



A review of Colorectal Cancer in Tanzania: an exploratory study in relation to the work of (Mziray et al 2024) in selected regional hospitals, Dar es Salaam – Tanzania

Richard Owusu Nyarko¹, Edward A. Boateng², James Yamoah^{3*}, Umuhire Didier⁴, Paul Owusu Boateng⁵, Asare Bertram⁶, Anubhav Dubey⁷

¹General Surgery Resident, Department of Surgery, Kairuki University/ Kairuki Hospital, Dar es salaam – Tanzania.

²Specialist General Surgeon, Department of Surgery, International Maritime Authority Hospital – Tema, Ghana.

³President, Ghana Christian University College, Accra – Ghana.

⁴Department of Obstetrics & Gynecology, Kibogora Level 2 Teaching Hospital, Rwanda.

⁵Department of Public Health, GIMPA, Accra – Ghana

⁶Department of Critical Care and Intensive Care Unit, Korlebu Teaching Hospital, Accra – Ghana.

⁷Department of Pharmacology, Maharana Pratap College of Pharmacy, Kanpur, India.

*Corresponding Author

James Yamoah

President, Ghana Christian University College, Accra – Ghana.



Article History

Received: 01.12.2024

Accepted: 11.01.2025

Published: 07.02.2025

Abstract: -

Background: Persons with a family history of colorectal cancer or other risk factors may need earlier or more frequent screening. Regular and early screening can significantly reduce colorectal cancer incidence and mortality by detecting and removing precancerous polyps or detecting cancer at an early, more treatable stage.

Objective: To explore colorectal cancer (CRC) clinically, its impact on the population among aged patients in regional referral hospitals in Dar es Salaam - Tanzania.

Methodology: The researchers used exploratory research design to underpin the work of (mziray et al 2024) since both teams worked in same facilities with similar indicators. Socio-demographic characteristics, knowledge, and awareness about CRC were assessed through observations, clinical test, in-depth interviews and confirmed cases of CRC that has been managed surgically and medically. Diagnostic interventions, including stool analysis, H. pylori antigen testing, and endoscopic interventions Risk assessment for CRC was conducted based on dietary habits and medical history.

Conclusion: Socio-demographic analysis revealed limited awareness and knowledge about CRC, with notable disparities between positive and negative CRC cases. Comprehensive screening programs, coupled with increased knowledge dissemination, are crucial for early detection and prevention of CRC in Tanzania.

Keywords: Stool Blood Test, Breast Cancer Antigen 1 and 2 (BRCA1, BRCA 2), Carcinoembryonic Antigen (CEA), Colorectal Carcinoma (CRC), Body Mass Index (BMI).

Introduction

Notably, the belief that Colorectal Cancer (CRC) mostly affects the elderly is being challenged by an increasing prevalence of the disease among those 45 years of age and beyond [8,9]. Men are more susceptible than women, suggesting that gender also has an impact [10]. Genetic disorders such as Lynch syndrome (Hereditary Non-Polyposis Syndrome (HNPCC)), Familial Adenomatous

Polyposis (FAP) syndrome, and mutations in the Breast Cancer 1 (BRCA1) and Breast Cancer 2 (BRCA2) genes are among the non-modifiable risk factors for CRC [7,11]. Furthermore, several gastrointestinal diseases, including inflammatory bowel disease (which has a stronger correlation with ulcerative colitis), increase the risk of CRC (7,11). One's vulnerability to CRC is further increased by a personal or family history of the disease [11,12]. For average-risk individuals, CRC screening can be done through stool

Cite this article:

Owusu Nyarko R., Amoah Boateng E., Yamoah J., et al (2025). A review of Colorectal Cancer in Tanzania: an exploratory study in relation to the work of (Mziray et al 2024) in selected regional hospitals, Dar es Salaam – Tanzania. *ISAR Journal of Medical and Pharmaceutical Sciences*, 3(2), 27-32.

tests like FIT, multi-target DNA, and gFOBT annually or biannually. If stool test results are positive, it must be followed by colonoscopy. Visual screening methods, including proctoscopy and virtual colonoscopy, should be repeated every five years if done with annual FOBT or every 3 years if not done without FOBT if negative, but if positive, they should be followed by colonoscopy. Colonoscopy, considered the gold standard screening modality, should be done every ten years for average-risk individuals ^[1,3].

Problem Statement

Limited data on awareness about screening protocols and the absence of an established screening program in Tanzania underscore the need for comprehensive understanding. Despite the benefits of screening in reducing CRC incidence, morbidity, and mortality, it remains unclear if Tanzanian individuals aged 45 and above are aware of CRC symptoms, risk factors, and screening methods.

Due to the lack of screening programs in the country, numerous studies have indicated late presentations of the disease, sometimes as emergency cases, leading to increased incidence, mortality, morbidity, and treatment costs, thereby imposing an economic burden on individuals, families, and the government ^[5,7].

This study aims to emphasize the need for the government to increase endoscopy services to enhance screening and consequently reduce the incidence and improve outcomes of CRC through early diagnosis.

Significance of the Study

The outcomes of this study may play a vital role in developing strategies aimed at raising awareness about CRC, addressing modified and non-modifiable risk factors, and establishing routine screening protocols for both average and high-risk populations hence improving diagnosis at an early stage where the disease is curable, thus reducing incidence of disease and its burden in social and economic perspectives.

Research Questions

1. What proportion of CRC cases is found among patients with positive FOBT among adult patient aged between 40-75 years attending outpatient clinics in regional referral hospitals in Dar es Salaam?
2. What is the prevalence of CRC among adult patients aged between 40-75 years attending outpatient clinics in regional referral hospitals in Dar es Salaam?

Specific Objectives

- i. To determine the proportion of CRC among patients with positive FOBT among adult patients aged 40-75 years attending outpatient clinics in regional referral hospitals in Dar es Salaam.
- ii. To determine the prevalence of CRC among adult patients aged 40-75 years attending outpatient clinics in regional referral hospitals in Dar es Salaam - Tanzania.

Hamartomatous Polyposis Syndromes.

Peutz-Jeghers and juvenile polyposis are the most frequent hamartomatous polyposis syndromes that lead to colorectal cancer. Peutz-Jeghers individuals are also at risk for stomach, pancreatic,

breast, and uterine cancers, as well as ovarian sex cord tumors, Sertoli cell tumors, and cervical adenoma malignum. In addition to colorectal cancer, juvenile polyposis patients are at risk for gastric, duodenal, and pancreatic cancer. Both of these disorders lack evidence-based surveillance guidelines. The advice must be tailored to each individual. Genetic testing is also offered to afflicted people ^[28].

Crohn Disease.

The incidence and features of colorectal cancer in Crohn's disease have been found to be comparable to ulcerative colitis. There are no particular surveillance guidelines in Crohn's disease. However, based on the ulcerative colitis model, a colonoscopy can be recommended after 8 years of diagnosis and then every 1 to 2 years. Random biopsies at 10 cm intervals should be considered ^[28].

Ulcerative Colitis.

In a meta-analysis of 116 publications, it was noted that the prevalence of CRC in ulcerative colitis (UC) patients was 3.7%, increasing to 5.4% for those individuals with pancolitis. The estimated cumulative risk of CRC for any patient with UC was 2% at 10 years, 8% at 20 years, and 18% at 30 years ^[28].

Surveillance in UC is determined by the disease's severity and duration. Annual colonoscopies are indicated after 8 years of pancolitis. If the illness just affects the left side of the colon, monitoring can begin later. It is critical to do random biopsies every 10 cm. If the specimens show significant dysplasia, surgery should be considered since there is a high risk of occult colon cancer.

Annual fecal occult blood tests reduce colorectal cancer mortality by 15-33%

A positive FOBT will be followed by a timely colonoscopy and early treatment of any detected lesions. Research analyzing a one-time FOBT with sigmoidoscopy found that advanced neoplasia, defined as an adenoma 1 cm or bigger, a villous adenoma, an adenoma with high-grade dysplasia, or invasive malignancy, would have been missed in 24 percent of the patients ^[28].

Two large studies evaluating the risk of advanced proximal neoplasia in patients undergoing distal colon evaluation followed by colonoscopy revealed that advanced proximal neoplasia would not have been detected in 50% and 62% of patients, respectively, because there were no distal neoplasms that would have required a full colonoscopy. In the National Polyp Study, a double-contrast barium enema failed to detect 48% of adenomas larger than 1 cm. Colonoscopy isn't ideal as Visualizing the cecum is not always possible.

Additionally, there is morbidity related with colonoscopy. The risk of perforation is low following a diagnostic colonoscopy, but it increases after polypectomy. There have been reports of problems with conscious sedation and bleeding following polypectomy.

CT Colonography has been used to report encouraging results from a single institution. However, patients must still undergo bowel preparation, competence varies, and there is no uniform software. Patient acceptability of this technique may be better, making it a more helpful screening tool in the future. Screening for colorectal cancer looks to be more cost-effective than not screening. Each

modality mentioned above has pros and cons; as a result, colorectal cancer screening must be tailored to the patient's and healthcare provider's preferences, as well as available resources.

The identification of molecular markers in patient feces is one area being investigated as a possible screening technique. Ahlquist and colleagues investigated the viability of a multitarget DNA-based stool test. The test specifically targeted K-ras, APC, p53, Bat 26, and DNA with a long or high molecular weight. The sensitivity for malignancy was 91% in 61 stool samples examined, and 82% for big adenomas. The specificity was 93 percent.

The American Cancer Society (ACS) recommends that men and women at average risk who are asymptomatic begin CRC screening at age 45. Screening should start earlier and more often for people who are at high risk^[3,11,12].

Person's decision to get a CRC screening largely depends on how well-informed they are about the symptoms and risk factors of the illness.

Even though some individuals may be aware of the screening guidelines, they may choose not to get a colonoscopy because they find it embarrassing^[3,10].

Becoming familiar with screening criteria and recommendations should aid in the early diagnosis and treatment of CRC. Studies conducted in Saudi Arabia have shown that 42.9% of respondents think screening should only start when symptoms appear (this is not screening but it is diagnostic investigation done to symptomatic patients). Likewise, just 22.1% of respondents were aware of the appropriate time to start CRC screening. Similarly, according to a different survey, just 20.8% of people are thinking about screening^[1,3] and only 13.1% of individuals accurately identified the proper age for screening. According to a recent study done in Nigeria, of 97 participants whose relatives had been diagnosed with CRC, only 21.6% had heard about CRC screening^[1,3]. This indicates that there is a lack of information and awareness of CRC screening, as well as a negative attitude toward screening.

African nations with rising rates of CRC include Nigeria, Ghana, and Tunisia^[2,4]. Furthermore, inadequate knowledge of CRC symptoms, delayed diagnosis, and a lack of screening tests are the main causes of CRC mortality in low- and middle-income nations^[2,4]. The National Cancer Steering Committee in Ghana advised using the FOBT as a first screening method for individuals between the ages of 50 and 70. Those who tested positive would next have an endoscopic examination (2,4,13). It is also critical to remember that CRC screening recommendations made in wealthy nations might not apply everywhere. For instance, the age at which CRC occurs is lower in African nations than in the US, and there is no standard cutoff point for FOBT findings to forecast CRC^[2,4].

The scarcity of endoscopic resources in African nations has been identified as a significant obstacle to CRC screening^[4,5,7].

Research has revealed that inadequate infrastructure, particularly in terms of facilities and equipment as well as the restricted capabilities of colonoscopy, is a hindrance to CRC screening^[4]. A study revealed that participants found colonoscopy without sedation to be unacceptable, hence it reduced rate of follow up, after bad experience with first colonoscopy. According to another study, a high number of false-positive results from FOBT resulted in a significant endoscopic burden for a nation with limited

endoscopic resources, moreover colonoscopy referrals led to longer waiting time, which in turn decreased follow-up CRC screening adherence by individuals with an initial positive test result^[4,14].

Studies have shown that 60.7% of the physicians who were interviewed identified the shortage of trained providers that could conduct follow-up invasive procedures as a barrier and 58.6% identified a shortage of providers trained for screening modalities other than FOBT as a potential barrier^[2,15]. The limited availability of trained health care professionals, such as physicians and/or laboratory technicians and pathologists. Researchers also found that the two main reasons doctors did not advise FOBTs for CRC screening in asymptomatic average risk patients were inadequate facilities and equipment^[4,5,15].

Lack of patient awareness is another obstacle to CRC screening in Africa, according to studies in Ghana, 86.2% of doctors surveyed stated that patients' ignorance of screening, particularly their failure to view CRC as a serious health threat, was a barrier to CRC screening. Additionally, 10% of doctors would not suggest CRC screening for asymptomatic average risk patients, even if their age fell within the national guidelines, and 65.6% of physicians stated that primary care doctors do not aggressively recommend screening to their patients^[2,4].

Research revealed that a barrier is the healthcare providers' lack of attention and education on preventative screening^[2,13]. Only a small percentage of participants in an Egyptian survey cited doctors as a source of knowledge. Regarding how patients viewed screening and receiving a cancer diagnosis, several doctors expressed concerns^[2].

In an intervention trial, 11.1% of participants cited their belief that they had a low risk of CRC as justification for avoiding having a follow-up colonoscopy following a positive FIT test^[2].

The stigma attached to receiving a cancer diagnosis, individuals' views about healthcare, traditional medicine, and religion were among of the important cultural elements impacting CRC screening in Africa^[2,16,17]. Most physicians surveyed (~75%) cited the intrusive aspect of colonoscopy and the notion of stool collection for FOBT as obstacles. Patients said there is no shame attached to collecting their waste, but doctors said that in traditional settings, people view feces as an abomination that causes suffering. According to some research, patient acceptance and worry or fear of receiving a cancer diagnosis are obstacles to following CRC screening recommendations^[2,18,19]. Twelve-point three percent (12.3%) of individuals with a positive FIT test did not get a follow-up colonoscopy because they were afraid, they might be diagnosed with cancer, according to Moroccan research^[2].

Religion has a significant influence on people's attitudes about medicine and health care in general. Doctor appointments following the onset of symptoms are not common, and Nigeria and Egypt have a similar cultural mindset^[2]. Research has indicated that individuals with lower levels of education had a higher probability of not finishing FITs, and that among patients who had a positive FIT result, the rate of follow-up colonoscopy was positively correlated with education level^[2,20,21].

One underlying intrapersonal obstacle to CRC screening is socioeconomic status. Particularly, several studies have noted that patients from better socioeconomic classes and educational backgrounds were often more informed about health issues and so

saw doctors earlier and more frequently ^[13,22,23]. Additionally, patients with higher socioeconomic status might visit private clinics, which provide more screening services, including FOBT and colonoscopies, than public clinics, which simply recommend next steps to patients with linked symptoms, like anemia and change in bowel habits ^[2,24].

Accurate cancer incidence statistics are scarce in Sub-Saharan Africa, nonetheless, anecdotally; physicians report a notable increase in CRC incidence during the previous ten years ^[5]. We don't yet know the actual prevalence of CRC in Tanzania. Nonetheless, several hospitals including Ocean Road Cancer Institute (ORCI) have seen acknowledge raise in colon and rectal cancer diagnoses in their wards. For instance, from 2005 to 2015, the major cancer center in Tanzania, Ocean Road Cancer Institute (ORCI) in Dar es Salaam - Tanzania, studied the incidence of CRC, they observed that the number of CRC cases increased from 23 in 2005 to 146 in 2015 ^[5,6,8].

According to the studies done in Tanzania on CRC, most individuals diagnose their disease after it has already progressed, and it might be difficult to appropriately stage these patients before treatment since there aren't enough endoscopic and diagnostic resources available ^[5,6,8].

In Tanzania, late presentations are a typical aspect of CRC. An examination of 332 CRC cases at Bugando, a zonal referral hospital serving Tanzania's Lake and Western Zones, from 2006 to 2011 revealed that all patients had symptoms upon presentation, with a median duration of 22 months (about 2 years) for symptoms to manifest. Moreover, emergencies were reported in 13.5% of these patients. In a similar vein, 65% of the 174 CRC patients at Kilimanjaro Christian Medical Center that were reviewed between 1998 and 2018 presented as emergencies.

100 percent of patients at ORCI who were reviewed between 2010 and 2015 had symptoms at the time of diagnosis (4,6), of those patients, five percent had Stage 2, thirty-three percent had Stage 3, and sixty-two percent had Stage 4 illness. CRC screening has been shown to be quite beneficial in high-income environments. Screening identifies CRC in 40–60% of cases in Europe, where there are well-established national screening programs with participation rates above 50% (4,6,8). This is hardly surprising, as a far smaller percentage of CRC patients who visit the hospital in Tanzania have screen-detected malignancy. Delays in the referral process and travel times to treatment facilities might be contributing factors, even if a lack of screening services could account for some of the late presentation ^[5].

For average-risk persons over 45, CRC screening using FOBT, flexible sigmoidoscopy, or colonoscopy is highly advised because of its capacity to facilitate early cancer detection and lower CRC mortality ^[25]. Physicians now prefer colonoscopy over FOBT as an initial screening method, and its usage is growing ^[13,25]. Nonetheless, there is no proof that screening colonoscopy programs lower the death rate from CRC, and patients still say they prefer FOBT—only 15% of US people have had this kind of screening ^[25]. FOBT is not a reliable screening test for CRC unless it is used in conjunction with a colonoscopy to provide a comprehensive diagnostic assessment of the colon in the event of a positive FOBT ^[13,25]. Unfortunately, many patients who have a positive result from a FOBT do not receive the necessary diagnostic examination as a follow-up. Given that up to 40% of

patients with a positive FOBT result have either early CRC or adenoma discovered on follow-up colonoscopy, this failure to "close the loop" implies a serious breach in treatment for these high-risk individuals.

Research revealed that in a group with average risk, follow-up rates following a positive stool blood test (SBT) test for CRC screening were low. The rates of colonoscopy follow-up after a positive stool blood test were as follows: 43.3% within 90 days (about 3 months), 51.4% within 180 days (about 6 months), and 56.1% within 360 days (about 12 months) ^[13,23,25].

A total of 92 individuals were included in research conducted in Brazil, of which 52 (56.5%) were female, of them, 42.4% had positive results from the FOBT, and 41 (44.6%) had abnormal findings from the colonoscopy ^[23,26,27]. The most common change identified in 20 individuals (21.7%) was a polyp, of the patients exhibiting polyps, 5 (5.4%) had non-neoplastic polyps and 15 (16.3%) had neoplastic polyps ^[13,26,27].

The FOBT demonstrated a 66.7% sensitivity, 62.3% specificity, 11% positive predictive value, and 94.2% negative predictive value in the diagnosis of neoplastic polyps ^[13,17]. The FOBT proved to be an efficient and trustworthy screening test that may be used in public health initiatives to identify and prevent CRC, given the necessity for a screening technique.

Regarding the incidence of CRC by colonoscopy in cases of positive FOBT, there is no literature currently accessible in Tanzania.

Study Design.

This study used an exploratory study design.

Study Area

Dar es Salaam is home to three primary regional referral hospitals: Amana Regional Referral Hospital, Mwananyamala Regional Referral Hospital, and Temeke Regional Referral Hospital. These hospitals collectively serve more than 800 patients daily, combining both inpatient admissions and outpatient services. So far as CRC is concern, all the referral hospitals mentioned above do basics serological, hematological and chemistries like FOBT, Carcinoembryonic antigen (CEA), CA 125 and baselin such as the full blod count (FBC), Urinalysis, and hematocrit.

Target Population

The target population for this study was adults aged 60 years and above who attend outpatient clinics in regional referral hospitals.

Age 60 years and above because of increasing CRC prevalence among the aged.

Study Population

The study population consisted of all adult patients aged 60 years and above attending surgical outpatient clinics for reasons other than CRC.

Inclusion Criteria

1. All adults aged 60 years and above attending outpatient surgical clinics at a regional referral hospital.
2. Patients without symptoms indicative of CRC.

3. Patients who have not undergone CRC screening within the past 10 years such as stool test, Proctoscopy, colonoscopy and sigmoidoscopy.

Sample Size Determination

Prevalence of positive FOBT/FIT was found to be 10.1% according to studies done 2020 in Nigeria by **Labaeka et al.**

$$\frac{z^2 p(1-p)}{e^2} = n$$

Where:

n is the sample size

Z is the Z-score corresponding to the desired confidence level (e.g 1.96 for 95%)

p is the estimated prevalence (which was 10.1% similar study done 2020 by Labaeka et al)

E is the margin of error (5%).

Data Collection Procedures

Another research and his group who were Tanzanian nationals were undertaken same research with similar indicators. Mziray et al were made to get all data due to language barrier and criteria given to him as researcher join the team and observed and asked relevant questions pertaining to the study area in English while mziray et al translated into Swahili to the patients who were mostly indigenes and reversed to English to researchers. The other team led by Dr. Amir Mziray, a chief resident in general surgery at that time supported the researchers in the data approach and laboratory works since his work and that of the researchers were similarly related.

Participants were then invited to engage in CRC screening and were guided on the correct procedure for collecting a stool sample by the principal investigator and a research assistant then they collected sample and handed it over to the laboratory where assigned laboratory technician collected them and performed the test.

Using rapid test for gFOBT, the specimen was taken from multiple areas of the sample using a special stick provided, then placed into a buffer solution for 2 to 3 minutes after vigorous shaking, the solution was then applied on the gFOBT kit, and waited for 15 minutes before reading the results, if two lines that is control line and test line are visible then, it's a positive test, if only control line is visible then test is negative, if only test line is visible but control line not visible then it's an invalid test.

Patients who tested positive for FOBT were asked to supply stool for routine stools analysis and H.pylori stool antigen test to rule out hookworm infestation or Peptic ulcer disease respectively as the source of GI bleeding, because these two are not uncommonest causes of GI bleeding in developing countries.

Recommendation:

In developing countries where resources may be limited, a simple recommendation for colorectal cancer prevention and early detection would be to prioritize public health education campaigns that raise awareness about the importance of healthy lifestyle choices and regular screening. Encouraging individuals to maintain

a balanced diet rich in fruits, vegetables, and whole grains while reducing consumption of processed foods and red meats, promoting physical activity and discouraging tobacco use in order to reduce risk of CRC. Emphasizing the significance of early detection through low-cost screening methods such as FOBT, and ensuring access to these tests through community health centers or outreach programs, can make a significant impact on reducing the burden of colorectal cancer in resource-limited settings.

Conflict of Interest Declaration

No conflict of interest to be declared. Research was done to lay solid foundation for future research work in the area of colorectal cancer and therefore to be published to the scientific and academic community for continuum of future work.

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