Colorectal cancer screening and awareness among patients attending outpatient clinic at Muhimbili National Hospital (MNH), Dar Es Salaam-Tanzania.

JOEL JOHANSON JAMES, MD

MMed (Internal Medicine) Dissertation

Muhimbili University of Health and Allied Sciences

October 2018

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By

Joel Johanson James, MD

A dissertation submitted in (partial) fulfillment of the requirements for the degree of Masters of Medicine In Internal Medicine of the Muhimbili University of Health and Allied Sciences, Tanzania

Muhimbili University of Health and Allied Sciences

October 2018

CERTIFICATION

The undersigned certify that he has read and hereby recommends for acceptance by the Muhimbili University of Health and Allied Sciences a dissertation entitled **"*Colorectal cancer screening and awareness among patients attending outpatient clinic at Muhimbili National Hospital (MNH), Dar es salaam-Tanzania*"** in partial fulfillment of the requirements for the degree of Masters of Medicine in Internal Medicine of The Muhimbili University of Health and Allied Sciences (MUHAS).

_____

Dr. Ewaldo Komba (Supervisor)

_____

Date

DECLARATION AND COPYRIGHT

I, Joel Johanson James, declare that this dissertation is my own original work and that it has never been presented and will not be presented to any other University for a similar or any other degree award.

Date ……. Signature……

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ACKNOWLEDGEMENT

I thank God the almighty for giving me health, energy and abilities of learning and finally accomplish this work.

Very sincere gratitude to my supervisor, Dr. Ewaldo Komba for his encouragement, guidance and all time supervision to this work.

I am also highly indebted to Prof. Ferdinand Mugusi for his mentorship and guidance during the development of this manuscript, and throughout my studies at MUHAS. I highly appreciate his help.

I would like to acknowledge all members of the Department of Internal Medicine, MUHAS under the Head of department, Dr. Paschal Ruggajo for their assistance and encouragement during all stages of preparation and accomplishment of this dissertation.

I would like also to thank the management of Muhimbili National Hospital (MNH) for allowing me to conduct this study. I am also very grateful to the gastroenterology unit for their invaluable assistance in doing colonoscopy for my patients.

My sincere thanks go to Dr Innocent J. Mosha of the Histopathology Department of MNH for processing and reading histology slides.

Special thanks also go to all the patients who agreed and participated in this study. Equally I also thank those who did not consent to participate due to various reasons.

Special thanks to my father Johanson and mother Julitha for their innermost belief in the importance of education and their support from the very early stages of my educational journey. I thank them also for their unending prayers and encouragement.

I also thank my wife, Marceline for her love, support and encouragement throughout my study period. Her presence made a tremendous difference in my life during some tiring moments in the course of preparation and accomplishment of this dissertation.

Very sincere thanks to my children Johannes and Joellyn for their endurance during my absence and their invaluable support. I understand how much you missed me. May my God almighty bless you.

DEDICATION

This work is dedicated to my family for its sacrifice. To my wife Marceline for her unending love and support during my study period.

To my children, Johannes and Joellyn for their positive and courageous way of tolerating my absence. This made me to see the good side of my tiresome days.

ABSTRACT

BACKGROUND

Colorectal cancer (CRC) is among the most commonly diagnosed cancers worldwide. There were 1,360,602 new cases of CRC worldwide and it was the 3rd most common cancer, accounting for 9.7% of all cancers apart from non-melanoma skin cancers (GLOBOCAN, 2012). The crude incidence of CRC in SSA for both sexes was found to be 4.04 per 100 000 population (4.38 for men and 3.69 for women). It is the 5th most common cancer in SSA.

CRC is not uncommon in Tanzania and it shows a trend towards a relative young age with a median age at presentation of 46 years majority of patients presenting late with advanced disease. It accounts for 4.7% of all malignancies and with male to female ratio of 1.6:1. It also accounted for 5.4% of all cancer deaths among females in Tanzania (WHO, 2014). However, according to WHO report of 2014 there is no screening program for CRC in the country. Also there is no study that has been done to determine the prevalence of CRC or the public awareness about CRC in the country.

OBJECTIVE: To determine the prevalence of colorectal cancer and awareness among adult patients attending outpatient clinic at Muhimbili National Hospital (MNH), Dar Es Salaam-Tanzania.

METHODOLOGY: The study was descriptive cross-sectional study involving patients who are 40 years or older attending NHIF outpatient clinic at Muhimbili National Hospital (MNH) from October 2016 to March 2017. The patients were screened for CRC using FOBT and colonoscopy was performed for those with positive fecal occult blood and biopsies taken for histological confirmation. The level of awareness of CRC and its risk factors was assessed by administering a validated questionnaire.

RESULTS: The total of 512 participants were involved in the study with slight women predominance 52.7% (n=270). The mean age of the participants was 54.4 years and majority, 144(28.1%) had the body weight in the category of 70-79 kg with the mean weight of 76.4 kilograms. Of all participants, 91(17.8%) were hypertensive patients who came for routine follow up or drug refilling and 46(9.0%) had diabetes mellitus.

Of all participants, 63 (12.3%) had positive FOBT and 33 (52.4%) of them underwent colonoscopy. Among patients who underwent colonoscopy, 7 (21.2%) had CRC. The overall

prevalence of CRC among adult patients who are 40 years and above ranged from 1.4% to 2.5%.

Of the all 512 patients involved in the study, 185 (36.1%) were aware of CRC. The awareness among males and females was 32.6% and 39.2% respectively. The level of awareness was lowest (32%) among those aged above 70 years and was highest (40%) among those aged between 50 and 59 years. The level of awareness was increasing proportionately with the level of education; 25% among those with no formal education and 41% among those with college or university education.

Only 94 (38.8%) males and 102(42.1%) of females agreed that family history of CRC is a risk factor while 81(33.5%) males and 66(24.4%) females were able to identify old age as a risk factor. Rectal polyps was identified as the risk factor for CRC by 148(61.2%) of males and 155(55.9%) of females. Excessive alcohol use was identified as the risk factor for CRC by most of the respondents, 196 (81.0%) of males and 227 (84.1%) of females.

CONCLUSION: Colorectal cancer is common in many asymptomatic patients with positive FOBT. FOBT can be used successfully as a screening tool for CRC. Te level of awareness of the CRC is generally below forty percent among adult patients attending outpatient clinic at MNH.

RECOMMENDATION: We recommend routine screening of adults 40 years and above for CRC using FOBT. This should be accompanied with an educational program for raising the level of awareness of CRC among adults.

LIST OF ABBREVIATIONS

CI.....Confidence interval

CRC..……Colorectal Cancer

CT……..Computed tomography

CTC……....Computed tomography colonography

CVS…….…..Cardiovascular system

DCBE……..…Double contrast barium enema

EGFR……..…Epidermal growth factor receptor

EUS……..…….……..Endoscopic ultrasound

FAP……Familial adenomatous polyposis

FIT……..…Fecal immunochemical test

FOBT…….…….Fecal occult blood test

FS…….Flexible sigmoidoscopy

GIT……..Gastrointestinal tract

HNPCC…….……Hereditary non-polyposis colorectal cancer

Kg…….……..……Kilogram

mCRC……..……Metastatic colorectal cancer

mt-sDNA…….…….Multi-tagret stool DNA

MNH……Muhimbili National Hospital

MRI……..……Magnetic resonance imaging

MUHAS……..…Muhimbili University of Health and Allied Sciences

NHIF…….……..…….National Health Insurance Fund

PET……Positron emission tomography

PPIs…….……..Proton pump inhibitors

RCT……..……Randomized control trial

RS…….Respiratory system

SSA……Sub-Saharan Africa

SPSS…….Statistical Package for Social Sciences

TNM…….Tumour size, lymph Node involvement and distant Metastasis

UICC……Union Internationale Contre le Cancer

UK……..…….……United Kingdom

U.S.A…….United States of America

VEGF……..…….Vascular endothelial growth factor

WHO…….....World Health organization

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CHAPTER ONE

1.1 BACKGROUND INFORMATION

Colorectal cancer is malignant epithelial tumour arising from the colonic or rectal mucosa. It is characterized by a change in bowel habits, iron-deficiency anemia, rectal bleeding (which may be occult initially), abdominal pain and Intestinal obstruction or perforation (1).

The natural history of the development of CRC, usually within a pre-existing polyp, typically follows quite a long course, between five to ten years. Cancers detected at an early stage have a better prognosis than cancers detected later. There may also be benefits from detecting pre-cancerous polyps and removing them before malignant change to CRC can occur (2,3).

It has been shown that mutations in a number of genes are associated with the development of adenomatous polyps, malignant transformation and invasive cancer (4). Individuals with germ-line mutations are at very high risk of developing the disease (FAP and HNPCC), whereas individuals with a first-degree family history of CRC are at moderately increased risk (5,6). The germ-line mutations in both FAP and HNPCC are inherited in an autosomal dominant fashion; however, these inherited syndromes account for only five percent (5%) of all CRCs (7). Seventy percent (70%) of people who develop CRC have no family history or other known risk factors (5). The majority of cases, therefore, occur in so-called 'average-risk' individuals who would not be reached by targeting screening to increased-risk groups (5).

Several risk factors are associated with the incidence of colorectal cancer, both modifiable and non-modifiable. Modifiable risk factors include cigarette smoking, high fat diet especially animal fat, physical inactivity and obesity and heavy alcohol consumption. Non-modifiable risk factors are age and hereditary factors (8).

The incidence of CRC increases after the age of 40 years, increasing progressively from age 40, raising sharply after age 50. More than 90% of colorectal cancer cases occur in people aged 50 or older (8–10).

The recommended tests used to screen colorectal cancer are high-sensitivity fecal occult blood tests (FOBT), sigmoidoscopy, or colonoscopy beginning at age 50. Other tests include Fecal immunochemical test (FIT), Endoscopic ultrasound (EUS),Imaging tests like CT scan, MRI scan, PET scan, Virtual colonoscopy or CT colonoscopy and Double contrast barium enema (DCBE) (11–13).

The classification of CRC is based on local invasion depth (T stage), lymph node involvement (N stage), and presence of distant metastases (M stage) (14). These stages are combined into an overall stage definition, which provides the basis for therapeutic decisions (14). Classification according to TNM and Union Internationale Contre le Cancer (UICC) stage provides valuable prognostic information and guides therapy decisions, but the response and outcome of individual patients' therapy is not predicted. This is a drawback for patients with UICC stage II and III CRC in particular. Adjuvant chemotherapy is recommended for UICC stage III patients and for stage II patients with additional risk factors; however, a substantial proportion of these patients do not seem to benefit from chemotherapy; hence improved informative markers could help to identify patients at high risk of relapse who might benefit from adjuvant therapy.

The 5-year survival for persons with CRC is 64% in the United States. If the disease is detected at an early stage, the 5-year survival rate increases to 90%. However, because of lack of screening programs in many countries, only 39% of colorectal cancers are diagnosed at this early stage. (15). A report from Korea indicated that the 5-year survival rates were 62.1% (15). In China, the overall 5-year post-operative survival rate was 60.8% in colorectal cancer patients, 62.3% in colonic cancer and 59.3% in rectal cancer.

Colorectal cancer survival is highly dependent upon stage of disease at diagnosis, and typically ranges from a 90% 5-year survival rate for cancers detected at the localized stage; 70% for regional; to 10% for people diagnosed for distant metastatic cancer. In general, the earlier the stage at diagnosis, the higher the chance of survival (16,17).

In the United States, the 5-year survival for colorectal cancer improved from 1995 to 2000 by more than 10% for both men and women, from 52 to 63% in women and from 50 to 64% in men (18).

Four key approaches are currently used for the treatment of CRC: surgery, chemotherapy, radiotherapy and targeted therapies. Surgery remains the mainstay of CRC treatment. In early stage disease (stage 0 or I), surgical excision is the treatment of choice and patients should not be given any treatment in addition to surgery because the local recurrence rate is very low (about 3%) and the benefit from neoadjuvant treatment is very small (number needed to treat to prevent one local recurrence=38) (19,20).

For patients with stage II CRC, surgery is the treatment of choice and the benefits of neoadjuvant therapy is less clear. However, benefit of neoadjuvant therapy is accepted for high risk (T4 and advanced T3) tumours infiltrating mesorectal fascia).

Patients with stage III disease benefit from additional treatment (20–22). Patients with stage III colon cancer have a risk of recurrence ranging between 15% and 50%. Adjuvant chemotherapy is recommended for all patients with stage III colon cancer without contraindications after curative resection. Regimens containing fluorouracil reduce recurrence rate by 17% units and increase overall survival by 13–15% units (23). Alternatively, capecitabine, an oral prodrug of fluorouracil, can be used with comparable efficacy (24). The addition of oxaliplatin increased the absolute 5-year disease-free survival by 6·2 to 7·5% units and the overall survival by 2·7 to 4·2% units in patients with stage III colon cancer (25–27).

Patients with stage IV disease (CRC with distant metastases) require chemotherapy or targeted therapies combined with surgery and/or radiation, where appropriate. Generally, patients with resectable liver or lung metastases should be offered surgical resection of the metastases. Patients with irresectable distant metastases should be offered palliative chemotherapy. For patients diagnosed at an advanced stage, systemic chemotherapy with or without targeted biological agents remains the mainstay of management, providing a significant improvement in median and progression-free survival. Surgical resection of metastases is usually recommended with or without adjuvant chemotherapy. In most patients, the goals of treatment are to prolong overall survival while maintaining a good quality of life. In certain patients with metastases limited to the liver, potential cure can be obtained with hepatic metastasectomy. With increased efficacy of chemotherapy in decreasing the tumour size, the role of surgery in the management of advanced colon cancer continues to evolve as there is increasing susceptibility of the tumor to resection. However, the overall impact of combination regimens in metastatic CRC therapy has been

relatively modest with improved two-year survivals and no substantive gains in five-year survivals (28)

Though early stage colon cancer is associated with a 5-year survival rate of 74%, this percentage declines dramatically to 5% - 10% in stage IV disease (29). The median overall survival of patients with advanced CRC with supportive care alone is only about 5 - 6 months (30).

75% - 90% of stage IV colon cancers are not suitable for curative resection (31) due to tumor-specific (inextirpable primary, multiple metastases) or patient-specific (age, co-morbidities) reasons (32). These patients may benefit from systemic and local therapy (31).

The targeted therapies include Anti-angiogenic drugs like bevacizumab, a monoclonal antibody targeted to vascular endothelial growth factor (VEGF) and anti-EGFR monoclonal antibodies cetuximab and panitumumab. These therapies are indicated for metastatic colorectal cancers (mCRC) (1,33,34).

Overall Union Internationale Contre le Cancer stage classification of colorectal cancers

	T	**N**	**M**
Stage 0	Tis	N0	M0
Stage I	T1/T2	N0	M0
Stage II	T3/T4	N0	M0
IIA	IIA T3	N0	M0
IIB	IIB T4a	N0	M0
IIC	IIC T4b	N0	M0
Stage III	Any	N+	M0
IIIA	T1–T2 T1	N1 N2a	M0 M0
IIIB	T3–T4a T2–T3 T1–T2	N1 N2a N2b	M0 M0 M0
IIIC	T4a T3–T4a T4b	N2a N2b N1–N2	M0 M0 M0
Stage IV IVA IVB	Any Any Any	Any Any Any	M+ M1a M1b

Classification of colorectal cancers according to local invasion depth (T stage), lymph node involvement (N stage), and presence of distant metastases (M stage)

T Stage	**Definition**
Tx	No information about local tumour infiltration available
Tis	Tumour restricted to mucosa, no infiltration of lamina muscularis mucosae
T1	Infiltration through lamina muscularis mucosae into submucosa, no infiltration of lamina muscularis propria
T2	Infiltration into, but not beyond, lamina muscularis propria
T3	Infiltration into subserosa or non-peritonealised pericolic or perirectal tissue, or both; no infiltration of serosa or neighbouring organs
T4a	Infiltration of the serosa
T4b	Infiltration of neighbouring tissues or organs
N Stage	
Nx	No information about lymph node involvement available
N0	No lymph node involvement
N1a	Cancer cells detectable in 1 regional lymph node
N1b	Cancer cells detectable in 2–3 regional lymph nodes
N1c	Tumour satellites in subserosa or pericolic or perirectal fat tissue, regional lymph nodes not involved
N2a	Cancer cells detectable in 4–6 regional lymph nodes
N2b	Cancer cells detectable in 7 or greater regional lymph nodes
M Stage	
Mx	No information about distant metastases available
M0	No distant metastases detectable
M1a	Metastasis to 1 distant organ or distant lymph nodes
M1b	Metastasis to more than 1 distant organ or set of distant lymph nodes or peritoneal metastasis

1.2 LITERATURE REVIEW

Colorectal cancer (CRC) is among the most commonly diagnosed cancers worldwide. In 2012, according to the GLOBOCAN estimates , there were 1,360,602 new cases of CRC worldwide (3rd most common cancer worldwide, accounting for 9.7% of all cancers apart from non-melanoma skin cancers) (35). It is the 4th most common cause of death (36) and according to WHO colorectal cancer (CRC) accounted for 694 000 deaths in 2012 (37).

Colon cancer remains the most preventable major cancer through screening. RCT provided highest level of evidence to show that population screening of bowel cancer using FOBT and flexible sigmoidoscopy is effective in reducing mortality (38–40). Several studies have shown that screening for CRC reduced mortality. Minnesota trial showed a cumulative 18-year colorectal cancer mortality was 33% lower in the annual group than in the control group (rate ratio, 0.67; 95% confidence interval [CI] = 0.51-0.83). The biennial group had a 21% lower colorectal cancer mortality rate than the control group (rate ratio, 0.79; 95% CI = 0.62-0.97)(41,42). Another study done at Nottingham UK, to assess the effect of FOBT in reducing the mortality from CRC, there was a 15% reduction in cumulative CRC mortality in the screening group (odds ratio=0.85 [95%; CI 0.74-0.98], p = 0.026) compared with the control group(43,44).

Another study which was assessing the effect of FOBT screening on mortality from CRC (RCT) at a median follow up of 11 years there was a 13% reduction in colorectal cancer mortality (95% confidence interval 3-22%) in the intervention group despite an uptake at first invitation of only approximately 50%. The mortality reduction for those accepting screening was 27%. The reduction in mortality was independent of sex and site of tumour (45,46).

Despite the cost effectiveness of screening and the availability of proven screening tools, the incidence rate of the disease is expected to increase by 33.5% by 2020 (47). In general there have been increases in incidence in countries where the overall risk of large bowel cancer was low, while in high-risk countries there have been either stabilizations or decreases in incidence, particularly in younger age groups. About 70% of patients with colon cancer are >65 years of age and the disease is rare under the age of 45 (2 per 100 000/year) (48).

The crude incidence of CRC in SSA for both sexes was found to be 4.04 per 100 000 population (4.38 for men and 3.69 for women). Colorectal cancer (CRC) is the 5th most common cancer in SSA. Incidence increased with age with the highest rates in Southern Africa, particularly in South Africa. The rates of CRC in SSA were much lower than those reported for high–income countries (49–51).

Studies done in Nigeria have shown increased rates of CRC over the last 20 years. This increase has been hinged on change in the hitherto rural lifestyle and diet to the more urban and Caucasian type. Over the last 20 years, colorectal cancer (CRC) in Nigeria was not within the top 10 cancers; recently it has become the fourth most common cancer in Nigeria(1). One study showed that the male/female ratio is averagely equal and the peak age remains around 44 years, with a significant subgroup of the under-30s (50).

Over the past decade, the overall incidence of CRC in South Africa has increased markedly, in 1989, CRC was the 10th most common cancer diagnosed in males and females in South Africa but was more recently ranked among the foremost 5 cancers (5th among males and 3rd among females). CRC among black South Africans is far less common, but there is evidence that numbers have been increasing in some centers and disproportionately large numbers of young black patients (below 50 years) seem to be presenting with CRC (41% of black patients with CRC were below 50 years). This trend appears to be common among countries throughout the African continent (52).

Colorectal cancer is the fifth most common malignancy in Kenya. Rectal cancer forms 55.3% of the total colorectal cancer burden and peaks in the fifth decade. The male to female ratio is 1.5:1). The disease presents late (average delays of 33 weeks). Hospital studies show poor documentation of pathology and follow up data (53).

In Tanzania Colorectal cancer is not uncommon and shows a trend towards a relative young age at diagnosis and the majority of patients present late with advanced stage. Colorectal cancer makes 4.7% of all malignancies and males outnumbered females by a ratio of 1.6:1. It accounted for 5.4% of all cancer deaths among females (WHO, 2014).The median age of patients at presentation was 46 years. The majority of patients (96.7%) presented late with advanced stages (54). However, despite the CRC being common in Tanzania, according to WHO report of 2014 there is no screening program for CRC in the country (55).Also there is no study that has been done to assess the public awareness of this growing problem and the availability of the screening

services and hence no awareness rising program in the country. Colorectal cancer survival is highly dependent upon stage of disease at diagnosis, and typically ranges from a 90% 5-year survival rate for cancers detected at the localized stage; 70% for regional; to 10% for people diagnosed for distant metastatic cancer. In general, the earlier the stage at diagnosis, the higher the chance of survival (16,17).

The objective of CRC screening is to reduce the burden of CRC and thereby the morbidity and mortality rate of the disease. It is believed that this can be achieved by regularly screening the average-risk population, enabling the detection of cancer at early and curable stages and polyps before they become cancerous. The ideal screening technique for CRC should be feasible, accurate, safe, acceptable, and cost-effective. Several methods of screening for CRC have been proposed, each with their own advantages and drawbacks. Screening techniques for CRC can be classified according to three categories:

Endoscopic techniques:

- Optical colonoscopy
- Flexible sigmoidoscopy (FS)

Stool-based techniques:

- Fecal occult blood test (FOBT)
- Fecal Immunochemical Test (FIT)
- Fecal DNA testing

Imaging techniques:

- Virtual colonoscopy techniques using:
    - a) Computed tomographic colonography (CT colonography)
    - b) Magnetic resonance colonography (MR colonography)
- Wireless capsule endoscopy (PillCam Colon)
- Double-contrast barium enema (DCBE)

Optical Colonoscopy

Colonoscopy is considered to be the gold standard tool of screening with a high sensitivity and specificity. It is recommended every 10 years in average-risk patients aged 50 years or older (56). This test affords the opportunity to detect and resect neoplasia and precancerous lesions across the entire large bowel and is the definitive examination when other screening tests are positive.

The sensitivity of colonoscopy for detecting CRC is 95%, while its sensitivity for detecting advanced adenomas is 88%–98% (57–59). Case-control studies have shown a 53%–72% reduction in the incidence of CRC and a 31% reduction in CRC-related mortality with colonoscopy (60,61).

One of the greatest advantages of colonoscopy is the ability to remove precancerous and small cancerous lesions at the time of detection. It can also assess both the proximal and distal portions of the colon.

Limitations associated with colonoscopy include the invasiveness of the procedure, the required bowel preparation, the use of sedation or anesthesia, time off of work or other activities, and discomfort post procedure (62,63). There is a risk of bowel perforation during colonoscopy and a risk of postcolonoscopy bleeding, especially in postpolypectomy patients (64). The risk of perforation is higher in the presence of conditions such as active colitis, inflammation, diverticular or ischemic disease, and prior irradiation. These limitations contribute to low compliance with colonoscopy screening (65).

Flexible Sigmoidoscopy

Flexible sigmoidoscopy (FS) is similar to colonoscopy except that only the distal half of the colon is examined, sedation is not necessary, and the bowel preparation consists of an enema on the day of the examination (43). It has a 95% sensitivity for the detection of CRC in the portion of the colon that is examined and a 70% sensitivity for advanced adenomas. If lesions are identified in the distal colon, a follow-up colonoscopy is required, at which time proximal lesions may be found (41,62). Several randomized controlled trials have shown that screening with FS, followed by colonoscopy if precancerous polyps are detected, reduces CRC mortality (66). Analysis from several large, randomized, controlled trials have confirmed the efficacy of one-time and periodic (every 3 to 5 years) sigmoidoscopy, with a 26% to 31% lower mortality from

CRC among patients who underwent FS screening than among those who underwent no screening (60,67,68). However, the benefit of sigmoidoscopy is limited to cancer in the distal colon (rectum, sigmoid, and descending colon), for which the reduction in mortality was reported to be 46%(69). Many programs have abandoned this strategy in favor of colonoscopy for better prevention results.

Fecal Occult Blood Test (FOBT) and fecal immunochemical tests (FIT)

FOBT and fecal immunochemical tests (FITs) are designed to detect hemoglobin as a marker of occult blood in the stool (62). FOBT detects the peroxidase activity of heme and, as such, is not specific for human blood, whereas FIT uses human globin-specific antibodies to detect hemoglobin, so it is more specific for human blood than FOBT (70,71). In several studies that used colonoscopy as a reference standard, the sensitivity of FIT for detecting CRC and precancerous lesions were 71%–75% and 27%–29%, respectively, and was higher than that of FOBT, 33%–75% and 11%–25%, respectively. The specificity of FOBT (98%–99%) was greater than FIT (94%–95%) (72–74). In another study the sensitivity of guaiac and immunochemical tests for the detection of CRC in the screening group was 50.00% (95% confidence interval [CI] =6.76–93.24) and 75.00% (95% CI =19.41–99.37), respectively FOBT has been shown to reduce CRC mortality by 15%–33% (43,68,75). When used as the sole screening method, FOBT and FIT should be repeated annually (35,62,76).
FOBT and FIT can be performed at home, are noninvasive, and do not require extensive bowel preparation. It is an inexpensive, simple, and widely available test. Limitations including sporadic bleeding from lesions can lead to false-negative test results, and lesions in early development bleed less frequently, if at all, so there is a greater tendency for these tests to detect more advanced lesions and miss precancerous lesions (62,77). In addition, dietary intake of vitamin C can lead to false-negative results as it can inhibit the peroxidase activity of FOBT, and dietary hemoglobin from the ingestion of red meat can generate false-positive results on FOBT(62,78).

A landmark study that evaluated the fecal occult blood test randomized 46551 participants 50 to 80 years of age to screening for CRC on once a year basis, every two years, or to a control group. They concluded that annual fecal occult-blood testing with rehydration of the samples decreased the 13-year cumulative mortality from CRC by 33% (41,43). Another randomized study compared mortality rates after FOBT tests every 2 years during a 10-year period with those of unscreened similar controls. They found that after 10 years of follow-up, screening by FOBT every 2 years (Hemoccult-II without rehydration) led to a reduction of 18% in CRC mortality. This was independent of sex and age, in individuals aged 45-75 years (75,79). In the Minnesota

Colon Cancer Control Study a 30-year follow-up of patients randomly assigned to annual/or biennial gFOBT *vs* usual care showed a 32% decrease in CRC mortality.

Computed tomography colonography

Computed tomography (CT) colonography is a structural radiologic examination of the colon also referred to as "virtual colonoscopy". It uses CT and special software to create a three-dimensional image of the colon to identify colonic lesions, which may be found on subsequent optical colonoscopy to be cancer and precancerous polyps (78). The sensitivity of CT colonography for detection of CRC and advanced adenomas shown by clinical studies suggest that rates are more than 90% for detection of CRC, 90% for detection of polyps ≥10 mm, and 78% for detection of polyps ≥6 mm (80). The use of CT colonography as a recommended CRC screening tool is limited mainly to patients who are not good candidates for colonoscopy due to other comorbidities or structural issues that preclude adequate optical examination of the colon (62,70,81). There is no empirical evidence to demonstrate that CT colonography can reduce CRC incidence or related mortality. Although the screening interval for negative CT colonography results is uncertain, studies suggest that for average-risk, asymptomatic patients, the test should be repeated every 5 years (62).

CT colonography or virtual colonoscopy is a rapid radiographic non-invasive imaging test that requires no sedation with lower procedural risks compared to colonoscopy (62,82). In addition to that, it carries the advantage of extra colonic evaluation (83). However, CTC is not a very pleasant study since the patient must take the same preparation as for colonoscopy in addition to the same discomfort during procedure insufflation. Moreover, contrast allergy, radiation exposure, and the need for colonoscopy if positive findings are considered additional disadvantages of CTC. Perforation risk is an existing drawback but to a lesser degree than colonoscopy.

Stool DNA testing

Multitarget stool DNA (mt-sDNA) testing is a noninvasive screening method designed to detect abnormal DNA and occult blood in stool samples (62,77). It targets molecular debris in stool including abnormal DNA present in malignancies such as mutant KRA, actin, aberrantly

methylated BMP3, and NDRG4 promoter regions. In August 2014, mt-sDNA test became the first multi-target stool DNA approved by the FDA for general CRC screening (84).

In stool DNA test targets One multicenter study on nearly 10000 patients comparing mt-sDNA to FIT using colonoscopy as the gold standard showed that the fecal DNA test had a higher sensitivity than FIT for detecting CRC (92% *vs* 74%). Unfortunately, mt-sDNA detected fewer than half of all large advanced adenomas (42%), limiting its preventive role. Fecal DNA test had lower specificity at 87%-90% compared to FIT (95%-96%) (85).

1.3 STATEMENT OF THE PROBLEM

Colorectal cancer is not uncommon in Tanzania and shows a trend toward younger ages as shown by the study done at Bugando Medical centre in which the median age at presentation was 46 years accounting for 4.7% of all malignancies. Majority of patients (96.7%) presented late with advanced disease (54) . This trend is the same as in other African countries where there is increasing trend towards younger ages (below 50 years) (86,87). According to the WHO in 2014, 5.4% of all cancer deaths among females in Tanzania were caused by colorectal cancer.

However, despite the colorectal cancer being common in Tanzania, according to WHO report of 2014 there is no screening program for CRC in the country (55). Also there is no study that has been done to assess the public awareness of this growing problem and the availability of the screening services. Colorectal cancer survival is highly dependent upon stage of disease at diagnosis, and typically ranges from a 90% 5-year survival rate for cancers detected at the localized stage; 70% for regional; to 10% for people diagnosed for distant metastatic cancer. In general, the earlier the stage at diagnosis, the higher the chance of survival (16,17).

1.4 RATIONALE OF THE STUDY

Colorectal cancer is the 5th commonest cancer in many African countries where majority of patients present very late with advanced disease (53,86,87). The trend in these countries has also shown a growing incidences in the younger generation compared to the developed countries where it is usually diagnosed in patients above 50 years of age (88). There is a need to assess the awareness of the community about this growing problem and also about the presence of screening services. In this study the investigator did the colorectal cancer screening in order to determine the magnitude of this growing problem. The study also determined the level of awareness of the community about the colorectal cancer and the associated risk factors. This is important because colorectal cancer is the major preventable cancer by screening. Several studies have shown a marked reduction in both incidence and mortality from CRC of approximately 15-30% in the screening group than the control group(41,45,79).

The results of this study will be useful in planning strategies of how to raise awareness of the community about the modifiable risk factors of CRC and establishing the programs for routine screening especially for people who are at risk.

1.5 STUDY OBECTIVES

1.5.1 MAIN OBJECTIVE

To determine the prevalence of colorectal cancer and awareness among adult patients attending outpatient clinic at Muhimbili National Hospital (MNH), Dar Es Salaam-Tanzania.

1.5.2 SPECIFIC OBJECTIVES

1. To determine the prevalence of fecal occult blood positive among adult patients aged 40 years and above attending Muhimbili National Hospital (MNH) outpatient clinic.
2. To determine the proportion of colorectal cancer among patients with positive fecal occult blood attending National Hospital (MNH) outpatient clinic.
3. To determine the prevalence of colorectal cancer among adult patients aged 40 years and above attending Muhimbili National Hospital (MNH) outpatient clinic.
4. To determine the level of awareness of colorectal cancer and risk factors among adult patients aged 40 years and above attending Muhimbili National Hospital outpatient clinic.

CHAPTER TWO: STUDY METHODOLOGY

2.1 STUDY DESIGN

The study design is the descriptive cross-sectional study

2.2 STUDY SETTING

The study will be conducted in the National Health Insurance Fund (NHIF) clinic at Muhimbili National Hospital (MNH).

MNH is a tertiary referral and teaching hospital, situated in Dar Es Salaam city centre. The hospital serves patients referred from other hospitals in the city and from other regional hospitals in the country. It has a bed capacity of approximately 1,500 and serves about 1,500 outpatients per day. The average number of patients attending NHIF clinic daily is 115.

2.3 STUDY POPULATION

The study population is all the adult patients 40 years old and above attending NHIF clinic at MNH for various health problems. These are the patients seeking consultations for various health conditions including both medical and surgical conditions but with no symptoms suggestive of colorectal cancer.

2.4 STUDY DURATION

The study duration is six months from October 2016 to March 2017.

2.5 INCLUSION CRITERIA

Inclusion criteria are:

1. All adults 40 years of age and above
2. Patients with no symptoms suggestive of CRC or inflammatory bowel disease
3. Patients who have not been screened for CRC within the past one year.

2.6 EXCLUSION CRITERIA

Exclusion criteria are:

1. People with the symptoms suggestive of colorectal cancer or
2. Patients with confirmed CRC
3. Patients who have been screened using FOBT/colonoscopy within the past one year.

2.7 SAMPLING TECHNIQUES AND SAMPLE SIZE

Sample size is calculated by the using the formula; $n = Z^2P(1-P)/E^2$

where n =sample size

Z= standard normal deviation (1.96)

E= margin of error (4%). 4% is used as a margin of error in order to increase the sample size.

P= prevalence of colorectal cancer

Because there is no previous study to determine the prevalence of colorectal cancer in the country or in other East African countries, 50% was used as the prevalence of colorectal cancer. Therefore the p value will be 50%.

Substituting in the formula,

$N=Z^2P(1-P)/E^2$

$N= (1.96^2)50(100-50)/4^2 \quad =600$

Therefore the calculated minimum sample size is 600 participants. However, the investigator was able to recruit 512 patients only.

The principle investigator was involved in identifying the patients who were eligible for the study and they were asked for their consent to participate in the study.

All the patients who attended outpatient clinic and met the inclusion criteria for the study were asked participate and were recruited into the study when they give consent. The sampled participants were asked to fill the questionnaire about their demographic characteristics, awareness of CRC and risk factors for CRC and the knowledge about the screening services and past history of colorectal cancer screening. The participants who were not able to read and write

were interviewed and helped by the principle investigator/ research assistant to fill the questionnaire. They were also asked to provide the stool sample for fecal occult blood test (FOBT).

2.8 DATA COLLECTION TOOL:

The validated questionnaires were prepared for the participants to fill. It was divided into three parts: The first part of the questionnaire contained the participant's demography, the second part contained the questions assessing the awareness about the CRC and third part contained questions assessing the knowledge about the risk factors for CRC. Some of the questions are adapted from the surveys identified in the literature review (55,89). The individuals were instructed to choose true/false or unsure if they are uncertain about the correct answers.

The participants were asked to participate in the screening of CRC and were asked to provide the stool sample. They were instructed on the proper method of stool sample collection by the principle investigator and research assistant. They were instructed to perform bowel movement only after voiding urine and flushing the toilet and were provided with disposable paper lining of the toilet bowl to prevent the contact of stool with water. The stool sample was collected using a disposable applicator and were taken from different portions of the formed stool. The sample application windows labeled A and B were opened respectively, to expose the reactive surface of the test card. By using the applicator provided in the kit a very thin layer of stool was spread on the reactive surfaces of the window A similarly on window B from different parts of the stool and wait until the smeared sample had dried completely and then cover the test card and store in the dry cool place ready for testing.

The principle investigator did testing of the sample using FOBT. EUROPOST KIT (a standard guaiac method), a two field test for occult blood in stool was used for stool sampling. For testing, the investigator opened the results window and add one drop of fields RA and RB (the reverse side of the sample smeared on the sample application windows) respectively. Then he observed for colour change exactly at two minutes. The positive field turned to blue colour. Even if only one field turns blue, the test is positive for occult blood. The two test fields provided in EUROPOST KIT facilitate detection and localizing the source of bleeding. The patients who

tested positive for occult blood was asked to do colonoscopy at the MNH colonoscopy unit for further evaluation. Colonoscopies were performed by experienced gastroenterologists. The biopsies were taken for histological studies of lesions or polyp detected and appropriate treatment was provided. Histological studies were performed by experienced pathologist.

2.9. DATA ANALYSIS:

All questionnaires were checked daily for completeness and consistencies by the principal investigator.

Pre-coded data were entered into computer using SPSS version 16 for further cleaning, categorizing of continuous variables and eventual analyses. Each item was analyzed separately. The participants were required to answer the questions in the questionnaire and the level of awareness was assessed according to the percentage of questions answered correctly. We graded the level of awareness as very low, low, high and very high. The level of awareness below 30% was considered very low, above 30% but below 50% was low, above 50 but below 80% was considered high and the level of awareness above 80% was considered very high. A p value of less than 0.05 will be considered statistically significant.

Continuous data was summarized as mean +/- standard deviation (SD), medians and ranges while discrete (categorical) data will be recorded as percentages.

2.10 ETHICAL CONSIDERATION:

1. The investigator was sought ethical clearance from the Research and Publication committee of MUHAS and the Ethics department of MNH.
2. The informed verbal and written consent was also sought from the respondents.
3. Confidentiality will be observed by using the identification numbers instead of the names of respondents. The data collected will not be accessible to the unauthorized persons.
4. The screening costs using fecal occult blood test was covered by the program but for those patients who need colonoscopy, the cost was covered by National Health Insurance Fund (NHIF) because all the patients were members of NHIF. The patients who were diagnosed with colorectal cancer or rectal polyps were treated at MNH gastroenterology unit and the treatment costs will be covered by NHIF.

5. The participants benefited by early diagnosis and treatment of malignant and premalignant lesions and colorectal cancer.
6. There were no risks that the respondents can encounter due to their participation in this research.
7. The benefit of research study is that the information obtained will help to set the intervention for colorectal cancer.

CHAPTER THREE

3.0 RESULTS

3.1. SOCIAL DEMOGRAPHIC AND CLINICAL CHARACETRISTICS OF STUDY SUBJECTS

From September 2016 to February 2017 a total of 512 patients attending outpatient clinic at Muhimbili National Hospital (MNH) were included in the study. The calculated sample size was 600 patients but due to time limit we were not able to reach the expected number of patients. However, the study results gave important useful findings.

Of the 512 patients, 270 (52.7%) were females. The mean age of the participants was 54.4 years and the age range was 40 to 89 years. Majority of them were in the age groups of 40-49 and 50-59 (198 (38.7%) and 162 (31.6%) respectively). Of all the participants 132(25.8%) had secondary education and 224(43.8%) had college/university education.

Most of the participants were either civil servants (36.5%, N=187) or business personnel (24.5%, N=127). The rest 198(38.7%) were either self-employed or unemployed. Majority of the participants 144(28.1%) had the body weight in the category of 70-79 kg with the mean weight of 76.4 kilograms. The weight range was between 55 kg and 107 kg.

91(17.8%) of all the participants were hypertensive patients who came for routine follow up clinic or drug refilling. Other commonly reported diagnoses were diabetes mellitus 46(9.0%) and malaria 42(8.2%). Antihypertensive drugs are the most prescribed drugs of all the medications. Other drugs are analgesics, antimicrobials, proton pump inhibitors (PPIs) and oral hypoglycemics.

The most commonly reported symptoms among patients attending outpatient clinic were fever (12.5%), abdominal pain (8.2%), cough (7.8%), headache (6.3%), general body malaise (6.1%) and back pain (4.7%). The reported symptoms and their frequencies are shown in table 2 below. The details of social demographic characteristics are shown in table 1 below.

TABLE 1. BASIC DEMOGRAPHIC AND CLINICA CHARACTERISTICS OF PATIENTS (N=512)

Characteristics		Frequency (N)	Percentage (%)
Sex	Male	242	47.3
	Female	270	52.7
Age group	40-49	198	38.7
	50-59	162	31.6
	60-69	99	19.3
	70-79	49	9.6
	80-89	4	0.8
Marital status	Married	377	73.6
	Widow	50	9.8
	Divorced	29	5.7
	Single	56	10.9
Education level	None	59	11.5
	Primary	97	18.9
	Secondary	132	25.8
	College/University	224	43.8
Occupation	Civil servant	187	36.5
	Business	127	24.5
	Self employed	57	11.1
	Unemployed	141	27.5
Body weight (Kg)	50-59	17	3.3
	60-69	100	19.5
	70-79	144	28.1
	80-89	105	20.5
	90+	46	9.0

TABLE 1. BASIC DEMOGRAPHIC AND CLINICAL CHARACTERISTICS OF PATIENTS (N=512)

Diagnosis	Hypertension	91	17.8
	Diabetes mellitus	46	9.0
	Malaria	42	8.2
	UTI	30	5.9
	URTI	23	4.5
	Peptic ulcers	20	3.9
	Spondylosis	18	3.5
	Pneumonia	11	2.1
	Others	231	45.1
Drugs	Antihypertensives	165	32.2
	Analgesics	45	8.8
	Antimicrobials	70	13.7
	Proton pump inhibitors	29	5.7
	Oral Hypoglycemics	36	7.0
	Others	55	10.7
Smoking	Yes	97	18.9
	No	415	81.1
Symptoms	Abdominal pain	42	8.2
	Back pain	24	4.7
	Cough	40	7.8
	Constipation/diarrhea	7	1.4
	Dysuria	16	3.1
	Fever	64	12.5
	Flue	19	3.7
	General body malaise	31	6.1
	Headache	32	6.3
	Body itching	13	2.5
	Lower limb numbness	17	3.3
	Shortness of breath	10	2.0

3.2.PREVALENCE OF POSITIVE FECAL OCCULT BLOOD TESTS AMONG ADULT PATIENTS ATTENDING OUTPATIENT CLINIC AT MUHIMBILI NATIONAL HOSPITAL

Among 512 patients who were screened for CRC using fecal occult blood test, 63 had positive fecal occult making the prevalence to be 12.3%.

The age group of 50-59 had a largest proportion of patients who were positive for fecal occult 27(16.7%) as compared to other age groups. The proportion of males with positive fecal occult blood was 30 (12.4%) and it did not differ significantly from that of Females which was 33(12.2%). Majority of patients 45(11.9%) with positive fecal occult were married and 47(13.2%) of them had either secondary or college/University education. 27 (14.4%) of the patients with positive fecal occult blood were civil servants and most of them (13.2%, N=19) had body weight between 70 and 79kg. Almost half 31(15.8%) of patients with positive fecal occult were diabetics. The details of social and clinical demographic characteristics of patients with positive and negative fecal occult blood are shown in Table 2 below.

FIGURE 1. The Prevalence of Positive Fecal Occult Blood Test (FOBT)

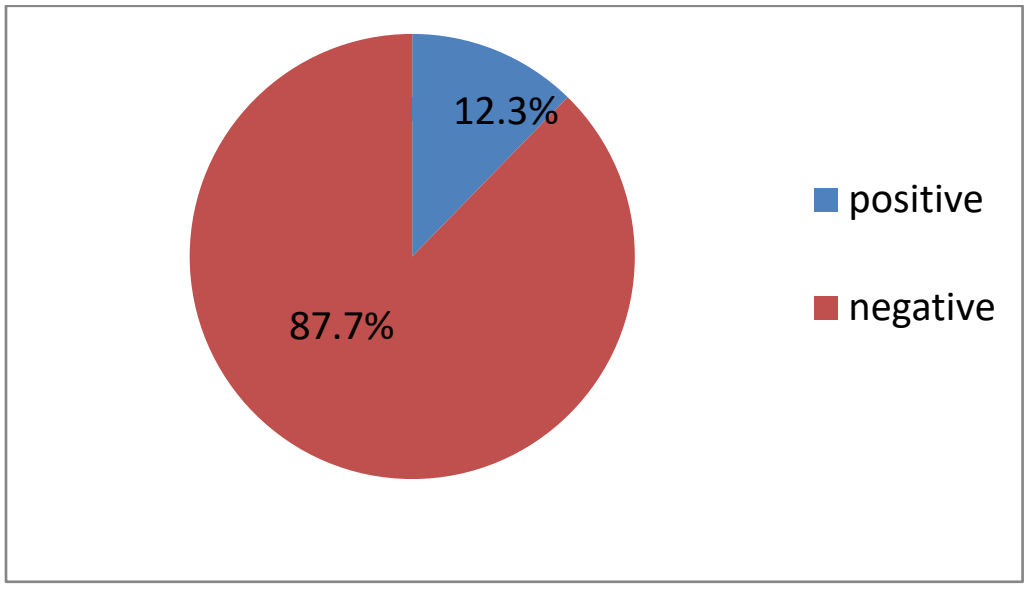


TABLE 2. COMPARISON OF DEMOGRAPHIC CHARACTERISTICS OF RESPONDENTS WITH POSITIVE AND NEGATIVE FOBT (N=512)

Characteristic		Frequency N (%)		Total	p-value
		Positive (N=63)	Negative (N=449)		
Sex	Male	30(12.4)	212(87.6)	242(100.0)	0.952
	Female	33(12.2)	237(87.8)	270(100.0)	
Age of Respondents	40-49	20(10.1)	178(89.9)	198(100.0)	0.288
	50-59	27(16.7)	135(83.3)	162(100.0)	
	60-69	10(10.1)	89(89.9)	99(100.0)	
	70-79	5(10.2)	44(89.8)	49(100.0)	
	80-89	1(25.0)	3(75.0)	4(100.0)	
Marital status	Married	45(11.9)	332(88.1)	377(100)	0.198
	Widow	4(8.0)	46(92.0)	50(100.0)	
	Divorce	7(24.1)	22(75.9)	29(100.0)	
	Single	7(12.5)	49(87.5)	56(100.0)	
Education level	None	8(13.6)	51(86.4)	59(100.0)	0.600
	Primary	8(8.2)	89(91.8)	97(100.0)	
	Secondary	18(13.6)	114(86.4)	132(100.0)	
	College/university	29(12.9)	195(87.1)	224(100.0)	
Occupation	Civil servant	27(14.4)	160(85.6)	187(100.0)	0.297
	Business	12(9.4)	115(90.6)	127(100.0)	
	Self-employed	4(7.0)	53(93.0)	57(100.0)	
	Unemployed	20(14.2)	121(85.6)	141(100.0)	
Smoking	Yes	12(12.4)	85(87.6)	97(100.0)	0.982
	No	51(12.4)	364(86.0)	415(100.0)	
Body weight(Kg)	50-59	4(23.5)	13(76.5)	17(100.0)	0.442
	60-69	16(16.0)	84(84.0)	100(100.0)	
	70-79	19(13.2)	125(86.8)	144(100)	
	80-89	10(9.5)	95(89.1)	105(100.0)	
	90+	5(10.9)	41(89.1)	46(100.0)	
Diagnosis	CVS(Hypertension)	7(8.5)	75(91.5)	82(100.0)	0.533
	Endocrine(Diabetes mellitus)	31(15.8)	48(88.9)	54(100.0)	
	GIT	5(13.9)	31(86.1)	36(100.0)	
	RS	6(11.1)	165(84.2)	196(100.0)	
	Other diagnoses	4(10.8)	33(89.2)	37(100.0)	
Drugs	Cardiovascular	20(12.1)	145(87.9)	165(100.0)	0.825
	Analgesics	7(15.6)	38(84.4)	45(100.0)	
	Antimicrobials	11(15.7)	59(84.3)	70(100.0)	
	PPIs	2(6.9)	27(93.1)	29(100.0)	
	Hypoglycemic	6(16.7)	30(83.3)	36(100.0)	
	Others	8(14.5)	47(85.5)	56(100.0)	

3.3. COMPARISON OF CLINICAL CHARACTERISTICS OF PATIENTS WITH POSITIVE FECAL OCCULT BLOOD TEST WHO UNDERWENT COLONOSCOPY AND THOSE WHO DIDN'T DO COLONOSCOPY (N=63).

We compared the clinical characteristics of the patients who had positive fecal occult blood who underwent colonoscopy and those who didn't do the colonoscopy. More than half 16(53.3%) of patients who did colonoscopy were males and majority (51.9%) were aged between 50 and 59 years. Most of them had a body weight between60 and 69 kilograms 9(56.2%). Majority of the patients 18(58.1%) who came for colonoscopy were diabetics and were on oral hypoglycemics. The symptoms most commonly reported in patients who did the colonoscopy are the abdominal pain/discomfort, constipation or diarrhea, back pain and anemia (See table 3 below).

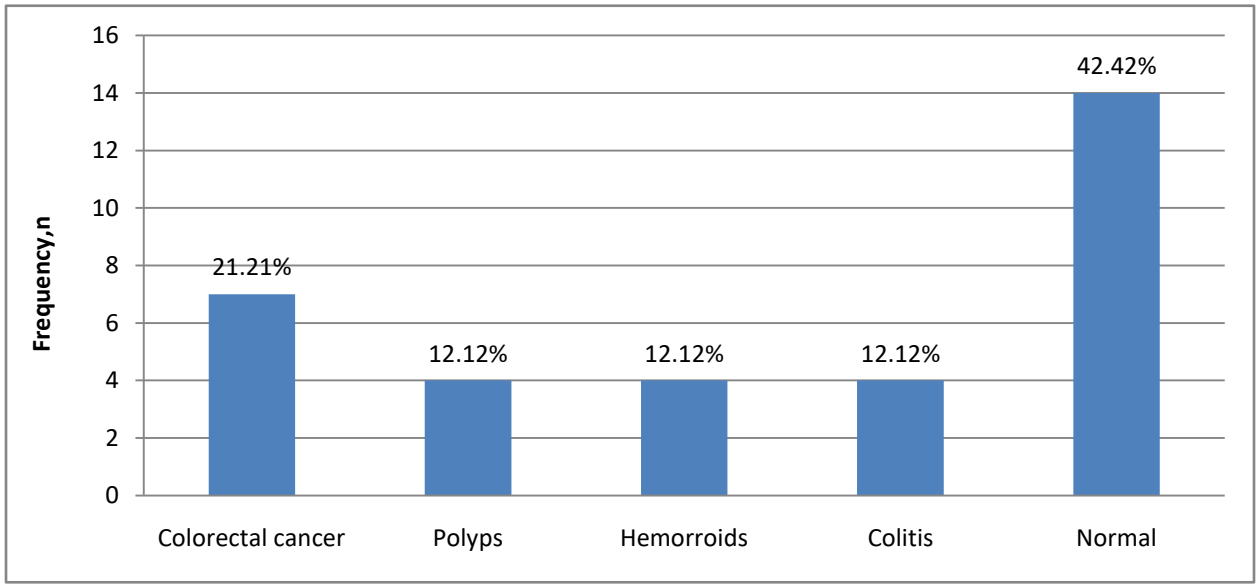
TABLE 3. COMPARISON OF CLINICAL CHARACTERISTICS OF PATIENTS WITH POSITIVE FOBT WHO DID COLONOSCOPY AND THOSE WHO DIDN'T DO. (N=63)

Characteristics		Frequency		Total	p-value
		Colonoscopy done	Colonoscopy not done		
Sex	Male	22(73.3)	8(26.7)	30(100.0)	<0.001
	Female	6(36.4)	27(63.6)	33(100.0)	
Age group	40-49	10(50.0)	10(50.0)	20(100.0)	0.391
	50-59	14(51.9)	13(48.1)	27(100.0)	
	60-69	2(20.0)	8(80.0)	10(100.0)	
	70-79	2(40.0)	3(60.0)	5(100.0)	
	80-89	0(0.0)	1(100.0)	1(100.0)	
Weight category (Kg)	50-59	1(25.0)	3(75.0)	4(100.0)	0.713
	60-69	9(56.2)	7(43.8)	16(100.0)	
	70-79	7(36.8)	12(63.2)	19(100.0)	
	80-89	5(50.0)	5(50.0)	10(100.0)	
	90+	2(40.0)	3(60.0)	5(100.0)	
Diagnosis	CVS(Hypertension)	1(14.3)	6(85.7)	7(100.0)	0.037
	Endocrine (Diabetes mellitus)	18(58.1)	13(41.9)	31(100.0)	
	RS	0(0.0)	6(100.0)	6(100.0)	
	GIT	3(60.0)	2(40.0)	5(100.0)	
	Other diagnoses	2(50.0)	2(50.0)	4(100.0)	
Drugs	Antihypertensives	6(30.0)	14(70.0)	20(100.0)	0.141
	Analgesics	6(85.7)	1(14.3)	7(100.0)	
	Antimicrobials	5(45.5)	6(54.5)	11(100.0)	
	PPIs	0(0.0)	2(100.0)	2(100.0)	
	Oral hypoglycemic	3(50.0)	3(50.0)	6(100.0)	
	Others	4(50.0)	4(50.0)	8(100.0)	
Symptoms	Fever	1(16.7)	5(83.3)	6(100.0)	0.043
	Dysuria	1(25.0)	3(75.0)	4(100.0)	
	Back pain	3(100.0)	0(100.0)	3(100.0)	
	Abdominal pain	3(60.0)	2(40.0)	5(100.0)	
	Constipation/diarrhoea	3(100.0)	0(0.0)	3(100.0)	

3.4.COLONOSCOPIC AND/OR HISTOLOGICAL FINDINGS OF PATIENTS WHO UNDERWENT COLONOSCOPY BY THEIR DEMOGRAPHIC DATA (N=33)

Among all the 63 patients with positive fecal occult blood, only 33(52.4%) underwent colonoscopy and biopsies were taken from the identified lesions. Of all the 33 patients seven (7) had colorectal cancer, four (4) had polyps, 4 had hemorrhoids, four (4) had colitis and fourteen (14) were normal. The finding are summarized in the bar chart below (Figure 2)

FIGURE 2. COLONOSCOPIC AND/OR HISTOLOGICAL FINDINGS AMONG PATIENTS WITH POSITIVE FECAL OCCULT TEST



3.5.PROPORTION OF PATIENTS WITH COLORECTAL CANCER AMONG THOSE WITH POSITIVE FECAL OCCULT BLOOD TEST.

The proportion of patients with colorectal carcinoma among those with positive fecal occult blood who underwent colonoscopy is 21.2% (7 out of 33 patients had CRC). If we assume that the thirty patients who did not do the colonoscopy have the same characteristics and hence the same proportion of colorectal cancer, then there will be six more patients with colorectal cancer and hence the proportion of patients with colorectal cancer among those with positive fecal occult blood will be 20.6% (13 out of 63 patients). But if there is no patient with colorectal cancer in those thirty patients, the proportion of patients with colorectal cancer will be 11.1% (7 patients out of 63 patients has CRC). Of all the patients with CRC, four were males and majority of them aged between 50 and 59 years. Only one patient was below 50 years and one was above 60 years. All patients were married and six out of seven had either secondary or college/university education. The average body weight was 81kg (70-90kg). Only two patients were smokers (table 4).

TABLE 4. CHARACTERISTICS OF PATIENTS WITH COLORECTAL CANCER COMPARED WITH THOSE WITHOUT (N=63)

Characteristics		**Colorectal cancer (N=7),%**	**No colorectal cancer (N=56,%)**	**Total**
Sex	Male	4(25.0)	12 (75.0)	16 (100.0)
	Female	3(25.0)	9 (75.0)	12(100.0)
Age group	40-49	1(100.0)	0 (0.0)	1(100.0)
	50-59	5(29.4)	12 (70.6)	17(100.0)
	60-69	1(16.7)	5 (83.3)	6 (100.0)
	70-79	0(0.0)	3 (100.0)	3 (100.0)
	80-89	0(0.0)	1 (100.0)	1 (100.0)
Marital status	Married	7(31.8)	15 (68.2)	22 (100.0)
	Unmarried	0(0.0)	6 (100.0)	6 (100.0)
Education level	Secondary	2(25.0)	6 (75.0)	8 (100.0)
	College/university	4(36.4)	7 (63.6)	11 (100.0)
Occupation	Civil servant	5(35.7)	9 (64.3)	14 (100.0)
	Business	0(0.0)	4 (100.0)	4 (100.0)
	Self-employed	1(33.3)	2 (66.7)	3 (100.0)
	Unemployed	1(16.7)	5 (83.3)	6 (100.0)
Body weight (Kg)	70-79	2(100.0)	-	2
	80-89	2(20.0)	-	10
	90+	2(50.0)	-	4
Smoking	Yes	2(28.6)		7
	No	5(23.8)	16	21

3.6.THE PREVALENCE OF COLORECTAL CANCER AMONG ADULT PATIENTS 40 YEARS AND ABOVE ATTENDING OUTPATIENT CLINIC AT MUHIMBILI NATIONAL HOSPITAL (MNH)

If the thirty three patients who did colonoscopy had the same characteristics as the thirty patients who didn't do the colonoscopy, the overall prevalence of colorectal cancer will be thirteen (13) out of five hundred and twelve (512) which is 2.5%. If there is no patient with colorectal cancer in those 30 patients who did not appear for colonoscopy, the overall prevalence will be seven out of five hundred and twelve which is1.4%. Therefore the overall prevalence of colorectal cancer in these patients ranges between 1.4% and 2.5%.

3.7. AWARENESS ABOUT THE COLORECTAL CANCER AMONG ADULT PATIENTS 40 YEARS AND ABOVE ATTENDING OUTPATIENT CLINIC AT MUHIMBILI NATIONAL HOSPITAL (MNH)

The awareness of colorectal cancer is generally low among the adult patients attending outpatient clinic at Muhimbili National Hospital (MNH). Only 185(36.1%) of all the respondents knew the presence of colorectal cancer.

When males and females were compared, 32.6% of males and 39.3% of females knew the presence of colorectal cancer but the difference between them was not statistically significant. There was no statistical difference in awareness between the age groups and it ranged from 32% to 40%, 32% among those aged above seventy years and 40% among those aged between 50 and 59 years.

The level of awareness among those with no formal education was 25% but it increased proportionally with level of education. The level of awareness was 41% among those with college or university education. However, the difference is not statistically significant (See table 5 below).

The level of awareness regarding the risk factors for colorectal carcinoma was also generally low. Only 94 (38.8%) males and 102(42.1%) of females agreed that having family history of CRC is a risk factor. The difference between males and females was not statistically significant.

Regarding old age as a risk factor for colorectal carcinoma, only 81(33.5%) of males and 66(24.4%) of females were able to identify old age as a risk factor. The difference is not statistically significant.

Only 73(14.3%) of males and 54(20.0) of females agreed being a male is a risk factor for colorectal carcinoma. There is no statistical difference between males and females.

Majority of the respondents were able to identify rectal polyps as the risk of colorectal cancer, 148(61.2%) of males and 155(55.9%) of females and the difference between males and females was not statistically significant.

Excessive alcohol use was identified as the risk factor for colorectal cancer by most of the respondents. Of all 242 males, 196 (81.0%) and 227 (84.1%) of all 279 females agreed that excessive alcohol intake is a risk of colorectal cancer, however; the difference was not significant statistically.

Smoking was identified as a risk factor for colorectal cancer by 52.0% of males and 55.2% of females with no statistical difference between the two groups.

64.9% of males and 58.1% of females said that fatty meals is associated with increased risk of colorectal carcinoma and there was no statistical difference between males and females (See tables 6 below).

TABLE 5. AWARENESS OF COLORECTAL CANCER AMONG ADULT PATIENTS AGED 40 YEARS AND ABOVE ATTENDING OUTPATIENT CLINIC AT MUHIMBILI NATIONAL HOSPITAL.

Variables		**Yes N=185 (36.1%)**	**No N=327 (63.9%)**	**Total N=512 (100%)**	**p-value**
Gender	Male	79(32.6)	163(67.4)	242(47.27)	0.12
	Female	106(39.3)	164(60.7)	270(52.63)	
Age	40-49	73(36.9)	125(63.1)	198(38.67)	0.408
	50-59	64(39.5)	98(60.5)	162(31.64)	
	60-69	32(32.3)	67(67.7)	99(19.33)	
	70-79	16(32.7)	33(67.3)	49(9.57)	
	80-89	0(0.0)	4(100.0)	4(100.00)	
Education Level	None	15(25.4)	44(74.6)	59(11.52)	0.072
	Primary school	29(29.9)	68(70.1)	97(18.94)	
	Secondary school	49(37.1)	83(62.9)	132(25.78)	
	College/University	92(41.1)	132(58.9)	224(43.75)	

TABLE 6. AWARENESS OF THE RISK FACTORS FOR COLORECTAL CANCER AMONG ADULT PATIENTS AGED 40 YEARS AND ABOVE ATTENDING OUTPATIENT CLINIC AT MUHIMBILI NATIONAL HOSPITAL (N 512).

Risk factor	Male: N=242 (%)		Total	Female: N=270 (%)		Total	P-value
	Yes	No		Yes	No		
Family history	94(38.8)	148(61.2)	242(100.0)	102(42.1)	168(57.9)	270(100.0)	0.709
Old age	81(33.5)	161(66.5)	242(100.0)	66(24.)	204(75.6)	270(100.0)	0.199
Male sex	73(14.3)	169(85.7)	242(100.0)	54(20.0)	216(80.0)	270(100.0)	0.062
Polyps	148(61.2)	94(38.8)	242(100.0)	151(55.9)	119(44.1)	270(100.0)	0.181
Excessive alcohol	196(81.0)	46(19.0)	242(100.0)	227(84.1)	43(15.9)	270(100.0)	0.358
Cigarette smoking	127(52.5)	115(47.5)	242(100.0)	149(55.2)	121(44.8)	270(100.0)	0.540
Fatty meals	157(64.9)	85(35.1)	242(100.0)	157(58.1)	113(41.9)	270(100.0)	0.119
Smoking	127(52.5)	115(47.5)	242(100.0)	149(55.2)	121(44.8)	270(100.0)	0.540

CHAPTER FOUR

4.0. DISCUSSION

Colorectal cancer (CRC) is not uncommon among asymptomatic patients and normally the patients present very late with advanced disease. In this clinic based cross-sectional study, we did the colorectal cancer (CRC) screening using fecal occult blood test (FOBT) and assessed the knowledge of CRC and the associated risk factors in adult patients who are 40 years of age or above attending outpatient clinic at Muhimbili National Hospital (MNH).

The fecal occult blood test (FOBT) is a rapid, convenient and noninvasive qualitative method for detecting fecal occult blood. FOBT is easy to perform and may be preferable to patients than the invasive tests requiring bowel preparations. The primary use of the FOBT is to screen for early colorectal cancer. The test is also used to detect the early stages of other gastrointestinal problems such as polyps, colitis, diverticulitis, and fissures which may not show any visible symptoms but only the presence of occult blood.
FOBT has demonstrated a statistically significant reduction in CRC mortality of between 15% and 35% in randomized trials and meta-analyses during the past 12 or so years (41,90,91).
In our study more than 10% of the adults who were screened for colorectal cancer using FOBT had positive fecal occult. This indicate a high sensitivity of the FOBT in detecting fecal occult blood and hence warrant a room for further investigations.

In this study the prevalence of patients with positive FOBT among adult patients attending outpatient clinic for complains other than those of colorectal cancer was 12.3%. This prevalence is slightly higher than that which was reported previously from the studies done in U.S.A, Brazil and Ireland which was between 8.3%and 9.8% (92–94). The proportion of males and females with positive fecal occult was almost equal, 30(12.4%) and 33(12.2%) respectively. In another study, among participants with positive results 3.5% were men and 2.2% were females (95,96).

Majority of the respondents with positive FOBT were aged between 50 and 59 years. This is in keeping with other studies in which majority were aged above 50 years and rate of positivity increases proportionally with age(70,92).

The variations in prevalence could be explained by variation in socio-demographic characteristics of source populations in the localities studied, prevalence of CRC in the general populations where these studies were conducted, the study methodology and probably the effect of other co-morbidities in our study population.

In this study among thirty three patients with positive FOBT who underwent colonoscopy, seven had histologically confirmed colorectal cancer making the proportion of 21.2%. If all the sixty three patients with positive fecal occult would have done the colonoscopy and if all the patients had the same characteristics, the expected proportion was 20.6% (13 patients out of 63 had colorectal cancer). But if there is no patient with colorectal cancer in those patients who didn't do colonoscopy, the proportion of patients with CRC in those with positive FOBT will be 11.1% (7 out of 63 patients will have CRC). This proportion is higher than the one reported by Muinuddin et al whereby out of 346 patients with positive FOBT 41 had colorectal cancer making an overall proportion of CRC 11.8%. When the patients were classified according to the number of positive FOBT into one, two and three positive results, the cancer was found in 5.6%, 15.5% and 29.5% of individuals with one, two and three positive FOBT results, respectively (OR 3.0 [95% CI 1.2 to 7.3] and 6.5 [95% CI 2.8 to 15.0] for two or three positive FOBTs compared with one; P=0.015 and P<0.001, respectively) (97). In the study to determine the prevalence of CRC among patients undergoing colonoscopy in Egypt, CRC was diagnosed in 57 out of 412 patients making the prevalence of 14% and fifty six percent were females. The mean age was 51 ± 15 years (age range: 16–80 years). Twenty-five percent of cancers occurred in patients aged less than 40 years. There are relatively higher CRC rates in patients under 40 years of age than reported in the West (98). This higher rates of CRC in young African patients was also reported in other studies done in South Africa, Uganda, Nigeria and U.S.A (87,99–101).
These differences in prevalence in this study and other studies can be explained by the differences in clinical characteristics of the two groups of patients. In the study by Muinuddin et, all the patients were completely asymptomatic but in our study, majority of the patients who underwent colonoscopy were diabetics and had gastrointestinal symptoms like abdominal pain, constipation or diarrhea and back pain. This makes these patients to be a self-selected group. On the other hand majority of patients had type 2 diabetes which is associated with a 1.3-fold increased risk of colorectal cancer especially in patients who are obese for 4-8 years. (HR 1.26

[95% CI 1.18–1.33]) (102,103). Other reasons for the discrepancy may be differences in methodology and the type of studies.

Of all the seven patients with colorectal cancer, four were males, hence slight male predominance. In other studies the male to female ratio was almost the same but slightly higher in males which is in keeping with our study(104,105). Many patients with CRC were aged between 50 and 69 years. Only one patient was below 50 years. Their body weights were between 70 and 90 kilograms with the average weight of 81 kilograms. This is in keeping with the other studies which showed that colorectal cancer is more common after the age of 50 years(10,36).

The overall prevalence of colorectal carcinoma in adults aged 40 years and above attending outpatient clinic at Muhimbili National Hospital ranges from 1.4% to 2.5%. This is because in 33 patients who underwent colonoscopy, there were seven patients with colorectal cancer and by assuming that 30 patients with positive fecal occult blood test who didn't do the colonoscopy had the same baseline characteristics as the ones who did colonoscopy, there could have been 6 more patients with CRC making a total of 13 patients with CRC and the proportion of CRC will be 2.5% (13/512). But if in the group of 30 people who didn't appear for colonoscopy there is no patient with colorectal cancer, the prevalence will be 1.4% (7 patients out of 512 had colorectal cancer).

In another multi-center, prospective colonoscopy study involving 16 Asia-Pacific regions performed from 2008 to 2015, the prevalence of CRC was 0.6% in subjects with no family history of CRC, 1.1% if sibling had CRC, 0.5 if mother had CRC, 1.2 if father had CRC and 3.1% if two or more members had CRC, $P<0.001$). The prevalence of advanced colorectal neoplasia (CAN) was 6.5% (none: 6.1%; siblings: 8.3%; mother: 7.7%; father: 8.7%; ≥2 members: 9.3%, $P<0.001$).

In the study to determine the performance of a single test using two fecal occult blood tests with colonoscopy for the detection of colorectal cancer (CRC) for the first time in Saudi Arabia, of the 277 subjects, 79 (28.5%) tested positive for occult blood. Colonoscopy data were obtained for all 277 patients. A total of 3 (1.1%) invasive cancers were detected among the screening group.

The findings of the study done in Tehran, Iran to determine the prevalence of colorectal polyps in asymptomatic average risk individuals who are above 40 years of age showed that (2.15%)

had advanced neoplasms and the prevalence of colorectal neoplasia was more common among the 50-59 age group (106). Another study was done in Seoul, South Korea to determine the prevalence of advanced neoplasm in asymptomatic adults aged between 40 and 49 years, the prevalence of overall and advanced colorectal neoplasm was 20.2% and 2.5% respectively(96,107,108).

In this study we also assessed the level of awareness of CRC and the associated risk factors among patients who were enrolled in the study. The overall awareness of colorectal cancer is generally low among the adult patients enrolled in the study. Only 185(36.1%) of all the respondents knew the presence of colorectal cancer. This correlates with the findings in another study to assess the public awareness of the risk factors, screening and prevention of CRC, in which the level of knowledge about colorectal cancer was poor in 53% , good in 37% and excellent in 10% of the respondents(55,109).

When males and females were compared, 32.6% of males and 39.3 of females knew the presence of colorectal cancer. The level of awareness between the age groups ranged from 32% to 40%; 32% among those aged above 70 years and 40% among those aged between 50 and 59 years. This difference between the age groups may be explained by the difference in education level because the younger age group had higher level of education. The level of awareness seemed to be increasing proportionally with the level of education from 25% among those with no formal education to 41% among those with college or university education but the difference was not statistically significant. In the study by Bukhari et al, highest percentage for education level about Public awareness for colorectal cancer was 45% and lowest was 4% which varied significantly according to level of education. Study in Saudi Arabia also showed that the level of awareness varied significantly with the level of education (109,110).

The level of awareness regarding the risk factors for colorectal carcinoma was also generally low. Only 94 (38.8%) males and 102(42.1%) of females agreed that having family history of CRC is a risk factor. This level of awareness is lower than that reported in another study (56.6%) (94,111)

Regarding old age as a risk factor for colorectal carcinoma, less than 40% were able to tell that age is a risk factor (33.5%) of males and 66(24.4%) of females). Awareness that male sex is associated with increased risk of CRC is much lower (14.3% among males and 20% among

females). This is almost the same as in another study assessing the awareness of colorectal cancer symptoms and screening in which the level of awareness that old age is a risk factor was 29.4% and that for male sex was 4.4% (94)

More than half of the respondents were able to identify rectal polyps as the risk of colorectal cancer, 148(61.2%) of males and 155(55.9%) of females. In a study by Zubaidi et al in Riyadh Saudi Arabia, less than 20% of all respondents believe that polyps are a risk factor for CRC.(110).

Excessive alcohol use was identified as the risk factor for colorectal cancer by most of the respondents. 81.0% of males and 93.8% of females agreed that excessive alcohol intake is a risk of colorectal cancer, however, smoking was identified as a risk factor for colorectal cancer by 52.% of males and 55.2% of females but there was no statistical difference between the two groups(112).

64.9% of males and 58.1% of females said that fatty meals is associated with increased risk of colorectal carcinoma and there was no statistical difference between males and females. In the study assessing the awareness of lifestyle and colorectal risk 11% failed to identify specific factors related to diet and activity(111,113).

Our findings indicated that there is a lack of enough knowledge about CRC and associated risk factors. These results may facilitate the development of effective educational strategies primarily for adults who are above 40 years of age.

CHAPTER FIVE

5.0 CONCLUSION

The prevalence of patients with positive fecal occult blood test (FOBT) was high among patients attending outpatient clinic at MNH. The prevalence of CRC was also high in asymptomatic patients with positive FOBT despite few patients who underwent colonoscopy. FOBT can be used successfully as a screening tool for CRC. Male sex, age above 50 years and gastrointestinal complaints are the major associated risk factors. The knowledge of CRC and associated risk factors among adult patients was generally low in this group of patients.

5.1. RECOMMENDATIONS

All adults who are 40 years old and above should be screened for colorectal cancer using FOBT because CRC is normally asymptomatic for a long time and when patients present with symptoms it is already too late and the disease is very advanced. FOBT is a rapid, simple, noninvasive, cheap, not time consuming and preferable by the patients. Early screening will help to identify pre-cancerous lesion and hence removed before the development of active cancer.

The policy should be developed for routine screening of CRC in adults who are 40 years or older using FOBT. There is a need of having an educational program of raising the awareness of CRC and its risk factors among adults.

Another study with large sample size is needed to determine the prevalence of colorectal cancer in the general population.

5.2. LIMITATIONS OF THE STUDY

In this study all patients with positive fecal occult blood were supposed to do colonoscopy but we managed to do only 33 (52.4%) patients because other patients didn't respond when required for colonoscopy. This may lead to underestimation of the prevalence and hence the results cannot be generalized.

Because the number of patients who did colonoscopy and those with colorectal cancer are small, we could not do comparison with those who do not have the CRC and so we could not tell exactly the factors associated with CRC.

Our study was clinic based and all patients were insured with the national health insurance fund (NHIF) making them easy to access health care. This makes them to be selected group that may be different from other uninsured patients who are not able to access health care easily and hence the prevalence may be different from that of the general population. These limitations open the door for other larger studies to determine the prevalence of colorectal cancer in adults.

5.3. STRENGTH OF THE STUDY

This is the first study to be done in the country and although a cross-sectional study, it has provided an insight that colorectal cancer is a burden in asymptomatic patients and that FOBT can be used as a reliable, simple, noninvasive and cheap method for initial CRC screening before confirmatory screening methods.

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APPENDICES

APPENDIX I: QUESTIONNAIRE (ENGLISH VERSION)

Colorectal cancer screening and assessment of awareness among patients attending Nationa Health Insurance Fund (NHIF) clinic at Muhimbili National Hospital (MNH), Dar Es Salaam-Tanzania.

STUDY NUMBER…….

PART ONE: SOCIO-DEMOGRAPHIC DATA

1. Name ……
2. Gender
   I. Male ( )
   II. Female ( )
3. Age (complete years): ……
4. Physical address: ……
5. Phone number ……
6. Registration number……
7. Marital status
   I. Married ( )
   II. Widowed ( )
   III. Divorced ( )
   IV. Single ( )
8. Educational level
   I. None ( )
   II. Primary school( )
   III. Secondary school ( )
   IV. College/University ( )
9. Occupation
   I. Civil servant ( )
   II. Business ( )

III. Self employed ( )

IV. Unemployed ( )

9. Are you smoking?

I. Yes ( )

II. No ( )

PART TWO: HISTORY

1. Abdominal pain a) Yes b) No
2. Diarrhoea a) Yes b) No
3. Constipation a) Yes b) No
4. Blood in stool a) Yes b) No
5. Fever a) Yes b) No
6. Weight loss a) Yes b) No
7. Back pain a) Yes b) No
8. General body weakness a) Yes b) No
9. Other symptoms (mention if any)

……
……
……
……

10. Body weight (kg)……..
11. Diagnosis …….
12. Medications

……
……
……

PART THREE: AWARENESS OF THE COLORECTAL CANCER

1. Which is the leading cancer in causing deaths in Tanzania?
   I. Breast cancer ( )
   II. Cervical cancer ( )
   III. Prostate cancer ( )
   IV. Colorectal cancer ( )
   V. Oesophageal cancer ( )
   VI. Lung cancer ( )
2. Have you ever heard colorectal cancer?
   I. Yes ( )
   II. No ( )
3. If your answer to the above question is yes, from where did you get the information?
   I. Friend ( )
   II. Relative ( )
   III. Doctor/health care worker ( )
   IV. TV/radio/newspaper ( )
4. Colorectal cancer is among the top 5 commonest cancers in Tanzania
   I. Yes ( )
   II. No ( )
   III. Uncertain ( )
5. Colorectal cancer often starts with no symptoms
   I. Yes ( )
   II. No ( )
   III. Uncertain ( )
6. Which of the following are the symptoms of colorectal cancer?
   I. Blood in stool ( )
   II. abdominal pain ( )
   III. Unexplained weight loss ( )
   IV. Change in bowel movements ( )
   V. Recurrent fevers ( )

VI. Tiredness and ( )

VII. Anaemia ( )

VIII. Headache ( )

PART FOUR: KNOWLEDGE OF THE RISK FACTORS

7. What is the relationship between the family history of colorectal cancer and the risk of developing colorectal cancer?
   I. no any relationship ( )
   II. having a family member with colorectal cancer increases your risk of developing colorectal cancer ( )
   III. I do not know ( )
8. Is there any relationship between the age of a person and colorectal cancer?
   I. no relationship ( )
   II. children and young adults are more at risk ( )
   III. all age groups are affected equally ( )
   IV. people with old age are more at risk ( )
   V. I do not know ( )
9. Between men and women which sex group is more at risk of colorectal cancer?
   I. all are affected equally ( )
   II. men are more at risk
   III. women are more at risk ( )
   IV. women do not get colorectal cancer ( )
   V. I do not know ( )
10. Having new growths in the rectum and colon is a risk factor for colorectal cancer because they can change to cancer overtime.
    I. True ( )
    II. False ( )
    III. Uncertain ( )

11. The following are the other risk factors for colorectal cancer. please tick the ones you think are the risk factors for colorectal cancer.
    I. excessive alcohol intake ( )
    II. doing strenuous exercises ( )
    III. fatty meals ( )
    IV. smoking ( )
    V. having bowel disease ( )

PART FIVE: SCREENING SERVICES

12. Do you know if there are screening services for colorectal cancer?
    I. Yes ( )
    II. II. No ( )
13. If the answer to question (12) above is yes, who told you about these services?
    I. Doctor/health worker
    II. Relative
    III. Friend
    IV. Media (television, radio, magazine)
14. People with family history of CRC or polyps should start screening at a younger age than others
    I. True ( )
    II. False ( )
    III. Uncertain ( )
15. Which group of people do you think need to be screened regularly for colorectal cancer?
    I. the people of all age groups **(**)
    II. only men aged 50 years and older ( )
    III. only women aged 50 years and older (**)**
    IV. all the people aged 50 years and above ( )
    V. regular screening for colorectal cancer is not necessary
16. Colorectal cancer/new growths in the rectum can be found early by screening tests
    I. True ( )
    II. False ( )

III. Uncertain ( )

17. Finding and removing new growths in the rectum and colon early helps prevent cancer

I. True ( )

II. False ( )

III. Uncertain ( )

18. People with a family history of CRC may get tested at a younger age than 50

I. True ( )

II. False ( )

III. Uncertain ( )

19. Screening using fecal occult blood test can detect new growths/ colorectal cancer early

I. True ( )

II. False ( )

III. Uncertain ( )

20. Are you ready to be screened using fecal occult blood test?

I. Yes ( )

II. No ( )

III. Uncertain ( )

21. If fecal occult blood test is positive, will you be ready for colonoscopy which is more specific for diagnosis of new growths and colorectal cancer?

I. Yes ( )

II. No ( )

III. Uncertain ( )

APPENDIX II: INFORMED CONSENT (ENGLISH VERSION)

CONSENT FORM TO PARTICIPATE IN THE STUDY.

COLORECTAL CANCER SCREENING AND AWARENESS AMONG PATIENTS ATTENDING OUTPATIENT CLINIC AT MUHIMBILI NATIONAL HOSPITAL (MNH), DAR ES SALAAM-TANZANIA.

My name is Dr. Joel Johanson, a Resident in the department of Internal Medicine. I would like to conduct a study mentioned above for my dissertation.

Purpose of the study.

The aim of the study is to determine the magnitude of colorectal cancer and assessment of awareness among patients attending NHIF clinic at MNH. The results of the study will help in planning the strategies of how to raise community awareness about CRC and in planning interventions for the routine screening programs of CRC

Eligible patients will be recruited into the study. They will be interviewed using a questionnaire, which will include their social demographic characteristics, their awareness about colorectal cancer, risk factors and the screening services. They will then be asked to provide a stool sample for fecal occult blood test (FOBT) and those who will test positive for occult blood will be asked to do colonoscopy for further evaluation.

Risks.

There is no anticipated risk due to participation in this study.

Benefits:

Patients who will be found to have colorectal cancer or early changes of CRC will be treated before they develop advanced disease.

Confidentiality:

Any patient's results will not be revealed to anybody except attending doctors and patient himself.

Cost.

No payment is requested from you as a fee to participate in the study.

Person to contact in questions or problems

DR E. Komba (Tel: 0784 200 171), Department of Internal Medicine, MUHAS.

I…… have read/been told of the contents of this form and understood its meaning. I agree to participate in this study.

Signature…….. (Participant) Date……

Signature…….. (Researcher) Date……

APPENDIX III: QUESTIONAIRE (KISWAHILI VERSION)

Uchunguzi wa saratani ya utumbo mpana na njia ya haja kubwa na upimaji wa ufahamu kwa wagonjwa wanaohudhuria kitengo cha wagonjwa wa nje katika hospitali ya taifa Muhimbili, Dar Es Salaam.

NAMBARI YA UTAMBULISHO……

SEHEMU YA KWANZA: UTAMBULISHO

1. Jina……
2. Jinsia
    I. Mwanaume ( )
    II. Mwanamke ( )
3. Namba ya usajili……..
4. Umri (Miaka): ……
5. Makazi: ……
6. Namba ya simu ……
7. Hali ya ndoa
    I. Nimeoa/Nimeolewa ( )
    II. Mjane/Mgane ( )
    III. Tumeachana ( )
    IV. Sijaoa/Sijaolewa( )
8. Kiwango cha elimu yako
    I. Sijasoma ( )
    II. Elimu ya msingi ( )
    III. Sekondari ( )
    IV. Chuo/Chuo kikuu ( )
9. Kazi yako
    I. Mtumishi wa umma ( )
    II. Mfanya biashara ( )
    III. Nimejiajiri ( )
    IV. Mkulima ( )
    V. Sina kazi ( )

10. Je; unavuta sigara?

I. Ndiyo ( )

II. Hapana ( )

SEHEMU YA PILI: HISTORIA YA UGONJWA

1. Maumivu ya tumbo a) Ndiyo b) Hapana
2. Kuharisha a) Ndiyo b)Hapana
3. Kukosa choo a) Ndiyo b) Hapana
4. Kuwa na damu katika choo a) Ndiyo b) Hapana
5. Homa a) Ndiyo b) Hapana
6. Kupungua uzito a) Ndiyo b) Hapana
7. Maumivu ya mgongo a) Ndiyo b) Hapana
8. Uchovu wa mwili a)Ndiyo b) Hapana
9. Dalili zingine (zitaje kama zipo)

……
……
……

11. Uzito wa mwili (kg)
12. Urefu (cm)…….
13. Diagnosis ……..
14. Dawa unazotumia

……
……

SEHEMU YA TATU: UFAHAMU KUHUSU SARATANI YA UTUMBO NA NJIA YA HAJA KUBWA

15. Je; ni saratani ipi inaongoza kwa kusababisha vifo Tanzania?

I. saratani ya matiti ( )

II. Saratani ya shingo ya uzazi ( )

III. Saratani ya tezi dume ( )

IV. Saratani ya utumbo na njia ya haja kubwa ( )

V. Saratani ya koo ( )

VI. Saratani ya mapafu ( )

16. Je; umewahi kusikia satani ya utumbo na njia ya haja kubwa?

I. Ndiyo ( )

II. Hapana ( )

17. Ikiwa jibu lako ni ndiyo kwa swali namba 2 hapo juu, je; ni wapi uliposikia?

I. Kwa rafiki yangu ( )

II. kwa jamaa yangu wa karibu ( )

III. Kwa daktari/mhudumu wa afya ( )

IV. kwenye redio/luninga/gazeti ( )

18. Saratani ya utumbo na haja kubwa ni kati ya saratani tano za kwanza kwa Tanzania

I. Ndiyo ( )

II. Hapana ( )

III. Sina uhakika ( )

19. Saratani ya utumbo na haja kubwa mara nyingi huanza bila dalili yoyote.

I. Ndiyo ( )

II. Hapana ( )

III. Sina uhakika ( )

20. Ipi kati ya hizi zifuatazo ni dalili ya saratani ya utumbo mpana na njia ya haja kubwa?

I. Damu katika choo ( )

II. Maumivu ya tumbo ( )

III. Kupungua uzito kusikoelezeka ( )

IV. Kuharisha au kukosa choo ( )

V. Homa za mara kwa mara ( )

VI. Uchovu ( )

VII. Upungufu wa damu ( )

VIII. Maumivu ya kichwa ( )

SEHEMU YA NNE: VISABABISHI VYA SARATANI

21. Kuwa na mtu mwenye saratani ya utumbo au njia ya haja kubwa kuna uhusiano wowote na mtu mwingine katika familia kupata saratani?
    I. Hakuna uhusiano wowote ( )
    II. kuna ongeza uwezekano wa kupata saratani ya utumbo au njia ya haja kubwa ( )
    III. Sijui ( )
22. Kuna uhusiano wowote kati ya umri wa muhusika na saratani ya utumbo na njia ya haja kubwa?
    I. Hakuna uhusiano ( )
    II. watoto na watu wa umri mdogo wako kwenye hatari zaidi ( )
    III. watu wote wanaathirika kwa uwiano sawa ( )
    IV. watu wa umri mkubwa wako kwenye hatari zaidi ( )
    V. Sijui ( )
23. Je; ni jinsia gani iko kwenye hatari zaidi ya kupata saratani ya utumbo na njia ya haja kubwa?
    I. Wote wanaathirika kwa uwiano sawa ( )
    II. Wanaume ( )
    III. Wanawake ( )
    IV. Wanawake hawapati saratani ya utumbo na njia ya haja kubwa ( )
    V. Sijui ( )
24. Kuwa na vinyama vinavyoota katika njia ya haja kubwa na utumbo mpana kuna ongeza hatari ya kupata saratani ya utumbo na njia ya haja kubwa.
    I. Kweli ( )
    II. Si kweli ( )
    III. Sina uhakika ( )
25. Hivi hapa chini ni visababishi vya saratani ya utumbo na njia ya haja kubwa. Weka alama ya (√) kwenye visababishi vya saratani ya utumbo na njia ya haja kubwa
    I. Kunywa pombe kupita kiasi ( )
    II. Kufanya mazoezi sana ( )
    III. vyakula vya mafuta ( )

IV. Kuvuta sigara ( )

V. Kuwa na magonjwa ya tumbo ( )

SEHEMU YA TANO: HUDUMA ZA UCHUNGUZI

26. Je; unafahamu uwepo wa huduma za uchunguzi wa saratani ya utumbo na njia ya haja kubwa?

I. Ndiyo ( )

II. Hapana ( )

27. Kama jibu lako ni ndiyo kwa swali la (12) hapo juu, ni wapi ulipopata taarifa za huduma hiyo ya uchunguzi?

I. daktari/mhudumu wa afya ( )

II. Jamaa wa karibu ( )

III. Rafiki ( )

IV. Vyombo vya habari (luninga, redio,magazeti) ( )

28. Ikiwa kuna mtu ana saratani ya utumbo au haja kubwa au ana vinyama katika njia ya haja kubwa, uchunguzi wa saratani unapaswa kuanza mapema zaidi kuliko watu wengine.

I. Kweli ( )

II. Si kweli ( )

III. Sina uhakika ( )

29. Unafikiri ni watu wa kundi gani wanahitaji uchunguzi wa mara kwa mara?

I. Watu wote **(**)

II. Wanaume wa umri miaka 50 au zaidi ( )

III. Wanawake miaka 50 au zaidi (**)**

IV. IV. Watu wote wa umri wa miaka 50 na zaidi ( )

V. Uchunguzi wa mara kwa mara siyo muhimu.( )

30. Saratani ya utumbo au njia ya haja kubwa inaweza kugundulika mapema kwa uchunguzi wa mapema.

I. Kweli ( )

II. Si kweli ( )

III. Sina uhakika ( )

31. Kugundulika mapema na kuondoa vinyama katika njia ya haja kubwa na utumbo mpana kunaweza kuepusha saratani ya utmbo na njia ya haja kubwa.

I. Kweli ( )

II. Si kweli ( )

III. Sina uhakika ( )

32. Uchunguzi kwa njia ya kupima choo kunaweza kugundua uwepo wa vinyama katika njia ya haja kubwa au saratani katika hatua za awali.

I. Kweli ( )

II. Si kweli ( )

III. Sina uhakika ( )

33. Je; uko tayari kufanyiwa uchunguzi kwa njia ya kupima choo?

I. Ndiyo ( )

II. Hapana ( )

34. Je; ikiwa kipimo cha choo kitaonyesha kwamba kuna shida, utakuwa tayari kufanya kipimo cha mpira ambacho kinatoa majibu ya uhakika zaidi?

I. Ndiyo ( )

II. Hapana ( )

APPENDIX IV: CONSENT FORM (KISWAHILI VERSION)

UCHUNGUZI WA SARATANI YA UTUMBO MPANA NA NJIA YA HAJA KUBWA PAMOJA NA UFAHAMU KWA WAGONJWA WANAOTIBIWA KATIKA KITENGO CHA WAGONJWA WA NJE KATIKA HOSPITALI YA TAIFA YA MUHIMBILI, DAR ES SALAAM-TANZANIA

Ninaitwa Dr Joel Johanson, mwanafunzi wa shahada ya pili ya udaktari katika chuo kikuu cha tiba na sayansi shirikishi cha Muhimbili (MUHAS). Ninafanya utafiti uliotajwa hapo juu kama sehemu ya kukamilisha shahada yangu.

Sababu ya utafiti

Sababu ya utafiti huu ni kutaka kujua ukubwa wa tatizo la saratani ya utumbo mpana na njia ya haja kubwa na kutaka kujua ufahamu wa wagonjwa wanaofika kutibiwa katika kitengo cha wagonjwa wa nje katika hospitali ya taifa ya Muhimbili. Matokeo ya utafiti huu yatatumika katika kupanga mikakati ya kuongeza ufahamu wa watu kuhusu tatizo hili na njia za kufanya uchunguzi wa mara kwa mara wa saratani ya utumbo na njia ya haja kubwa

Wagonjwa wanaostahili watashirikishwa katika utafiti huu. Watahojiwa kwa kutumia dodoso ambayo itahusisha utambulisho wao na ufahamu wao kuhusu saratani ya utumbo na njia ya haja kubwa na pia ufahamu kuhusu huduma za uchunguzi. Watatakiwa kutoa choo kwa ajili ya uchunguzi na ikiwa kutakuwa na tatizo kwa kipimo cha choo, watatakiwa kupima kipimo kingine cha mpira kupitia njia ya haja kubwa (colonoscopy)

Madhara

Hakuna madhara yoyote inayotegemewa kwa kushiriki kwako katika utafiti huu.

Faida

Ikiwa utagundulika na saratani au viashiria vya saratani utatibiwa mapema kabla tatizo halijawa kubwa.

Usiri

Matokeo ya vipimo vyako havitatolewa kwa mtu yeyote isipokuwa kwa madaktari wanaokuhudumia na wewe mwenyewe.

Gharama

Hakuna malipo yoyote unayotakiwa kulipa kwa sababu ya ushiriki wako katika utafiti huu

Mtu wa kuwasiliana naye ikiwa una maswali au tatizo lingune lolote.

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Mimi…….nimesoma/nimeelezwa maelezo yote katika fomu na kuelewa vizuri na ninakubali kushiriki katika utafiti huu

Sahihi…….(Mshiriki), Date……

Sahihi……..(Mtafiti) Date……