

## Adherence to colorectal cancer screening

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### Abstract:

**Background:** Colorectal cancer is the third most common cancer in the world. Randomized trials have demonstrated the efficacy of screening. In this review, we discussed the benefits of colonoscopy & other screening tests and their role in decreasing the mortality rate from CRC.

**Aim of work:** this minireview discusses the different CRC screening modalities and the adherence of populations to these procedures.

**Keywords:** Colorectal cancer, screening, adherence, guidelines.

### Introduction:

Colorectal cancer (CRC) is one of the most common cancers worldwide. Between one and two million new cases are diagnosed every year, thus making CRC the third most common cancer and the fourth most common cause of cancer-related death, with 700,000 deaths per year. By gender, CRC is the second most common cancer in women (9.2%) and the third in men (10%) [1].

Colorectal cancer (CRC) is increasing among young individuals in the Arab world, Egypt, and other world regions [2].

In Egypt, no accurate formal prevalence rates; however, early reports showed that

## Review Article

colorectal cancer is the 7th commonest cancer among Egyptians. From the practice point of view, colon cancer is prevalent among different age groups of Egyptians, and no age seems immune against the development of this cancer. [3].

In the past decade, CRC incidence has been observed worldwide. Additionally, there is an increase in the prevalence of CRC in the younger population, and new cases are expected to increase among the younger people aged 20–49 years by 2030[3].

Although more than 90% of CRC cases are diagnosed in individuals over age 55, CRC incidence rises in younger populations. For example, Egypt, Saudi Arabia, the Philippines, and Iran have CRC incidence rates in individuals under age 40 of 38%, 21%, 17%, and 15%–35%, respectively. This is compared with only 2%–8% of new cases in the U.S[4].

Despite the availability of screening modalities, many populations refused to undergo screening, as they are doing well and there is no complaint. They refuse to be screened, especially with invasive procedures such as colonoscopy. [5].

***Risk Factors for Colorectal Cancer:***

Factors that increase the risk of developing colorectal cancer can be divided into two categories: modifiable factors and non-modifiable factors. Non-modifiable risk factors include having inflammatory bowel disease, some hereditary factors, and old age [6].

Modifiable factors include obesity, lack of physical activity, a diet high in red and processed meat, smoking, and excessive drinking of alcohol and are all known to be associated with the occurrence of colorectal cancer [6].

**Age:**

More than 90% of the patients diagnosed with colorectal cancer were found to be more than 55 years old in a study conducted by Li and colleagues. Age at diagnosis also affects survival. Other studies report a poor outcome in younger colorectal cancer patients despite previous findings that advanced associate age with poor survival.[7].

Generally, colorectal cancer in young patients usually presents with poor tumor morphology and late-stage diagnosis than older individuals and other factors that lead to poor survival [7]. A large population-based study reported that the most senior group of patients (> 80 years) have almost twice the risk of death after the operation with a hazard ratio of 1.95, 95%, after controlling for other factors [7].

## Review Article

This finding is explained by a higher percentage of comorbidities and complications experienced by older patients after surgery. This is agreed by Stornes and colleagues, who claimed that age influences the selection of treatment modalities in older patients; for example, older patients may be treated less often with surgery (including major radical surgery) or radio-chemotherapy in more local recurrence and poorer eventual outcomes. This suggests a more complex causal pathway [8].so it is important to be adherent to the international guidelines regarding the age of the populations, according to the latest report of the American colorectal cancer guidelines [9]. Relatives of patients with colorectal cancer may begin their screening at an earlier age [9].

**Sex:**

The incidence of colorectal cancer is considerably higher in men than women in many countries worldwide. Findings on the influence of sex differences in colorectal cancer prognosis have been less consistent. Some studies reported better survival in women, while others did not find any significant difference [10].

An analysis of a large representative cohort comprising 24 clinical trials that enrolled more than 30,000 colon cancer patients between 1978 and 2003 found that women with early-stage colon cancer have significantly higher survival rates than men [11].

**Race:**

Different races or ethnic groups may have different cultures, lifestyles, environments, and food preferences, and these factors may influence their health outcomes in general. Racial disparities have been reported to affect the survival of colorectal cancer in many countries [12].

**Smoking**

Investigators carried out a study on the relationship between smoking and the survival of 10,794 rectal cancer cases in Ireland. Current smokers with rectal cancer were significantly poorer survival (HR=1.15, 95%CI 1.06-1.24) than non-smokers. Still, the association was insignificant in ex-smokers diagnosed with rectal cancer [13].

**Diabetes**

## Review Article

There is ample evidence of the association of four metabolic syndrome disease characteristics (diabetes, obesity, hypertension, and dyslipidemia) to progression-free survival in Stages I to Stages III colorectal cancer [14].

Diabetes mellitus had a significant positive association with progression-free survival. They found that the use of Metformin in the treatment of diabetic patients improved their outcome of progression-free survival [14].

On the other hand, an extensive systematic review and meta-analysis involving 21 eligible cohorts, which involved more than one million patients of colorectal cancer, had different findings. This meta-analysis indicates that colorectal cancer patients with pre-existing diabetes mellitus were adversely associated with lower (worse) overall survival. However, the association was not significant with cancer-specific survival [15].

**Site**

The prognosis of colorectal cancer has been shown to vary depending on the anatomical site of the tumor. Lee and colleagues reported that patients with cancer at the rectum had better survival than those at the colon [16].

**Stage:**

As the stage of disease at diagnosis advances, survival becomes considerably shorter. **Aravani and colleagues** reported that 93% of patients who presented with earlier-stage disease survived longer than five years compared to only 6% of those with late-stage disease [17]. Therefore, screening is essential as it can detect precancerous lesions and colorectal cancer early, so the prognosis is good [17].

**Socioeconomic status:**

Socioeconomic status has an association with colorectal cancer survival in several studies. Low socioeconomic status is mainly associated with poorer survival. The group with the most inferior socioeconomic status in the study of Hines and colleagues had a 24% higher risk of death than that of the most elevated socioeconomic status [18].

## Colorectal Cancer Screening Tests and studies.

Several screening tests can be used to find polyps or colorectal cancer. The Task Force outlines the following colorectal cancer screening strategies. It is essential to know that if the test result is positive or abnormal on some screening tests (stool tests, flexible sigmoidoscopy, and CT colonography), a colonoscopy test is needed to complete the screening process [19].

### Stool Tests

- The **guaiac-based fecal occult blood test (gFOBT)** uses the chemical guaiac to detect blood in the stool. It is done once a year. You receive a test kit from your health care provider for this test. You use a stick or brush to obtain a small amount of stool at home. You return the test kit to the doctor or a lab, where the stool samples are checked for the presence of blood [20].
- The **fecal immunochemical test (FIT)** uses antibodies to detect blood in the stool. It is done once a year in the same way as a gFOBT [20].
- The **FIT-DNA test** (also referred to as the stool DNA test) combines the FIT with a test that detects altered DNA in the stool. For this test, you collect an entire bowel movement and send it to a lab that is checked for cancer cells. It is done once every three years [20].
- Screening guidelines for persons at higher risk generally recommend additional types of testing (e.g., colonoscopy rather than, or in addition to, Fecal Occult Blood Test (FOBT), more frequent testing, and commencement of testing at an earlier age, compared with their average risk counterparts [21].
- Several randomized controlled trials have demonstrated that CRC mortality can be reduced by 15% to 33% through FOBT screening [22].
- Improved patient screening adherence could be achieved with patient and physician education. In a CRC screening pilot program evaluating 300 underserved women, 31% of patients were interested in undergoing FOBT, and 14% requested CRC-related educational materials. This study emphasizes the importance of adequate education and the need to reach the underinsured populations who may lack access to and knowledge of CRC screening [23].

One study involved asymptomatic adults 50 to 69 years of age, compared one-time colonoscopy in 26,703 subjects with Fecal Immunochemical Testing (FIT) every two years in 26,599 subjects, found the rate of participation higher in the FIT group than in the colonoscopy group [24].

The experience at Kaiser-Permanente in California further illustrates it. Following failed efforts to implement screening by endoscopy, screening participation has consistently increased with the re-introduction of a non-invasive FIT test, despite the test having lower sensitivity [25].

### **Flexible Sigmoidoscopy**

It is repeated every five years or ten years with a FIT every year [26].

The most commonly applied and efficient method in diagnosing CRC is endoscopy. It includes sigmoidoscopy and colonoscopy. These examinations allow one to localize the tumor and take biopsies of the large intestine for histological analysis. The sensitivity and specificity of sigmoidoscopy for polyps and extended CRC recognition is 92–97% [27].

### **Colonoscopy**

This is similar to flexible sigmoidoscopy, except the doctor uses a more elongate, thin, flexible, lighted tube to check for polyps or cancer inside the rectum and the entire colon. The doctor can find and remove most polyps and some cancers during the test. Colonoscopy is used as a follow-up test if anything unusual is found during one of the other screening tests [28]. Every ten years (for people who do not have an increased risk of colorectal cancer) [28].

Obesity in women may affect CRC screening rates. A study found that colonoscopy rates were lowest among obese white women at 30.2% [29].

### **CT Colonography**

Computed tomography (CT) colonography, also called a virtual colonoscopy, uses X-rays and computers to produce images of the entire colon, which are displayed on a computer screen for the doctor to analyze [30]. It is done every five years [30].

Several CRC screening methods aimed at early detection have been developed, and there is a substantial body of evidence supporting the benefits of CRC screening. Paradoxically, despite the clear and long-standing evidence that CRC screening reduces mortality and may reduce cancer incidence, participation rates in screening programs remain too low, at an estimated 65% in the US and ranging from 1.9% to 54% across Europe [31].

Given the low participation in CRC screening programs despite the clear medical benefit, it is essential to understand the barriers to screening to develop successful alternative approaches. Numerous studies report behavioral as well as structural barriers that limit screening participation. These include factors specific to the tests themselves, such as embarrassment, fear of the procedure, or inconvenience, as well as broader factors such as lack of access to care, limited knowledge of screening, and a lack of physician recommendation [32].

In a recent study, through a questionnaire focusing on the first-degree relatives of Egyptian CRC patients, investigators found that all the surveyed relatives refused the screening tests, especially the invasive ones. According to the survey, the rationale for this was cultural and lack of knowledge about screening; they think that if they had no symptoms suggestive of colorectal cancer, there is no risk of colorectal cancer in the future. Most of them said we are healthy looking and have no symptoms, so why do I investigate? We believe that this is the most critical individual-related barrier -among others- against CRC screening [33].

A study that included 147 participants screened for CRC demonstrated the overall compliance rate for CRC screening was 33%. For the most part, the reasons for non-compliance were unknown (79%). A significant number of patients refused to be screened (20%) [34].

Luis et al. studied 281 first-degree relatives of CRC patients and found that the compliance rate to colonoscopy was 38%. Colonoscopy adherence was higher among female relatives, relatives of index patients under 65 years, and relatives with a higher degree of familial aggregation for colorectal cancer. They believed that the perception that colonoscopy and the preparation of the colon were uncomfortable or painful has a considerable influence on adherence. This was supported by findings that subjects prefer less awkward screening methods such as fecal occult blood tests. Other reasons reported for low commitment are lack of time to visit the doctor, low economic and educational levels, lack of interest, the perception of colorectal cancer as a minor problem, and, in the case of women, the fact that an endoscopist is a man [35].

Another study of 217 patients also concluded that patients preferred FOBT (43%) or colonoscopy (40%) as their primary screening method. Patients for whom accuracy was the most critical test feature chose colonoscopy (62%) as their preferred test. In contrast, patients for whom the invasiveness of the trial was critical decided FOBT (76%) [36].

Multiple studies have found that women are less likely than men to undergo CRC screening in both the United States and Canada. Disparities in the screening rates for CRC versus breast and cervical cancers may be partly due to a misperception by women and their physicians that CRC is a “man’s disease.” [37].

## Review Article

It is clear from the results of the previous studies that offering a blood test as part of the screening menu further improves participation, as approximately 100 percent of subjects opted for a blood test. While it is clear that the ease and convenience of a blood test can improve screening participation, many additional factors will determine the impact of a new screening test. In addition to performance characteristics, these include guideline recommendations, health economic considerations, and cost to the patient, among others [38].

Finally, Colorectal cancer screening programs remain less prevalent because of the invasive nature of endoscopies, financial burden, time-consuming, anesthesia, lack of awareness, and lack of a commonly accepted method of screening by researchers, and other barriers to screening [39].

The situation is different in Egypt, and in many developing countries with no screening or surveillance for colorectal cancer, so much effort is needed to persuade populations for screening programs in such countries. Also, the orientation of the general population to this serious cancer is required. Establishing national guidelines to consider the population's culture and customs is mandatory. It is essential to teach general practitioners and young physicians about the benefits of screening and the deadly results of advanced colonic carcinoma [40].

**Conclusion:** Providing non-invasive screening choices can augment participation in programs for colorectal cancer screening. The success of a screening program depends not only on having tests with acceptable performance but also on the willingness of the target population to participate.

**Footnotes.**

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## Review Article

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