioeconomic status and a higher risk of CRC development. A study by Doubeni et al reports that individuals from lower socioeconomic status had a 30% increase in the risk of developing CRC in comparison to those from higher socioeconomic backgrounds.¹⁷

Furthermore, individuals with low educational attainment or residing in socioeconomically disadvantaged areas exhibited a significantly higher incidence of CRC.¹⁴

Obesity and physical inactivity are also crucial behavioral contributors to the development of CRC. A sedentary

lifestyle has been suggested as an independent risk factor for colorectal carcinogenesis.¹⁴

BOWEL CANCER SCREENING AND VARIATION IN UPTAKE

A publication from WHO Europe acknowledged CRC screening as an exceptionally cost-efficient strategy in cancer screening. The report highlights that CRC screening is a valuable investment in terms of health outcomes. Furthermore, WHO Europe recommends that countries establish organized screening programs aiming to reach at least 70% of the eligible population. This guidance highlights the significance of implementing thorough and meticulously designed screening initiatives to maximize the advantages and efficacy of CRC screening programs.¹⁸

The incorporation of the FIT into bowel cancer screening initiatives in the UK has led to enhanced participation rates. After its introduction in England in June 2019, there was a significant uptick in the number of individuals participating in bowel screening. However, amid the COVID-19 pandemic, participation declined to its lowest point, hitting 55.4% in Jan-Mar 2020. Despite this decline, participation remained above the acceptable threshold of 52%. Thankfully, participation has since rebounded and is currently exceeding pre-pandemic levels, with a recorded participation rate of 71.0% in Jan-Mar 2021.^{19,20}

Likewise, in Scotland, the implementation of FIT has played a role in boosting participation in bowel screening. From 2015/17 to 2018/20, there was an increase in bowel screening uptake in Scotland, rising from 56.3% to 63.2%. These results underscore the beneficial effects of incorporating FIT into bowel cancer screening initiatives, as it has resulted in improved participation rates in both England and Scotland.^{19,20}

There are variations in the utilization of tests across different countries, influenced by the presence and implementation of organized screening programs and available screening options. Countries with fully established organized programs offering fecal tests or both fecal tests and colonoscopies exhibited higher utilization rates (ranging from 29.7% in Croatia to 66.7% in the UK for fecal tests and from 22.7% in Greece to 70.9% in Germany for both fecal tests and colonoscopies). Conversely, countries lacking organized programs showed lower utilization rates (from 6.3% in Romania to 30.5% in Norway). Across all types of screening offers, lower test utilization correlated with younger age (50-54 years), longer intervals since the last consultation with a doctor, and a lifestyle score associated with heightened CRC risk.

In nations with nationally implemented organized screening programs, three-quarters (the UK, Slovenia, and France) exhibited fecal test utilization rates

surpassing 50%, with Croatia displaying a lower rate of 22%. Among countries in the process of implementing organized programs, fecal test utilization varied, ranging from 10% in the Netherlands to 42% in the Czech Republic. In settings where fecal tests were predominantly offered opportunistically, Greece recorded the lowest utilization rate at 11%, while Germany and Austria reported higher rates of 51% and 49%, respectively, akin to those observed in the UK, Slovenia, and France. Fecal test utilization remained notably low (below 15%) in all countries and age brackets lacking organized screening programs. Interestingly, a segment of older adults, no longer within the target age range of screening programs, indicated being current with fecal tests, with percentages ranging from 8% in Spain to 30% in Italy.²¹

Evidence also indicates that participation in CRC screening is less common among South Asian communities in the UK when compared to higher participation rates among the Chinese and White British populations.²²

BARRIERS TO BOWEL CANCER UPTAKE

Bowel screening programs across the globe encounter varying degrees of obstacles.

The collective impact of these barriers is profound, deterring people from participating in bowel screening programs across the globe. A strong understanding of these barriers is crucial to overcome them and improve bowel cancer mortality and morbidity.

Lack of knowledge was one of the most important factors related to suboptimum rates of bowel screening. Furthermore, this literature review highlights the vital role of primary care physicians in promoting bowel screening. Effective communication helps address patients concerns and emphasizes the importance of bowel screening.

In Qatar, awareness of CRC symptoms and risk factors among the at-risk population (aged 50-74 years) is generally inadequate. Regression analysis highlights males, Qatari nationals, and those with limited education as having particularly low awareness levels. This underscores the necessity for tailored educational campaigns focusing on males and individuals with lower educational backgrounds, utilizing local evidence and effective engagement strategies for optimal dissemination of information.⁶

Research conducted among a Saudi population aged 45 years and above, the primary obstacle identified for CRC screening was the absence of physician recommendations. Additional significant barriers encompassed limited understanding of CRC and the absence of detectable signs and symptoms of the disease. Individuals who had not undergone any CRC screening reported encountering

more barriers compared to those who had undergone previous screening. These results highlight a significant lack of awareness and education among individuals in the age group susceptible to CRC.²³

Similarly, research conducted in the United States has identified various barriers to CRC screening, including concerns about the screening process and results, alongside the absence of physician recommendations, a pattern observed in other Western nations as well. Physician recommendations are pivotal in influencing patients' health-related choices. Moreover, it is essential for physicians to elucidate the rationale behind their recommendations, weighing both the benefits and risks. Additionally, physicians should consider patients' preferences and socio-cultural context when offering recommendations.^{24,25}

A systematic review of 23 studies conducted in Asia identified several key barriers to bowel screening uptake, including insufficient time and knowledge, absence of physician recommendations, apprehension regarding screening outcomes, low perceived risks, and lack of physician guidance.²⁶

Another significant hurdle was the absence of reminders about CRC screening from healthcare providers, with approximately 75% of healthcare professionals seldom discussing bowel cancer screening with their patients.²⁷

The fear of receiving a cancer diagnosis through screening tests often acts as a deterrent for individuals, discouraging them from seeking screening initially. There is also a concern that a cancer diagnosis would inevitably lead to imminent death. This fear consequently results in a belief that remaining unaware of the diagnosis equates to being free from the disease.²⁸ Furthermore, tests like a digital rectal examination (DRE) or flexible sigmoidoscopy have been associated with anxiety and panic, viewing it as the onset of a distressing journey.²⁸

Family members of individuals with a familial history of CRC (FDRs) may have negative perceptions toward invasive endoscopic procedures for screening. They anticipate discomfort, embarrassment, and a sense of intrusion, expressing concerns about potential pain and citing unpleasant anecdotes from others.²⁸

IMPROVING BOWEL SCREENING UPTAKE

Enhancing bowel screening participation requires a comprehensive approach that addresses both organizational barriers and patient-related factors. By implementing clear hospital policies and educational initiatives aimed at increasing awareness and addressing patient concerns, healthcare systems can improve screening uptake rates and ultimately contribute to better patient outcomes in colorectal cancer prevention and management.

Additionally addressing barriers to screening by enhancing access to screening services which can include increasing the number of screening facilities, providing mobile screening units, and implementing outreach programs to underserved populations could help improve bowel screening uptake.²⁹

Research suggests simplifying the screening test using less invasive screening methods, such as FIT, that are more user-friendly and require minimal preparation or discomfort could also help improve participants rates.²¹

Healthcare professionals specially physicians have a large role in health promotion, hence encouraging physicians to actively promote and recommend bowel cancer screening to eligible individuals, effective communication between physicians and patients can help address concerns, alleviate fears, and emphasize the importance of participation.²⁹

Furthermore, enhancing public awareness campaigns, implementing targeted public health campaigns using various media channels to increase awareness about bowel cancer screening, emphasizing its importance and benefits may improve bowel screening uptake.²¹

Improving education and health literacy by developing educational programs and resources to improve individuals understanding of bowel cancer, the screening process, and potential benefits, addressing misconceptions and providing information in plain language that is easily understandable for the general population may also improve screening uptake.²¹

CONCLUSION

CRC screening emerges not only as a cost-effective intervention but also as a globally indispensable tool for the prevention and management of CRC. Timely screening not only identifies CRC at its stages but also holds the potential to prevent its occurrence. Despite global efforts to reduce bowel cancer impact, there is a scope for improvement worldwide. Additional efforts are required to overcome barriers and boost screening rates. Governments, health authorities and healthcare professionals all have a pivotal role and should work together to improve CRC screening uptake to reduce the impact of CRC globally.

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