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AWARENESS OF COLORECTAL CANCER SCREENING AND ITS ASSOCIATED RISK FACTORS AMONG ADULTS ATTENDING OUTPATIENT CLINICS IN REGIONAL REFERRAL HOSPITALS IN DAR ES SA LAAM - TANZANIA

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Abstract: -

Background: Colorectal cancer screening aims to detect early signs of colorectal cancer before symptoms develop, increasing the chances of successful treatment and survival. Screening methods include colonoscopy, and stool-based tests like fecal occult blood tests (FOBT) or fecal immunochemical tests (FIT), which detect blood in the stool. Screening guidelines vary by country, but it is generally recommended to start regular screenings around age 40 for the average-risk individuals.

Objective: To assess colorectal cancer (CRC) awareness, risk factors and screening utilizing FOBT and colonoscopy among participants in regional referral hospitals in Dar es Salaam.

Methodology: A total of 150 participants were recruited for the study. FOBT was done to all participants, with positive cases undergoing further diagnostic interventions, including stool analysis, H. pylori antigen testing, and endoscopic interventions.

Results: Of the 150 participants, 73.3% tested negative and 26.67% tested positive for FOBT. Further investigations revealed hookworm ova 12.5% (n=5/40) and H. pylori infection 22.5% (n=9/40) among FOBT positive cases.

Conclusion: CRC screening using FOBT demonstrated significant number of positive cases, highlighting the need for improved awareness and education about CRC and its risk factors.

Keywords: Colorectal cancer, adenoma, carcinoma, colonoscopy, fecal occult blood.

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1.0 Introduction

1.1 Background Information

Colorectal Cancer (CRC) is a malignant disease that usually develops from preexisting polyps and affects both the colon and the rectum (1,2,3). The conversion of benign polyps into aggressive CRC occurs gradually over a period of 10 to 20 years (2,3,4). This gradual increase supports the need for routine screening and is consistent with the suggestions made in the American Cancer Society's most recent screening guidelines. Given the extended progression of this disease, such proactive screening procedures are essential in identifying and treating any colorectal lesions at an early stage (5). The disease may not show any symptoms in the early stages and only become apparent later, when there is a larger chance of complications and a higher chance of death than in the earlier stages of the illness. Yet, the condition can be detected early on, particularly in the pre-malignant phase, by using the recommended screening procedures. (2,3,5,6).

CRC symptoms include a wide range of symptoms, including bright red or dark colored stools mixed with feces, unexplained weight loss, appetite loss, intestinal obstruction, changes in bowel habits, changes in stool consistency (including pencil-like stools), tenesmus, and occasional diarrhea episodes (spurious diarrhea) (6,7).

A high-risk diet also categorized as a diet which contains a high animal fat content, plenty of sugar, and little fiber is one factor that may be changed to lower the risk of CRC (3,4,5). A sedentary lifestyle, alcohol use, smoking, being overweight or obese (which has a greater effect on colon cancer than rectal cancer), and managing age-related risks are among other modifiable risk factors (4,5).

1.2 Problem Statement

According to the World Health Organization (WHO), CRC is ranked as the second leading cause of death of all cancers, accounting for an estimated 9.6 million deaths in 2018. Despite its significant impact, overall knowledge of CRC remains poor across all age groups. Approximately 70% of cancer deaths occur in low and middle-income countries, primarily due to inaccessible diagnosis and treatment or late-stage presentation resulting from deficient screening or awareness (1,3)

In Africa, the implementation of screening programs remains challenging, even in countries like Ghana that have established CRC screening guidelines (2,4). The primary barrier to CRC screening in Africa is limited endoscopic capacity, specifically the lack of infrastructure and trained personnel (2,4,13).

Tanzania bears a substantial burden of CRC, which appears to be increasing (5,7,13)Late presentation, limited access to diagnostic and treatment services, and poor coordination continue to pose significant barriers to providing optimal treatment to patients (7).

This study aims to assess Tanzanians' awareness of CRC, primarily focusing on awareness about risk factors and screening. The results will inform campaigns aimed at improving awareness and establishing CRC screening guidelines.

1.3 Rationale of the Study

CRC is an increasing burden, affecting not only older individuals but also impacting young adults (5,7). Despite the high mortality rates in many developing countries,

CRC screening can lead to the early detection of pre-malignant lesions, and early intervention on such lesions can reduce the incidence of late-stage CRC, thereby lowering its morbidity and mortality. Research studies indicate that CRC screening can reduce mortality by 13% to 30% (8–10). Given the preventable nature of this potentially fatal disease through screening, it becomes crucial to evaluate the awareness of the general population regarding CRC.

1.4 Research Questions

1. What is the level of awareness regarding CRC screening and its associated risk factors among adult patients aged 40-75 years attending outpatient clinics in regional referral hospitals in Dar es Salaam?
2. What are the risk factors for CRC among adult patients aged between 40-75 years attending the outpatient clinics in regional referral hospitals in Dar es Salaam?
3. What is the prevalence of positive FOBT among adult patients aged between 40-75 years attending outpatient clinics in regional referral hospitals in Dar es Salaam?

1.5. Study Objectives

1.5.1 Broad Objective

To assess the level of awareness about CRC and its related risk factors as well as screen for CRC among adults attending surgical outpatient clinics at a regional referral hospital in Dar es salaam using history, fecal occult blood test (FOBT) and colonoscopy.

1.5.2 Specific Objectives

i. To assess the level of awareness regarding CRC screening and its associated risk factors among adult patients aged 40 years and above attending outpatient clinics in regional referral hospitals in Dar es Salaam.

ii. To screen for CRC risk factors among adult patients aged 40-75 years attending outpatient clinics in regional referral hospitals in Dar es Salaam.

iii. To determine the prevalence of positive FOBT among adult patients aged 40-75 years attending outpatient clinics in regional referral hospitals in Dar es Salaam.

1. 6 Conceptual Framework

The study conceptual framework is founded based on preventive health. The preventative health paradigm which explains why people should get screening for CRC, serves as the foundation of the conceptual framework of this study. The conceptual framework highlights the importance of individual awareness and risk perception in the decision to undergo screening. It was adapted from Vermon et al. (1997) and Myers et al. (1994). This framework offers an organized method for comprehending and enhancing the awareness, risk factors, and screening behaviors among adult patients in Dar es Salaam.

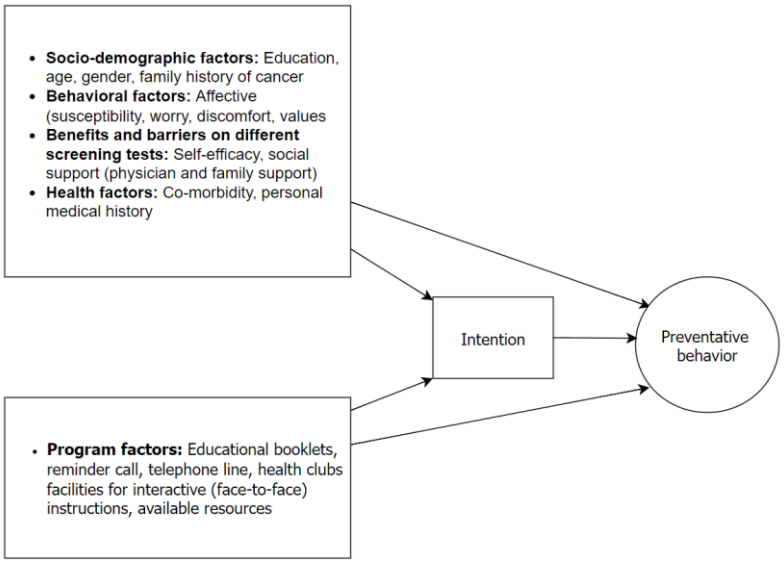

Figure 1. The conceptual framework.

2.0 Literature Review

According to the WHO, CRC is the third most prevalent cancer in the world, and it's the 5th in sub-Saharan African countries, ranked as the second leading cause of death, accounting for an estimated 10 million deaths in 2020 (2,4). Furthermore, it is estimated that 70% of cancer fatalities occur in low- and middle-income nations, primarily because of inadequate screening or awareness, which leads to late-stage presentation or unaffordable diagnosis and treatment (1,3,10).

Modifiable risk factors for CRC.

Although many processes remain unknown, a considerable body of research suggests that a variety of dietary and lifestyle variables are likely to have a significant impact on the risk of colon cancer. Physical inactivity, high body weight, and central adiposity are all persistent risk factors (29). Over-consumption of energy foods is considered to be one of the leading causes of colon cancer in Western countries. Aside from their impact on energy balance, the independent role of various macro-nutrients remains debatable. Red meat, processed meats, and maybe refined carbs increase the risk (29). Recent research suggests that prolonged hyperinsulinemia may raise the risk of colon cancer. Insulin resistance and consequent hyperinsulinemia are caused by excess energy consumption and certain features of the Western diet (for example, saturated fats and refined carbohydrates), hence insulin may be one of the variables influencing colon cancer risk. Recent data suggests that IGF-1 has a role, although our understanding of the modifiable elements that regulate these levels is still limited. Notably, hyperinsulinemia increases free IGF-1 exposure (29). High alcohol intake, most frequently in combination with a diet deficient in some micronutrients such as folate and methionine, as well as early smoking, are all likely to raise the risk of colon cancer (29). Recent epidemiologic research has tended to refute the notion that fiber has a major impact; rather, some micronutrients or phytochemicals in fiber-rich meals may be relevant. Folate is one nutrient that has recently attracted attention and is being investigated in randomized intervention studies (29). Chemo preventive agents, such as aspirin and postmenopausal estrogens, have possible side effects, thus a rigorous risk-benefit analysis is necessary before making broad recommendations for use in prevention for CRC. Other NSAIDs with potential for lower toxicity, such as celecoxib, are now being studied for effectiveness prevention of CRC and toxicity profile (29). The overwhelming data suggests that primary prevention of colon cancer is achievable. At least 70% of colon cancers may be prevented with basic dietary and lifestyle adjustments (29). Secondary prevention, such as sigmoidoscopy and colonoscopy, is also critical in preventing mortality from colon cancer; however, many of the diet and lifestyle risk factors for colon cancers are the same for cardiovascular disease and some other cancers, so focusing on modifiable risk factors for colon cancer is likely to have many additional benefits beyond this cancer (29).

Non - modifiable risk factors for CRC.

Age: After age 50, the incidence of colorectal cancer rises. In the Surveillance, Epidemiology, and End Results figures from 1995 to 1999, the incidence rate of colorectal cancer was 48 per 100,000 populations for those aged 40 to 49, and 327 per 100,000 populations for people aged 60 to 69 years. The incidence rate grew with each successive decade's age (28). However current studies have shown increasing trends of CRC in young adults 40 to 49 years old (4, 10).

Prior history of adenomas.

A personal history of adenomas increases the likelihood of developing more adenomas and consequently colorectal cancer. However, not all adenomas turn malignant, and various researchers have sought to identify certain features of polyps that raise the likelihood of recurring adenomas following polypectomy. These characteristics include histology, size, and the number of adenomas. If the adenoma carcinoma sequence can be disrupted, colorectal cancer incidence should fall. This was documented in the National Polyp Study. Patients who received a full colonoscopy and excision of one or more colorectal adenomas were prospectively examined with colonoscopies every one to three years. After adjusting for age, gender, and polyp size, patients who underwent periodic colonoscopy and adenoma excision had a lower-than-expected rate of colorectal cancer (76% to 90%) when

compared to three reference groups: two groups in which colon polyps were not removed, and a general population registry.

The current ACS guidelines for follow-up following polypectomy are based on the size of the adenomas (less than or larger than 1 cm), the number of adenomas, the degree of dysplasia, and the presence of villous alterations. Colonoscopic follow-up is advised 3 to 6 years after polypectomy in individuals with adenomas smaller than 1cm in size. If the colonoscopy is normal, proceed with the standard follow-up for an average-risk patient. If there are many adenomas, high grade dysplasia, or villous histology, a colonoscopy is indicated within three years post polyp removal (28).

Family history of CRC and adenomas.

A first-degree relative with a history of colorectal cancer raises the risk of the disease by two to three times. According to studies, an individual with a first-degree relative has roughly the same risk of colon cancer at age 40 as the general population at age 50. Furthermore, the risk increases as the number of afflicted relatives grows. Second-degree relatives with colorectal cancer raise an individual's risk of CRC by roughly 25% to 50% more than the norm. A family history of adenomas raises the chance of developing colorectal cancer. First-degree relatives with adenomas had a 1.78 relative risk of colorectal cancer. The younger the afflicted person, the greater the risk of CRC for their siblings. This was observed in the National Polyp Study, particularly if the adenoma was identified at the age of 60 or younger. Colonoscopy is recommended starting at age 40 or 10 years before the youngest CRC in the immediate family for people who have a first-degree relative with colorectal cancer or adenomas diagnosed at age 60 or younger, or for anyone who has two first-degree relatives whose family does not have one of the inherited colorectal cancer syndromes. Colonoscopy should be redone every five years (28).

Prior History of Colorectal Cancer.

Colorectal cancer patients are at risk of recurrence following curative resection. However, the primary goal of endoscopic monitoring is to identify metachronous lesions. Metachronous colorectal cancer and adenomas are more common in people with a personal history of CRC, at around 6% and 25%, respectively. Only in rare cases are isolated anastomotic recurrences identified. Colonoscopy is advised after one year post cancer resection, with a follow-up exam after three years if all is well. If the latter exam is normal, the gap might be extended to every five years (28).

Familial Adenomatous Polyposis.

Classic FAP is characterized by hundreds to thousands of polyps scattered throughout the large intestine. It is an autosomal dominant hereditary condition with a penetrance of about 100%. If the colorectal adenomas are not treated, persons with FAP will almost certainly develop colorectal cancer. The median age of adenoma diagnosis is 15 years. In untreated individuals, the average age of colon cancer diagnosis and death is 39 and 42 years, respectively. Colorectal polyps are less common in the milder phenotypic variation, attenuated adenomatous polyposis coli (AAPC), and colorectal cancer typically develops in the early fifties. Surveillance in FAP should begin around the age of 10 to 12. Annual flexible sigmoidoscopy is suggested for all first-degree relatives of afflicted people. Unless adenomas are discovered, in which case colonoscopy is the preferred technique, yearly flexible sigmoidoscopy should be continued until the age of 18 to 20 years, at which point colonoscopy should be performed annually. If no adenomas have developed by the age of 30, the time between colonoscopies can be extended to 2 to 3 years. APC mutations can be discovered in the germ line of afflicted patients, hence genetic testing is required for affected individuals. If a mutation is known in the family, individuals at risk can be tested for it, and those who do not have a mutation can be spared intensive surveillance and fall into the general population risk. It is important to note that genetic testing should be done in a setting that provides genetic counseling and psychological support, and informed consent is required (28).

Hereditary Nonpolyposis Colorectal Cancer (HNPCC)

This is an autosomal dominant syndrome with early onset of colorectal cancer, right-sided predominance, excess synchronous and metachronous colorectal neoplasms, and extracolonic malignancies such as endometrial cancer, small-bowel cancer, renal, pelvis, and ureter cancers, as well as skin lesions such as sebaceous adenomas, keratoacanthomas, and sebaceous carcinoma. The median age of onset of CRC is 45 years (28). Adenoma do exist in HNPCC. Currently, it is thought that once adenomas form in HNPCC, they proceed to carcinoma quicker than in sporadic CRC. Colonoscopy should be begun at the age of 20. Colonoscopy surveillance at least every three years reduced the incidence of colorectal cancer by 62% and the death rate from colorectal cancer by 65%. Others suggest colonoscopy beginning at age 21 and repeated every 1 to 2 years until age 40, after which it should be done yearly. Similar concepts apply to genetic testing in HNPCC and FAP, with the exception that children are not examined because cancer often develops at a later age than adenomas in FAP (28).

3.0 Study Methodology

3.1 Study Design

This study was a descriptive cross-sectional design.

3.2 Study Duration

The study was conducted for three months from May to July 2024.

3.3. Study Area

The research was carried out at the outpatient clinics of the regional referral hospitals in Dar es Salaam. 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 500 outpatient visitors daily, offering a diverse mix of individuals with varying social, economic, and demographic characteristics, adequate for this study.

In each hospital there is a wide range of inpatient surgical services as well as outpatient services like main theaters and minor theaters, laboratory for various investigations including FOBT, and biochemistry test like Carcinoembryonic antigen (CEA). In all three hospitals there were no facilities for endoscopy.

3.4 Target Population

The target population for this study was adults aged 40 years and above who attend outpatient clinics in regional referral hospitals.

Age 40 years and above because of increasing CRC prevalence among young adults.

3.4.1 Study Population

The study population consisted of all adult patients aged 40 years and above attending surgical outpatient clinics for reasons other than CRC.

3.4.2 Inclusion Criteria

1. All adults aged 40 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 year through stool tests, within the past three years through proctoscopy, and within the past ten years through colonoscopy or 5 years sigmoidoscopy.

3.4.3 Exclusion criteria.

1. Individuals exhibiting symptoms indicative of CRC or patients with a confirmed diagnosis of CRC.
2. Patients who have undergone screening using FOBT within the past year or colonoscopy within the past 10 years.
3. Individuals with severe co-morbidity as very sick individuals may die from their primary disease rather than from slow-growing colonic polyps."
4. These who did not provided consent.

3.5 Data Collection Procedures

Participants completed a self-administered questionnaires, after pre pretesting and validation, a closed end question questionnaire was used to meet objectives and then it was translated to Swahili and then translated back to English and it was concluded consistence was attained. The Swahili version was used for data collection , first section included social demographic data, and other sections had questions about awareness, knowledge and interaction with health care professions with regard to CRC. 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 spacimen was taken from multiple areas of the sample using a special stick provided, then placed into a buffer solution for 2 to 3minutes after vigorous shacking, 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. Then they were asked to undergo colonoscopy at Muhimbili/Mloganzila Hospital for further evaluation. All costs were covered by the researcher I.e. consultation fees, to and from transport fair, polyethylene glycol (coloprep) used for bowel preparation, as well as procedure fee(colonoscopy). informed consent was provided for the patient to sign after details of the procedure including possible complications like perforation of the colon with possibility of laparotomy, dehydration due to diarrhea following coloprep as well anesthetic complications such as anaphylactic reaction and other adverse drug reactions. Colonoscopies were performed by experienced surgeons. Colonoscopy was performed in the endoscopy unity, after 8 hrs fasting on the day of procedure, before procedure bowel preparation was done using coloprep solution that was taken at 11 hrs prior procedure and at 4 hours before procedure. A flexible colonoscope was used to inspect all length of colon as well 10cm of terminal ileum. Patient was placed in left lateral position and endoscopist was at the back of the patient facing the screen. Biopsies were taken for histological studies of identified lesions or polyps, and an appropriate treatment plan was discussed between the surgeon and the patient. Histological studies were conducted by experienced pathologists. The phone number of the participants and one next of kin were taken for follow-up. No any complication was encountered by any participants during colonoscopy. The patient that were found to have a positive colonoscopy histopathological examination cost was covered by PI and then he/she was guided by principal investigator on further management plan in conjunction with his/her primary attending surgeon as recommended by the surgeon who performed colonoscopy. Full treatment of the participant was not covered by PI but was covered by the participant himself. For insured patients insurance company covered all costs except transport fairs, that was covered by PI.

3.6 Data Analysis

The principal investigator conducted daily checks on all questionnaires to ensure completeness and consistency. Pre-coded data were entered into the computer using IBM SPSS version 27 for further cleaning, categorization of continuous variables, and subsequent analysis. Participants requested to respond to the questionnaire, and the level of awareness was evaluated based on the percentage of correctly answered questions. Awareness levels was categorized as very low, low, moderate, high and very high. Descriptive statistics in the form of frequencies and percentages using suitable tables and figures was used to represent categorical data, Continuous data summarized as mean ± standard deviation (SD), medians, and ranges. Pearson's chi-square test for association between categorical variables was used, and a p-value less than 0.05 was considered statistically significant.

3.7 Study Variables

The following variables were assessed during my study;

3.7.1 Independent Variables

1. Age
2. Gender
3. Educational level
4. Body Mass Index (BMI)
5. Personal or family history of CRC
6. Knowledge about CRC risk factors
7. Knowledge about different screening methods (e.g., colonoscopy, FOBT)
8. Understanding of the recommended age to start screening

9. Where individuals obtain information about CRC and screening (e.g., healthcare providers, media, internet)

3.7.2 Dependent Variables

1. Fecal Occult Blood Test (FOBT).
2. Colorectal Carcinoma (CRC).

3.8 Ethical Clearance

The Kairuki University institutional research ethical committee was consulted for approval to conduct this work ethically. The Mwananyamala, Amana and Temeke regional referral hospitals all granted permission for the study to be done. An introduction to the subject was done, and permission was sought from the participants and they all provided written informed consents.

3.9 Conflict of Interest Declaration

No conflict of interest to be declared. Research was done for academic purposes only.

4.0 Results

In this study, a total of 150 participants from three RRHs in Dar es Salaam were recruited. They were all outpatient clients with no any symptoms for CRC. In this study the mean age was 54.3 ± 8.02 years of which most of the participants 62 (41.33%) were within the age group of 40-49 years. The female to male ratio was 1:1.08. Many of the participants 83 (55.33%) recruited had completed primary level of education with the lowest formal education completed by the study participants being tertiary level 27 (18.00%). A total of 82 (54.67%) of the participants had abnormal BMI category with 49 (32.67%) having overweight BMI and remaining 33 (22.00%) having obese BMI. 16 (10.66%) of the study participants were smokers with 41 (27.33%) of the study participants taking alcohol. Of these participants, 110 (73.3%) had negative results with 40 (26.7%) testing positive for FOBT. Those with a positive FOBT underwent a series of diagnostic interventions including, routine stool analysis, stool antigen for testing H. pylori, and endoscopic intervention. Among the investigations, 5 (12.5%) tested positive for hookworm ova, and 9 (22.5%) tested positive for stool antigen test for H. pylori. Endoscopic interventions were also conducted for all (40) positive FOBT which yielded normal results for 15 (42.86%, n=15/35) of study participants, identifying 20(57.14%, n=20/35) of the participants with pathologies and the remaining 5 (12.5%, n=5/40) were lost to follow up. Among those with pathologies 5 (25%, n=5/20) were diagnosed with CRC with remaining classified in the non-CRC group.

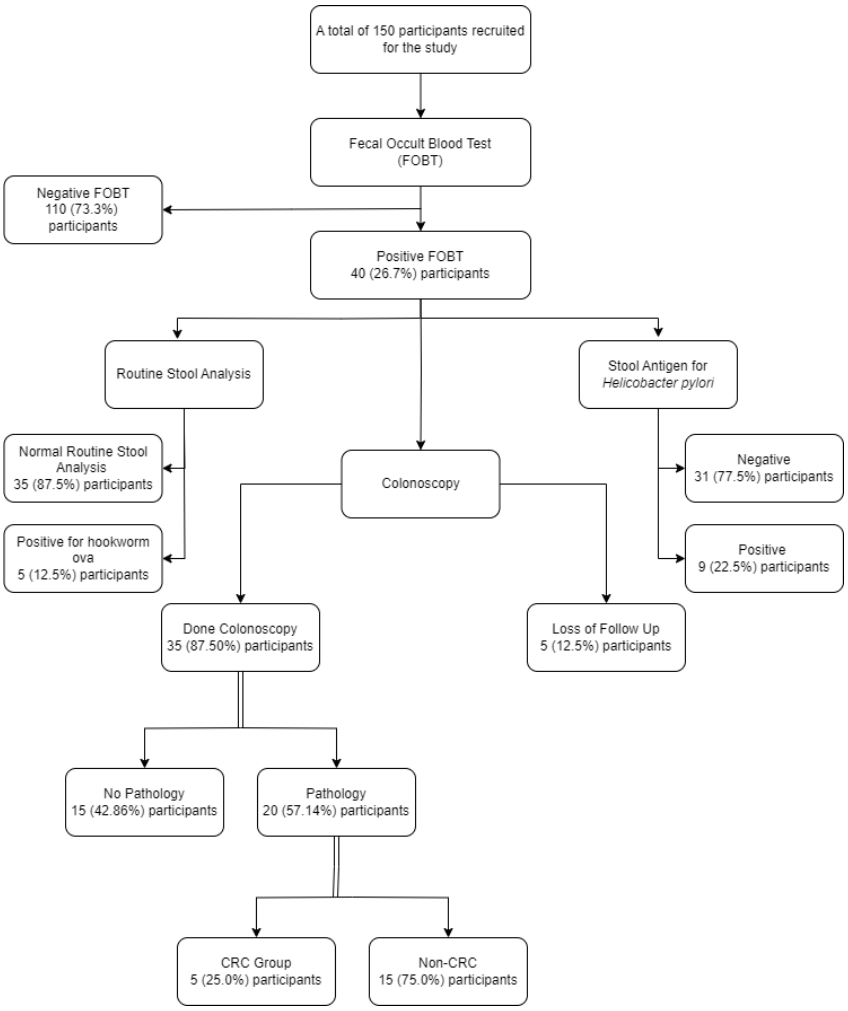

Figure 2. The study flowchart and diagnostic pathways of the study.

The flow chart figure 2 above, provides a comprehensive overview of the diagnostic pathway and outcomes for the study participants in the study.

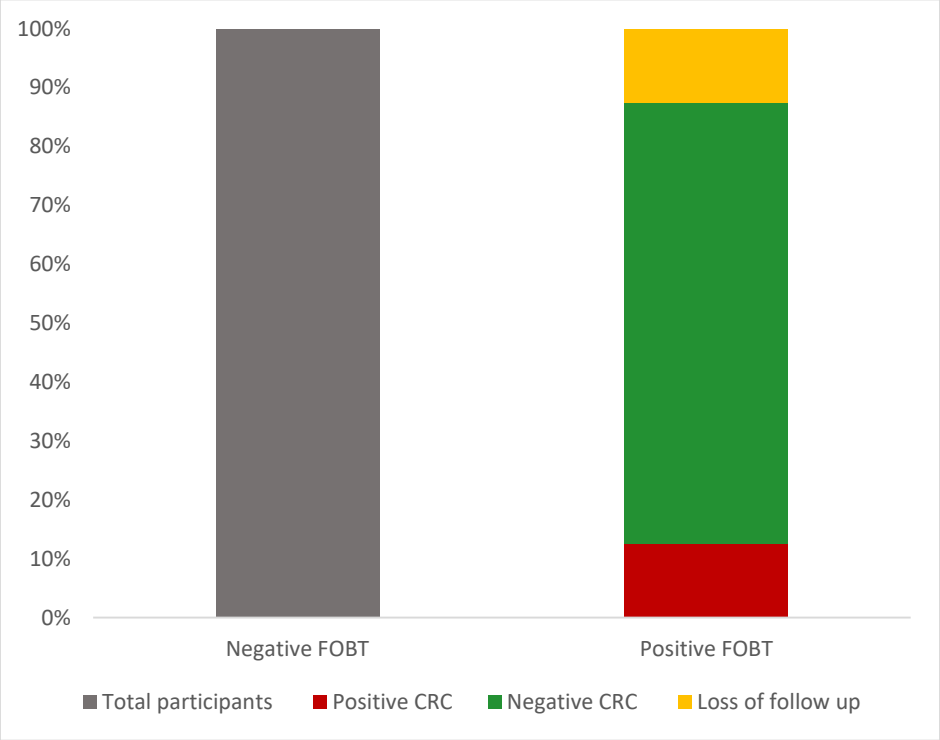

Figure 3. Histogram showing CRC screening results to participants with positive gFOBT.

The figure 3 above summarizes the CRC screening results of the positive FOBT: 25% (n=5/20) participants were positive for CRC results, with 75% participants negative for CRC and 12.5% participants were loss of follow up.

5.0. Strength and limitations

5.1. Strength

The study was able to uncover the low levels of knowledge and awareness among participants regarding colorectal carcinoma, its risk factors, screening in the three hospitals where the research was conducted also it was concluded that there were no any screening programs available. The study successfully screened participants for colorectal carcinoma, detecting some cases of positive colorectal cancer early. Early detection allowed for the institution of proper management, thereby reducing morbidity and mortality from CRC and related complications.

5.2. Limitations

As a cross-sectional descriptive study, it could not establish cause-and-effect relationships between risk factors and CRC among patients. The short duration of the study necessitated a small sample size, making it difficult to generalize the results to the entire population. Additionally, no long-term follow-up was conducted to assess whether patients with multiple risk factors would eventually develop CRC over time. Some patients refused to undergo colonoscopy due to stigma, religious beliefs, and fear of a cancer diagnosis.

The study focused on adults attending outpatient clinics in regional referral hospitals in Dar es Salaam, which may limit the generalization of the findings to other population or settings. The research relied on self-reported data from participants, which could be subject to recall bias or social desirability bias, potentially affecting the accuracy of the responses. The sample size of the study may have been limited, impacting the representativeness of the results and the ability to detect significant associations between variables. There may have been confounding factors not accounted for in the analysis, which could have influenced the results of the study e.g. level of education, health related literacy, social economic status etc. The study did not explore in-depth the specific reasons behind the lack of awareness of colorectal cancer screening and its associated risk factors among the participants, which could have provided valuable insights for intervention strategies. The research did not assess the knowledge and attitudes of healthcare providers towards colorectal cancer screening, which could have shed light on their role in promoting screening uptake among patients.

6.0. Results Dissemination

The findings of this research will be disseminated through presentations at scientific conferences and publications in scholarly journals. Additionally, electronic copies of the results will be distributed to Kairuki University repository, the hospitals where the research was conducted, the Medical Council of Tanganyika (MCT) under the Ministry of Health, and the supervising authorities.

These findings have the potential to assist the Ministry of Health in reviewing and refining the proposed screening guidelines. The insights gained from this research can contribute to the formulation of localized guidelines for colorectal cancer (CRC) screening.

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