# POST RADIOTHERAPY UTILIZATION OF PRIMARY HEALTHCARE AND ASSOCIATED FACTORS AMONG PROSTATE CANCER SURVIVORS.

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# POST RADIOTHERAPY UTILIZATION OF PRIMARY HEALTHCARE AND ASSOCIATED FACTORS AMONG PROSTATE CANCER SURVIVORS.

**BY**

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**A Dissertation Submitted in (Partial) Fulfilment of the Requirements for Master of Public Health of the Muhimbili University of Health and Allied Sciences.**

**October 2024**

## CERTIFICATION

The undersigned certifies that she has read and hereby recommends for acceptance by Muhimbili University of Health and Allied Sciences a dissertation entitled “Post Radiotherapy Utilization of Primary Healthcare and Associated Factors Among Prostate Cancer Survivors” in (partial) fulfilment for the requirement for Master of Public Health of Muhimbili University of Health and Allied Science.

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Professor Gideon Kwesigabo
(Supervisor)

Date: _____

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Dr Monica Shabani
(Co-Supervisor)

Date: _____

## DECLARATION

I, Rabson R Nakey, declare that this dissertation is my original work and that it has not been presented and will not be presented to any other university for a similar or any other degree award.

Signature: …… Date……..…

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# DEDICATION

To my dearest mother, the firm pillar of strength and love in my life, this thesis is dedicated. Your sacrifices, encouragement, and belief in me have lightened my path to this achievement. It is with deep gratitude and love that I honor you with this work.

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## LIST OF ABBREVIATION

| | |
|---|---|
| CNS | Central Nervous System |
| CT | Computed Tomography |
| ECG | Electrocardiogram |
| EEG | Electroencephalogram |
| EORTC | European Organisation for Research and Treatment of Cancer |
| GI | Gastro Intestinal |
| GP | General Practitioner |
| GU | Genital-Urinary |
| IBM | International Business Machines-corporation. |
| IRB | Institute of Review Board |
| LMICs | Low- and Middle-Income Countries. |
| MPH | Masters of Public Health |
| MRI | Magnetic Resonance Imaging |
| MUHAS | Muhimbili University of Health and Allied Sciences |
| OGD | Esophagogastroduodenoscopy |
| PCPs | Primary Care Provider |
| PHU | Primary Healthcare Utilization |
| PI | Principal investigator |
| PCS | Prostate Cancer Survivor |
| PSA | Prostate Specific Antigen |
| QLQ | Quality of Life Questionnaire |
| RT | Radiotherapy |
| SPSS | Statistical Package in Social Sciences. |
| TDHS | Tanzania Demographic and Health Survey |
| TNM | Tumour, Node, Metastasis |

## DEFINITION OF TERMS

**Primary healthcare** is a comprehensive approach to healthcare that considers the physical, emotional, and social elements of a person's health. Primary healthcare is critical for providing continuous assistance and monitoring to prostate cancer survivors including frequent check-ups, referrals to experts as required, and thorough care coordination. Primary healthcare practitioners that use a holistic approach may assist survivors in navigating the physical and emotional problems that come with a cancer diagnosis, thereby increasing their quality of life.

**Prostate cancer** is an uncontrolled proliferation of the prostate gland cells.

**Prostate cancer specialist leads follow-up care**: This refers to the medical care provided by the oncologist/urologist responsible for monitoring recurrence and the patient's progress and adjusting their treatment plan as needed.

**Shared follow-up care** refers to a collaborative approach to medical care, where the patient's care is jointly attended between consultants and PHC providers.

**Survivor** is a someone who has been diagnosed with cancer, has finished their treatment, and currently are on routine surveillance plan. In context of this study, it refers to prostate cancer patients who have completed radiotherapy are on surveillance plan at Besta Polyclinic.

**Radiotherapy** is the use of controlled ionising radiation to treat cancers. In this context, it is the standardized, computer-guided planning and administration of radiation to treat prostate cancer.

**Utilization of primary healthcare** refers to the act of seeking medical treatment from primary healthcare providers in specific district and community health facilities. In the context of this study, it entails the act of prostate cancer survivors visiting primary healthcare settings and getting primary healthcare services after completion of RT at Besta Super Specialized polyclinic.

**Post-radiotherapy** refers to the period and conditions following the completion of radiotherapy treatment. Radiotherapy is a medical treatment that uses high doses of radiation to kill cancer cells and shrink tumours. The post-radiotherapy phase involves monitoring and managing any side effects or complications that arise from the treatment, as well as ensuring the continued health and recovery of the patient. This period is crucial for assessing the

effectiveness of the treatment and providing necessary follow-up care to address any ongoing health issues.

## ABSTRACT

**Background**: Prostate cancer diagnoses have increased by 3% annually since 2014, with the disease representing 10.4% of reported cancer cases in Tanzania. Advances in treatment have raised the 5-year survival rate for early-stage prostate cancer to nearly 100%, with radiotherapy being essential for most patients. Survivorship care, including disease management and psychosocial support, is provided by specialized cancer centers and primary healthcare facilities, but information on primary care utilization for survivors in Tanzania is limited.

**Objective:** To determine the magnitude and factors associated with primary healthcare utilization (PHU) among prostate cancer survivors (PCS) treated at Besta Super Specialized Polyclinic from January 2021 to December 2023.

**Methodology:** A cross-sectional study was conducted at Besta Super Specialized Polyclinic to evaluate primary healthcare utilization (PHU) post-radiotherapy among prostate cancer survivors. Survivors who completed treatment between January 2021 and December 2023 were recruited through consecutive convenient sampling. Data were collected via questionnaires, medical registry retrieval, and telephone interviews. Analysis was performed using SPSS version 25, with bivariate analysis identifying variables ($p<0.25$) for inclusion in multivariable logistic regression to determine PHU predictors ($p<0.05$). Significant associations were found between PHU and various demographic and clinical factors.

**Result:** The study of 213 PCS (median age 70) found most were uneducated peasants, married/cohabiting, living rurally, and in stage III-IV on ADT. Common comorbidities included joint pain and hypertension, with fewer bowel symptoms. The PHU was found to be 147(69.0%). The PHU was found to be 147(69.0%) with the majority, 121(82.3%), reported visiting district hospital. Rural residence (AOR = 3.34, 95% CI [1.48, 7.57], p = 0.004), early-stage disease (AOR = 0.09, 95% CI [0.02, 0.47], p = 0.005), hypertension (AOR = 2.14, 95% CI [1.02, 4.48], p = 0.044), treatment symptoms (AOR = 4.75, 95% CI [2.16, 10.46], p = 0.001), and sexual symptoms (AOR = 5.44, 95% CI [2.44, 12.14], p = 0.001) remain significant.

**Conclusion**: The study has found 69% of the prostate cancer survivors utilize PHC. Factors such as rural residence, advanced disease stage, non-hypertension, and moderate treatment and sexual symptoms are associated with higher utilization of PHC. These insights emphasize the potential of PHU to alleviate the burden on overwhelmed specialized hospital by providing accessible and effective care for cancer survivors.

# CHAPTER ONE

## INTRODUCTION

### 1.1 Background

Globally, prostate cancer is the second most common male cancer (1). African men are at higher risk, and cases are rising in Africa and low- and middle-income countries (2). In Tanzania, prostate cancer is presently the leading cancer among males, with an estimated prevalence of 23.2% (3). Recent studies show that earlier detection and better treatment have increased prostate cancer incidence and decreased mortality (1,4). Prostate cancer survival has increased from 68% in the mid-1970s to 98% in 2011–2017 (5). Over 84% of prostate cancers are local or regional, with a 5-year survival rate near 100% (4). As this population grows, it is critical to identify the use healthcare services after active treatment for psychological and comorbidity conditions, as well as monitoring for recurrence and management of long-term and late side effects of treatment (6).

Surgery and radiation for prostate cancer may lead to physical impairments such as urinary incontinence, erectile dysfunction, and gastrointestinal issues (4,6). Over 95% of persons treated with surgery or radiation have sexual dysfunction, with more than 50% reporting urinary or bowel impairment (7). Hormonal treatment may lead to libido loss, hot flashes, nocturnal sweats, irritability, and gynecomastia. Furthermore, the high prevalence of prostate cancer in the elderly raises the likelihood of acquiring other comorbidities (6,8). Poorly managed cancer-related symptoms and comorbidities frequently result in worse quality of life and decreased adherence to follow-up therapy. As a result, a comprehensive care strategy at basic healthcare institutions may help manage these sequences while lowering the need for specialist treatment (6,9).

After completing initial treatment, cancer survivors receive follow-up care that includes regular check-ups and scans to monitor their health and detect any recurrence early. This care involves a multidisciplinary team providing physical, emotional, and psychological support, along with lifestyle guidance. PHC services offer regular monitoring, psychosocial support, health and wellbeing programs, personalized care plans, and symptom management to enhance survivors' quality of life. Regular communication with healthcare providers ensures any concerns are promptly addressed.

Cancer survivors have traditionally received follow-up treatment from cancer specialists, including medical oncologists, surgical oncologists, radiation oncologists, and urologists (10). Despite its popularity, regular medical reviews have little evidence of benefit since the chance of recurrence for many malignancies is minimal (11). As a result, standard follow-up often falls short of the larger aims of resolving cancer's medical and emotional implications, as well as care coordination across providers, leaving survivors with unmet needs (12). Furthermore, this paradigm of treatment cannot be maintained due to the rising number of survivors requiring sophisticated care, limited capacity in oncology and primary-care settings, and the need to manage costs with a growing focus on value-based care (10).

Cancer experts and general practitioners collaborate to offer follow-up care for cancer survivors (13). This model combines cancer-specific care with generalist care, including management of comorbid illness and preventive care (13,14). Shared care has been trialled for survivors of low to medium-risk prostate cancer, with no significant differences found for PSA testing adherence, quality of life, distress, and unmet needs (13,15–19). Patients prefer shared care, which also costs less per patient (19–22). Strong communication, clear roles, care coordination, follow-up guidelines, and survivorship care plans are the success factors for shared care (19–21).

According to research, follow-up treatment in Tanzania is mostly driven by oncologists and poorly coordinated between primary care and specialists, despite evidence suggesting primary care-led follow-up care is safer, more effective, and more acceptable than oncologist-led care (23). Furthermore, following active treatment, the hospital sends cancer survivors home with a follow-up plan. According to the Tanzania Ministry of Health, the suggested follow-up time is three months following treatment, followed by six months, one year, and three to five years, while continuing to utilize primary healthcare services for general health and other cancer-related issues. However, little is known about the factors that influence cancer survivors' use of primary healthcare, despite the fact that primary healthcare has the potential to provide follow-up services to cancer survivors, reducing the strain survivors place on already overburdened specialized institutions with active cancer patients.

## 1.2 Problem Statement

The growing population of prostate cancer survivors presents a challenge for healthcare systems, particularly in providing long-term follow-up care. These survivors have unique risks with up to 70% experiencing at least one treatment-related late effect and needs due to their age and associated comorbidities (25–27). While there has been considerable focus on identifying the most suitable providers for guideline-specific care, less attention has been given to optimizing the role of primary care, which is the most accessible source of care for most survivors. To improve care coordination, the use of detailed discharge summaries has been emphasized (18,27–30). These summaries provide comprehensive treatment histories and follow-up care recommendations, facilitating better communication and coordination among healthcare providers.

Despite advancements in care coordination, there is limited understanding of the factors influencing the utilization of primary healthcare services among prostate cancer survivor's post-treatment. Preliminary data from Besta Super Specialized Polyclinic in Tanzania indicates that only 19% of prostate cancer survivors have visited primary healthcare facilities at least once since completing radiotherapy. This low utilization rate highlights the need to study the factors affecting access to essential healthcare services, including socio-demographic factors, clinical characteristics, and systemic issues within the healthcare system.

The purpose of this study is to determine the magnitude of primary healthcare utilization among prostate cancer survivors and identify the associated factors among patients who have completed radiotherapy at Besta Super Specialized Polyclinic. This research aims to address the gaps in understanding and develop targeted interventions to improve healthcare access and outcomes for prostate cancer survivors.

### 1.3 Rationale of the study

This study aims to explore the factors that influence primary healthcare utilization among cancer survivors, focusing on identifying the specific barriers that hinder their access to essential services. By understanding these factors, the research seeks to provide a comprehensive analysis of the challenges faced by cancer survivors in accessing primary healthcare. This includes examining both systemic issues within the healthcare system and personal factors that may affect healthcare-seeking behavior.

The findings from this study will be instrumental for policymakers and healthcare providers. By offering detailed recommendations, the study aims to guide the development of targeted interventions that address the identified barriers. These recommendations will help in designing policies and healthcare programs that are tailored to the unique needs of cancer survivors, ultimately improving their access to primary healthcare services and enhancing their overall quality of life. This research is crucial for ensuring that cancer survivors receive the continuous and comprehensive care they need to maintain their health and well-being post-treatment.

### 1.4 Research question

#### 1.4.1 Broad research question

What are the magnitude and associated factors of post-radiotherapy primary healthcare utilization among prostate cancer survivors treated at Besta Super Specialized Polyclinic from January 2021 to December 2023?

#### 1.4.2 Specific research questions

1. What is the magnitude post radiotherapy PHU among PCS treated at Besta Super Specialized Polyclinic from January 2021 to December 2023?
2. What are the social demographic characteristics associated with post radiotherapy PHU among PCS treated at Besta Super Specialized Polyclinic from January 2021 to December 2023?
3. What are the clinical characteristics associated with post radiotherapy PHU among PCS treated at Besta Super Specialized Polyclinic from January 2021 to December 2023?

## 1.5 Objective

### 1.5.1 Broad objective

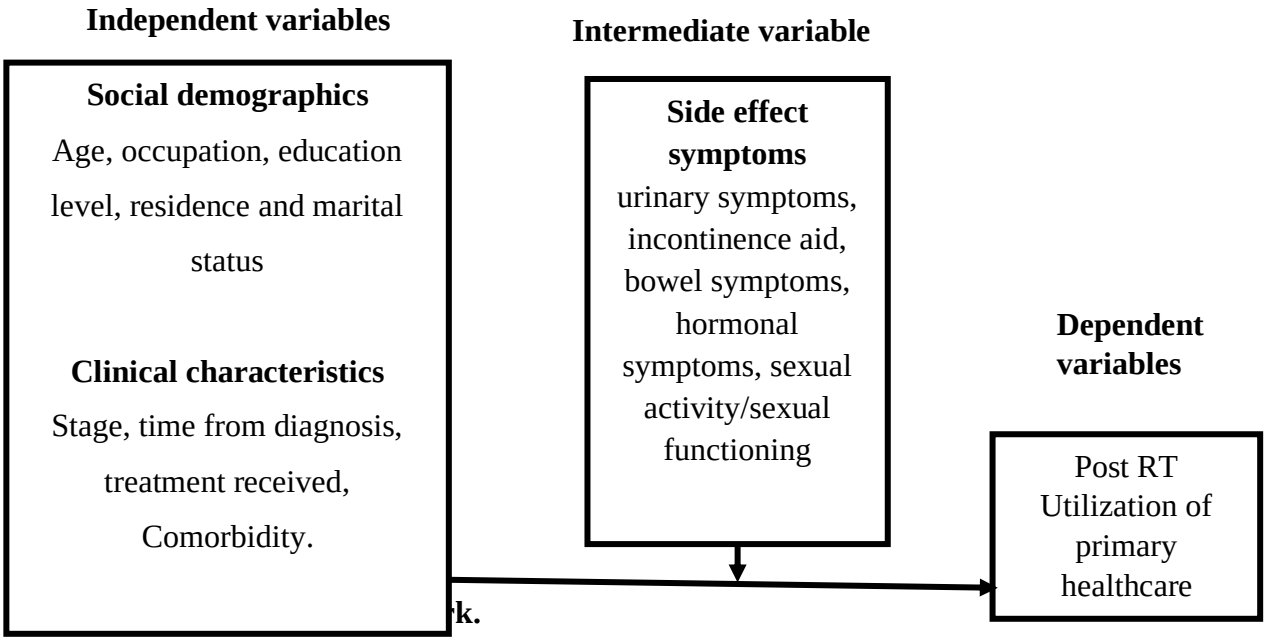
**To determine the magnitude and associated factors of post-radiotherapy primary healthcare utilization among prostate cancer survivors treated at Besta Super Specialized Polyclinic from January 2021 to December 2023.**

### 1.5.2 Specific objectives

1. To describe post radiotherapy PHU among PCS treated at Besta Super Specialized Polyclinic from January 2021 to December 2023.
2. To determine social demographic characteristics associated with post radiotherapy PHU among PCS treated at Besta Super Specialized Polyclinic from January 2021 to December 2023.
3. To identify clinical characteristics associated with post radiotherapy PHU among PCS treated at Besta Super Specialized Polyclinic from January 2021 to December 2023.

### 1.6 Conceptual Framework

Factors influencing primary healthcare usage among cancer survivors include age, comorbidity, treatment modalities, income, insurance status, education, race, illness stage, and cancer stage. Age is consistently related with greater primary healthcare usage among prostate and breast cancer survivors, while the degree of the connection varies by study. Common comorbidities among cancer survivors include hypertension, hyperlipidaemia, osteoarthritis, hypothyroidism, diabetes, and coronary artery disease. Patients undergoing radiation or testosterone deprivation treatment had considerably more primary care consultations. Income and insurance status are major determinants of primary healthcare utilization, with varied strengths and statistical significance. Education correlates positively with primary healthcare utilization among cancer survivors. Primary healthcare use correlates with both illness and cancer stage. Survivors with a recurrent history and frequent follow-up are less likely to consult a primary care physician (PCP), but those with greater symptoms and a perceived high level of care are more likely. Primary health care utilization increases dramatically 2-5 years following cancer diagnosis, particularly in younger individuals without a chronic condition.




**k.**

**SOURCE: Constructed from empirical literature review.**

# CHAPTER TWO

## LITERATURE REVIEW

### 2.0 Overview

Prostate cancer is a prevalent cancer among men worldwide, particularly among African-Americans, due to social, environmental, and genetic factors (1,3). It is the second most common malignancy in males and the sixth leading cause of cancer mortality in men (1,2). Survival rates have improved, with a 5-year survival rate approaching 100% for most cases diagnosed at local or regional stages (4–6). However, treatments like surgery, radiation, and hormone therapy can lead to physical impairments (4,6–9). Survivorship care is crucial in cancer care, providing support, symptom management, health promotion advice, and referrals (10–12). Traditional follow-up care led by specialists has shown limited evidence of benefit, leaving survivors with unmet needs and inadequate responses to address the medical and psychosocial consequences of cancer (10–12). Three alternative models of care have emerged: general practitioner-led care, shared care between general practitioners and cancer specialists, and oncology nurse-led care. Nurse-led care is less costly and effective in addressing symptom management and health promotion needs, while general practitioner-led care is cheaper and more accessible (21). Shared care is preferred by patients with low to medium-risk prostate cancer, but there is limited evidence on its post-treatment survivorship phase (22).

The number of cancer survivors is growing in low- and middle-income countries, yet providing excellent survivorship care in resource-constrained environments remains difficult (3,4). Most survival research and national cancer control initiatives originate from high-income nations. More data is required to promote survivorship care globally; more nations should concentrate on survivorship care; resource-specific recommendations should be produced; and regional collaborations should be formed to improve palliative care access and delivery.

### 2.1 Utilization of primary Healthcare among survivors

Roorda et al. (2013) found that 57% of patients visited general practitioners for primary healthcare. Patients preferrzd annual visits or a schedule with decreasing frequency over time and follow-up for more than ten years, including lifelong follow-up (31). Forsythe et al. (2014) found that 71.2% of non-Hodgkin lymphoma survivors had seen a PCP within a year of diagnosis (32). According to Smith et al. (2013), most survivors of cancer for a long time prefer joint care between PCPs and oncologists for cancer follow-up and subsequent screening, as well as PCP-led preventive health and comorbid condition treatment (33). Nyarko et al. (2015) investigated cancer survivors' perceptions on how primary care doctors offer survivorship care (34). The total PCP-delivered survival care received a 60% rating from 352 respondents. Survivors were less likely to see their PCPs as competent about cancer follow-up, the late or long-term consequences of cancer therapy, and the diagnosis and management of cancer-related illnesses (34). According to Chait et al. (1998), most patients consulted with their GP at least once during the year after discharge (35). The change in consultation rates in the year following patients' discharge was non-significant. One patient returned to the clinic with cancer-related morbidity (35). In a study by Kenzie et al. (2019), healthcare utilisation was measured among breast, prostate, and colorectal cancer survivors (age >40 years) (24). The study found that >80% of patients received medication for a health condition, and less than 20% of survivors needed a visit for a cancer-related problem in the past 12 months (24). The majority of survivors visited a primary care physician (PCP) for non-cancer-related issues (24). Krebs et al. (2012) found that 97.3% of participants described devising a routine physical exam with a primary care provider in the past year (36). Potosky et al. (2011) evaluated the knowledge, attitudes, and behaviors of primary care physicians and oncologists about follow-up care for breast and colon cancer survivors (37). They discovered that oncologists were less likely than PCPs to feel that PCPs had the abilities to do proper tests for breast cancer recurrence (37).

Dahlhaus et al. conducted interviews with 30 German GPs using purposeful sampling in a study (38). The study found that GPs can play a significant role in accompanying cancer patients throughout their care process. Moreover, shared care models should complement primary and specialist care (38). However, the evidence supporting the use of primary healthcare by cancer survivors in low- and middle-income countries is limited.

**2.2 Social demographic factors associated with Primary healthcare utilisation**

Primary healthcare utilisation among cancer survivors has been the subject of several studies. These studies have looked at various factors that influence primary healthcare use among cancer survivors, including age, income, insurance status, education, and race.

The studies (31,33,39–41) consistently show that age is associated with increased primary healthcare use among prostate and breast cancer survivors. The strength of the association varies between studies but is generally moderate to strong (OR range: 1.03-1.12).

Income and insurance status are common factors influencing primary healthcare use (14,42,43). all reported that income was associated with primary healthcare use, with varying strength measures and statistical significance. Insurance status was also found to be a common factor associated with primary healthcare use (14,42,43). Employment status and socioeconomic status (42) are additional factors influencing primary healthcare utilization among cancer survivors.

The studies conducted by Park et al. in 2016, Kent et al. in 2017, and Xu et al. in 2018 all found a positive association between education and primary healthcare use among cancer survivors (14,44,45). The strength of association ranged from OR=1.20 to OR=1.43, with corresponding p-values ranging from p=0.004 to p=0.01. Xu et al., 2018, conducted a systematic and meta-analysis study that determined the Utilization of primary care by breast cancer survivors in China (44). The associated overall primary healthcare use factors were marital status (OR=1.26, p=0.04) (44).

An study of 53 research including 20,832 patients with 12 forms of cancer in 15 different countries, mostly in Europe, North America, and Australia, in either a hospital or general practice setting discovered that the healthcare system had a considerable impact on the use of healthcare (46). Similarly, O'Brien et al. (2016) did a comprehensive study in Ireland and showed that the healthcare system factor had a substantial impact on the use of primary healthcare among prostate cancer survivors (47).

Heins et al. (2012) noted that primary health care (PHC) utilization increases considerably 2 to 5 years following cancer diagnosis, particularly in younger individuals without a chronic condition (41). The research, which utilized data from the Netherlands Information Network of Primary Care, compared the volume of PHC use in cancer survivors to age- and gender-matched cancer-free controls from the same practice. The researchers concluded that PCPs should prepare themselves for the growing quantity of aftercare, given the predicted rise in cancer survivors.

### 2.3 Clinical characteristics associated with Primary healthcare utilisation

Several studies have investigated the association between comorbidity and primary healthcare use among prostate cancer survivors. The results indicate that higher comorbidity is consistently associated with increased Utilization of primary health care. The strength of the association varies slightly across studies, with OR between 1.49 to 2.35 ($p<0.001$) (41,48–50). According to Roy et al. (2018), in a comparative case control research, the most prevalent linked comorbid disorders among cancer survivors include hypertension, hyperglycaemia, osteoarthritis, hypothyroidism, diabetes mellitus, and coronary artery disease (51). Cancer survivors are less likely to develop osteoarthritis than cancer patients. Other comorbid conditions are distributed similarly amongst the two groups.

Studies that have conducted systematic reviews and clinical trials have revealed interesting insights into the healthcare utilization patterns of prostate cancer survivors (4,7,9,24). These studies highlight how the type of treatment received by survivors can impact their use of primary healthcare services (4,24). The studies found that patients who received radiotherapy or androgen deprivation therapy (7,9) had significantly more primary care consultations. However, the association between treatment type and primary care use varied across studies. While some studies showed increased use among patients who received radiotherapy or androgen deprivation therapy, others found no statistically significant association. Overall, the pattern and strength of association between treatment type and primary care use among prostate cancer survivors are still unclear and require further investigation.

According to Miller et al. 2022, primary healthcare utilization among breast cancer survivors is associated with both disease stage and cancer stage (4). Xu et al. 2018 found that disease stage had a statistically significant association with primary healthcare utilization in China, with an odds ratio of 1.20. Meanwhile other study found that the cancer stage was also statistically significantly associated with primary healthcare utilization in Korea, with an odds ratio of 1.37 (52). These findings suggest cancer survivors with more advanced disease or cancer stages are more likely to utilize primary healthcare services.

### 2.4 Summary of literature

Several studies have explored the factors influencing primary healthcare utilisation among cancer survivors, with age, comorbidity, treatment types, income, insurance status, education, race, disease stage, and cancer stage being the most commonly investigated factors. However, there is limited research on primary healthcare utilisation among cancer survivors in Tanzania, which is a low-income country with a high burden of cancer. Given Tanzania's unique

sociodemographic and economic context, further research is needed to understand the factors that influence primary healthcare utilisation among cancer survivors and develop effective interventions to improve their access to primary healthcare services.

# CHAPTER THREE

# METHODOLOGY

## 3.1 Study design

The study was a quantitative analytical cross-sectional design, conducted at Besta Super Specialized Polyclinic with primary and secondary data collection. A cross-sectional design was chosen for this study because it allows for the collection and analysis of data at a single point in time, providing a snapshot of the current situation. This design is particularly useful for determining the prevalence of post-radiotherapy primary healthcare utilization among prostate cancer survivors and identifying associations between various social demographic and clinical characteristics. Additionally, cross-sectional studies are generally quicker and less expensive to conduct compared to longitudinal studies, making them suitable for studies with limited time and resources. It also facilitates the simultaneous collection of primary and secondary data, offering a comprehensive overview of the factors influencing healthcare utilization**.**

## 3.2 Study setting

The study was conducted at Besta Super Specialized Polyclinic. Besta Super Specialized Polyclinic, located at Plot No 122, Tunisia Road in Kinondoni Municipality, Dar es Salaam, is a therapeutic wing of Besta Diagnostic Company Limited. Besta Diagnostic Company Limited was registered and began operations in 2012 as a diagnostic center and later, in 2016, expanded to offer cancer treatments such as chemotherapy and radiotherapy. The center provides a range of diagnostic services, such as X-rays, CT scans, MRI, endoscopy, colonoscopy, ultrasound, EEG, ECG, and a general clinical laboratory. Additionally, the center offers clinical services such as oncology clinics, physiotherapy, orthopaedics, neurosurgery, paediatrics, and general outpatient care. The oncology services provided include radiotherapy and chemotherapy. The center receives oncology referrals from major hospitals for patients requiring radiotherapy. It was the first in the country to introduce the use of 3D radiotherapy with the Shinva XHA600D 6MV Linear Accelerator. Since 2020, it has treated an average of 540 cancer patients annually with radiotherapy as outpatients, with nearly 55% being prostate cancer cases. After completing the radiotherapy course, patients are referred back to the referral hospital; however, nearly 65% prefer to do their follow-up at the center. The clinic also offers post-treatment follow-up and psychological support through telephone calls to discharged patients. Besta

Super Specialized Polyclinic is one of the top-performing private oncology centers in Tanzania, known for its advanced cancer therapies. Studying the population of patients treated at this center is crucial for enhancing cancer services nationwide, as it provides valuable insights into the effectiveness of cutting-edge treatments and patient care practices.

### 3.3 Target population

The target population was a prostate cancer survivor in Tanzania.

### 3.4 Study population

The study population consisted of prostate cancer survivors who attended routine follow-up appointments at Besta Super Specialised Polyclinic from January 2021 to December 2023.

### 3.5 Eligibility criteria

#### 3.5.1 Inclusion

The study included prostate cancer survivors who met the following criteria:

i. Patients who received radiotherapy between January 2021 and December 2023.
ii. Patients who were on follow-up at Besta Super Specialized Polyclinic.
iii. Patients who were reachable through telephone calls.
iv. Patients with complete medical records and information.

#### 3.5.2 Exclusion

Prostate cancer survivors who developed recurrences, metastasis or secondary malignancies, Prostate cancer survivors who received radiotherapy as neoadjuvant or palliative treatment.

### 3.6 Sample Size Projection

The study aimed to analyze prostate cancer survivors previously treated with radiotherapy at Besta Polyclinic from January 2021 to December 2023. Out of the 919 prostate cancer patients treated during this period, a sample of 213 who were eligible were selected for the study.

### 3.7 Sampling technique

All prostate cancer survivors who satisfied the inclusion and exclusion criteria from January 2021 to December 2023 were included in the study, as shown in figure 2.

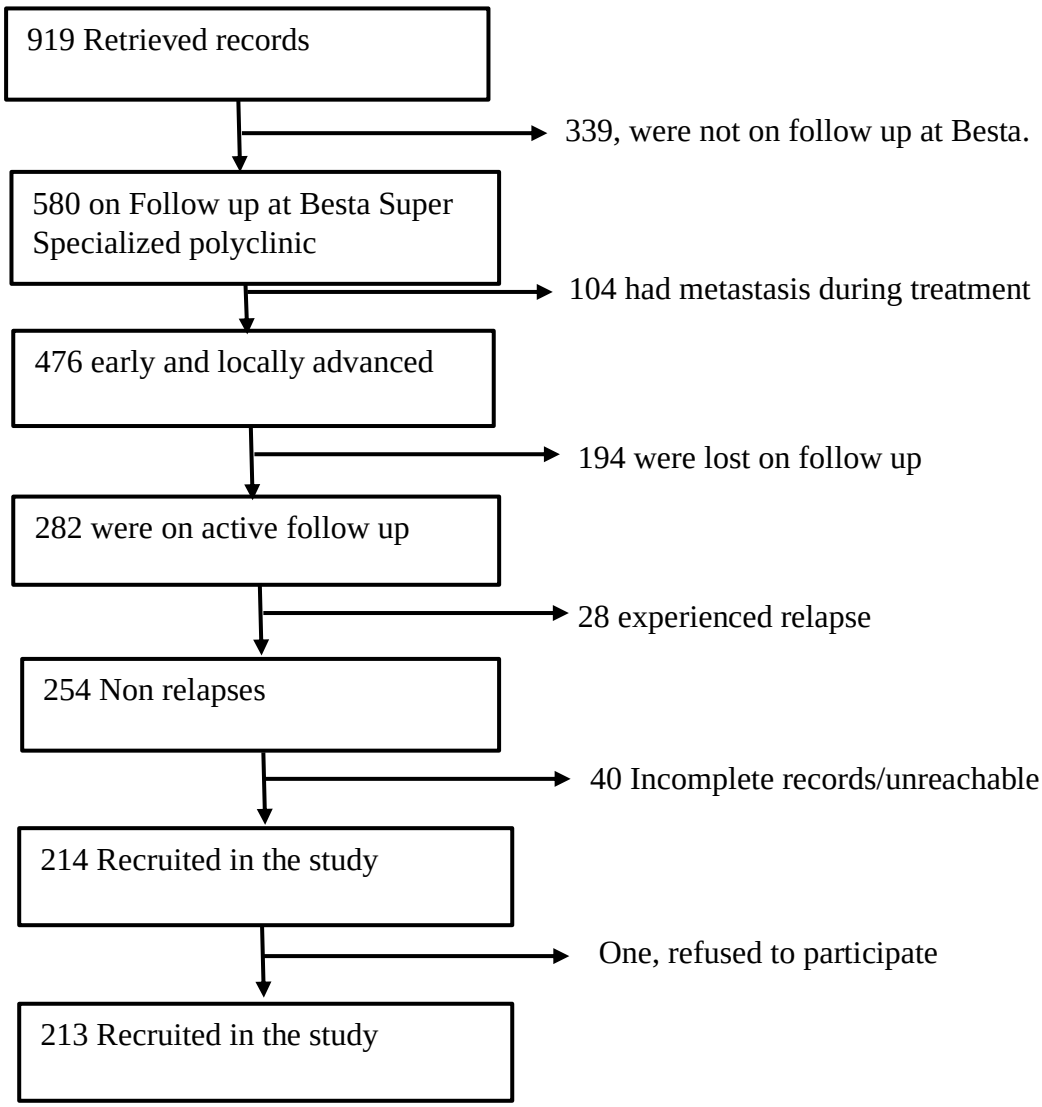



**Figure 2: Participants selection process.**

### 3.8 Study Variables

#### 3.8.1 Outcome variable

Utilization of PHC.

#### 3.8.2 Predictors variable.

**Social demographic**: Age, marital status, education level, and occupation.

**Clinical characteristics**: treatment received, duration since diagnosis, disease stage, comorbidity and treatment related side effects symptom.

### 3.9 Questionnaire.

The questionnaire comprised three sections: demographics, clinical variables, and PHC utilization questions. It was developed after reviewing studies on care continuity among cancer survivors. The study collected information on social demographics (age, education, marital status, and occupation) and clinical characteristics (treatments, duration since diagnosis, comorbidity, and tumour stage) from medical records. Patients self-reported their primary healthcare visits in the past six months. Treatment side effects were evaluated using a standardized questionnaire called European Organisation for Research and Treatment of Cancer Quality of Life Questionnaire - Prostate (EORTC QLQ PR-25) (56), which covered urinary symptoms, bowel symptoms, treatment symptoms, sexual activity, and sexual functioning.

### 3.10 Validity and reliability of the questionnaire

The study utilized a questionnaire that incorporated single questions, which inquired about participants' visitation to primary healthcare. This single-question construct, focusing on healthcare visitation post-active treatment, has demonstrated stability in many studies (7,31,47,55).

Additionally, the EORTC QLQ PR-25, which assesses symptoms specific to prostate cancer post-treatment, was adapted for this study. The EORTC QLQ-25 has been validated across diverse backgrounds and is available in multiple languages, including Swahili. Its widespread use in similar settings with minimal modifications underscores its reliability and applicability.

The single question and other items, which asked participants about their preference for increased primary healthcare visitation and specific primary healthcare information, were translated into Swahili and back-translated into English by the principal researcher. This translation process was reviewed by the study supervisor, co-supervisor, and the MUHAS-IRB reviewers.

To assess the reliability of a single question regarding primary healthcare utilization, a principal researcher conducted a pre-test among 29 pelvic malignancy survivors with relatively similar post-radiotherapy side effects. The pre-test included five prostate cancer survivors, 16 colorectal male survivors, and three male bladder cancer survivors under follow-up at Besta Super Specialized Polyclinic. The principal researcher telephoned the survivors one week before their scheduled follow-up, inquiring about their primary healthcare usage with a single question. A week later, during their scheduled follow-up and normal consultation, the

consultant administered the same question regarding their experience with primary healthcare utilization, and their responses were recorded. Subsequently, the principal researcher collected this information from the consultant. The test-retest of the pre-test showed a Cohen kappa of 0.97, indicating almost perfect agreement.

### 3.11 Data Collection Process

The data collection process began in early May 2024 after obtaining an ethical clearance letter from the Institute of Ethical Committee and Review Board (IRB) of MUHAS.

The researcher recruited and trained one research assistant, who was a registered nurse working at Besta Polyclinic. The research assistant's role involved collecting data from participants through telephone calls and subsequent data entry.

This study involved secondary data collection as medical records were reviewed for retrieving demographics and clinical characteristics of the participants while primary data collection inquired information regarding primary healthcare use, self-reported symptoms, and additional demographic information's.

Selected survivors were contacted and informed about the study's purpose, potential participation, risks and benefits, and the voluntary nature of participation or withdrawal from the study. Verbal informed consent was obtained, and detailed documentation was prepared. During the phone interviews, survivors were asked if they had visited primary healthcare after completing radiotherapy, the reasons for their visits, and the level of primary healthcare they accessed, such as dispensaries, healthcare centers, or hospitals. They were also asked about their experiences with treatment-related symptoms.

Researchers complemented the questionnaire by retrieving patient demographic characteristics and clinical information from hospital medical records. This information included age, marital status, education level, occupation, cancer stage, treatment modality, comorbidities and symptoms related questions.

The study's PI collected data through phone interviews and document reviews, obtained verbal informed consent, and ensured the confidentiality of data and participants' privacy.

### 3.12 Data management

The filled questionnaires were primarily entered into an Excel file on the evening following data collection. The PI cross-checked both the questionnaires and the Excel file to ensure that the information tallied and to identify any errors in collection and entry. The completely filled questionnaires were stored in a locked cabinet, while the Excel and later SPSS files were stored in a password-protected folder on the PI's personal computer, which was equipped with a strong firewall and Windows Defender.

### 3.13 Data analysis

The data were analyzed using SPSS Statistics for Windows, Version 25.0 (IBM SPSS Statistics for Windows, Version 25.0). Armonk, NY: IBM Corporation.

The SPSS data was cleaned to remove any missing data, forgotten entries, duplicate entries, and incorrect entries. The variables in the cleaned SPSS file were recoded to reflect the distribution of data frequencies. Variables such as occupations, education level, marital status, comorbidities, clinical features, and symptoms in the cleaned SPSS version were recoded based on the group frequency distribution. Continuous variables such as age were summarised as median and range (maximum-minimum) based on the distribution. Tables, figures, charts, and texts were utilized to show the summary of descriptive statistics.

A chi-square test was used to compare prostate cancer survivors based on their utilization of primary care among different groups of independent variables. Statistical group differences with a p-value $\leq 0.25$ were considered eligible for inclusion in the multivariable logistic regression analysis. Multivariable logistic regression analyses were run to examine the independent association between PHC utilization (yes or no) as the dependent variable and a priori determined independent variables: demographic and clinical characteristics (i.e., age, marital status, educational level, number of comorbid conditions, primary treatment, and duration since diagnosis), and symptoms. The variables were added to the model in two stages: first, social demographic and clinical parameters (block A), and then symptoms (block B) were included. The goal of including variables in the model in different phases was to better understand the additional impacts of block B's variable sets. Statistical significance was defined as $p \leq 0.05$, and 95% confidence intervals were reported appropriately.

### 3.14 Ethical consideration

The ethical clearance was acquired from the ethical committee and the institute of the review board of MUHAS following a thorough examination of the thesis proposal and the appropriate resolution of the reviewer's remarks. Approval was requested from the Besta Super Specialized Polyclinic administration through a letter, along with the MUHAS IRB's clearance and the study protocol. Prior to recruitment, consent for participation was obtained by providing an explanation of the study's objective, benefits, potential risks, and the voluntary nature of participation (see Appendix I). The participants' identifiers, such as their names and clinic registration numbers, were indexed. Additionally, the questionnaire was securely stored in the cabinet located in consultation room four at Besta Super Specialized Polyclinic. The keys to the cabinet were retained by the PI. The data from Excel and SPSS were stored in a password-protected folder on the PI's own computer, which had a robust firewall and Windows Defender. At the conclusion of the research project, the data were provided to MUHAS in accordance with the rules of the MUHAS library repository.

### 3.15 Dissemination plan

The results were presented to department of epidemiology and biostatistics in the School of Public Health in June 4 2024. Upon successfully defending and submitting an error-free document and manuscript as part of the requirements for the MPH degree, the manuscript will be sent to a peer-reviewed journal for publication.

# CHAPTER FOUR

## RESULTS

### 4.0 Social demographics and clinical profile of the study participants.

Median age was 70 years and range was 36 (minimum = 51 and maximum = 87). Table 1 provides the social demographic characteristics of the study participants. The majority of participants were aged between 70-79 years 85 (39.9%), with a significant portion also in the 60-69 age group 70 (32.9%). Most participants had a non-primary education level 171 (80.3%). The predominant occupation among participants was peasantry 118 (55.4%). A large majority of the participants were married or cohabiting 188 (88.3%), and most resided in rural areas 132 (62.0%). **All participants received radiotherapy**.

**Table 1: Participants Social Demographic characteristics [N=213].**

| VARIABLES | N(%) |
|---|---|
| **Age** | |
| 50-59 | 34 (16.0) |
| 60-69 | 70 (32.9) |
| 70-79 | 85 (39.9) |
| 80+ | 24 (11.3) |
| **Education level** | |
| No formal/primary education | 171 (80.3) |
| Secondary/college/higher education | 42 (19.7) |
| **Occupation** | |
| Retired | 33 (15.5) |
| Peasants | 118 (55.4) |
| Unemployed | 62 (29.1) |
| **Marital status** | |
| Married/cohabiting | 188 (88.3) |
| Single/widowed/divorced | 25 (11.7) |
| **Residence** | |
| Rural | 132 (62.0) |
| Township/urban | 81 (38.0) |

Table 2 provides the clinical characteristics of the study participants. The majority of participants were in Stage III-IV 171 (80.3%) of their condition. A significant portion of the participants did not undergo surgery 160 (75.1%), while a large majority received androgen deprivation therapy (ADT) 159 (74.6%). Chemotherapy was administered to 39.0% of the participants. Hypertension was present in 38.0% of the participants, and 16.0% had diabetes. Notably, 70.9% of the participants reported experiencing back joint pain, and 14.6% were HIV positive. The duration since diagnosis varied, with 47.4% of participants having been diagnosed for two years.

**Table 2: Clinical characteristics of the study participants [ N = 213].**

| VARIABLES | N(%) |
|---|---|
| **Stage** | |
| I-II | 42 (19.7) |
| III-IV | 171 (80.3) |
| **Surgery** | |
| Yes | 53 (24.9) |
| No | 160 (75.1) |
| **ADT** | |
| Yes | 159 (74.6) |
| No | 54 (25.4) |
| **Chemo** | |
| Yes | 83 (39.0) |
| No | 130 (61.0) |
| **Hypertension** | |
| No | 132 (62.0) |
| Yes | 81 (38.0) |
| **Diabetics** | |
| No | 179 (84.0) |
| Yes | 34 (16.0) |
| **Back joint pain** | |
| No | 62 (29.1) |
| Yes | 151 (70.9) |
| **HIV** | |
| No | 182 (85.4) |
| Yes | 31 (14.6) |
| **Duration since diagnosis (years)** | |
| 1 | 67 (31.5) |
| 2 | 101 (47.4) |
| 3 | 45 (21.1) |

**Figure 3, Most study participants reported less severe bowel symptom. Urinary, treatment related, and sexual symptoms were severe among by large proportion of the participants.**

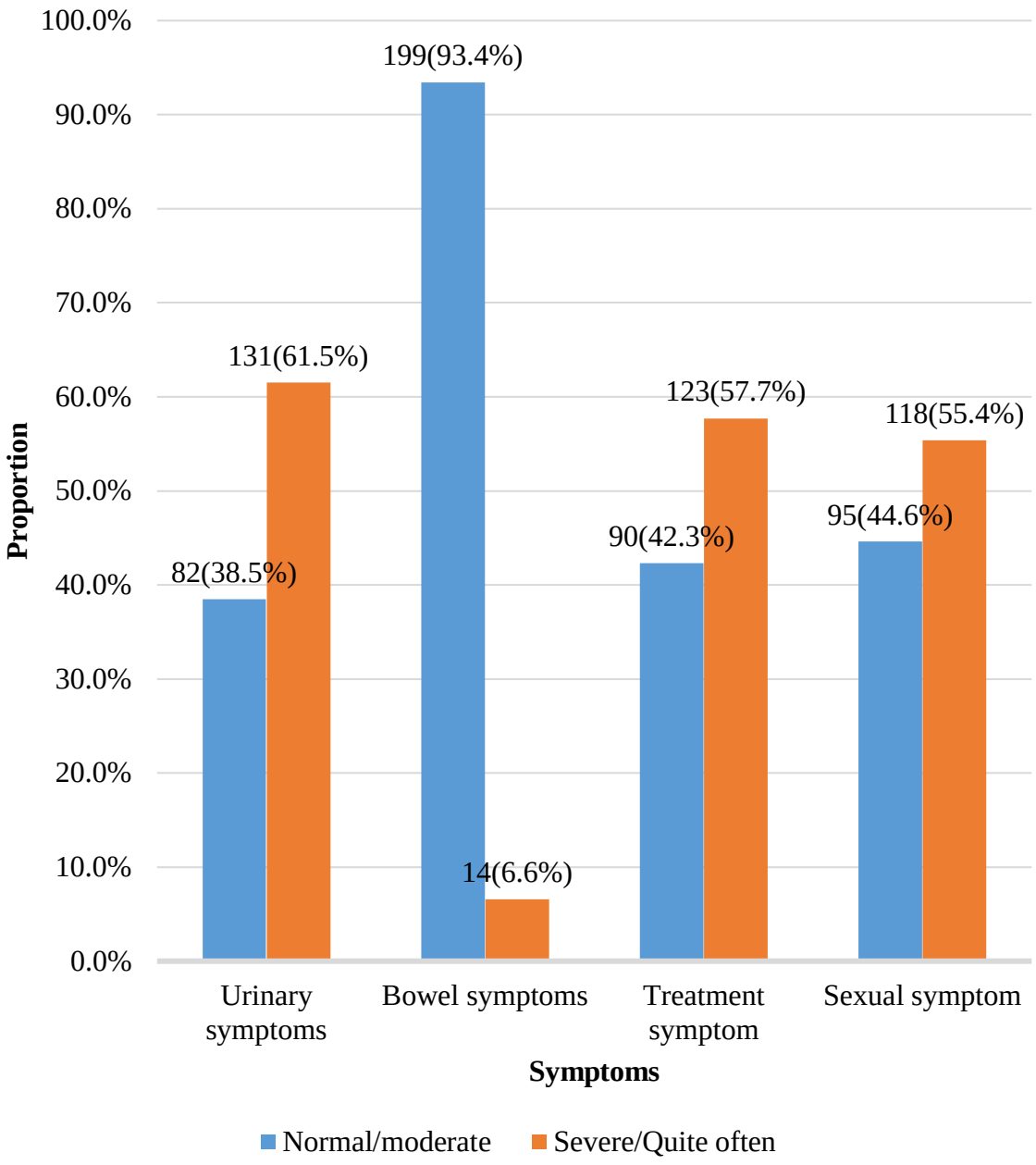



**Figure 3: Participants self-reported cancer and treatment related symptoms.**

### 4.1 Self-reported utilization of primary healthcare among prostate cancer survivors

Of the study participants, 147(69.0%) report to have been visiting primary healthcare. Most of these, 121 (82.3%) reported to have been visiting the district hospitals, Fig. 3.

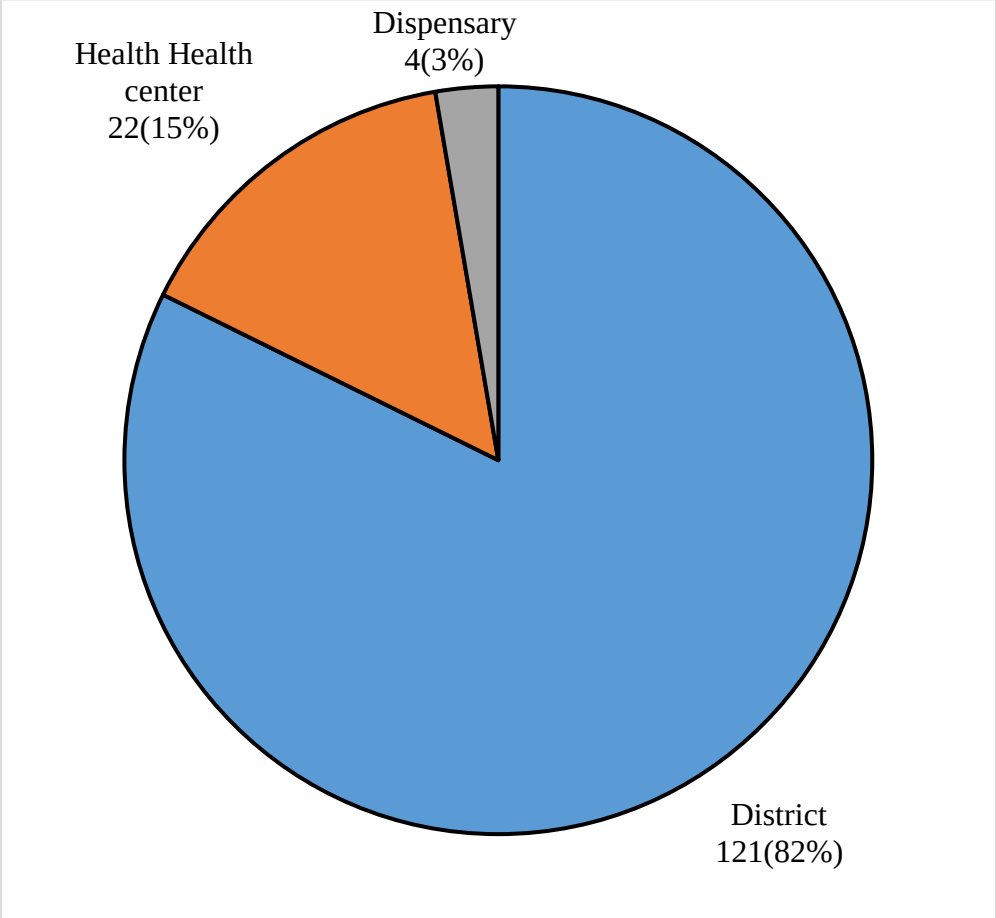



**Figure 4: Primary Healthcare Utilization among Prostate Cancer Survivors [N=213].**

### 4.2 Bivariate analyses of the social demographic characteristics associated with primary Healthcare use among prostate cancer survivors.

Table 3 examines the significant differences among demographic variables in PHC use. The analysis revealed significant differences for occupation and residence. Specifically, retired individuals (75.8%) and peasants (75.4%) had higher utilization rates compared to the unemployed (53.2%), with a p-value of 0.006. Additionally, those residing in townships or urban areas (81.5%) utilized PHC services more than those in rural areas (61.4%), with a p-value of 0.002.

**Table 3: Bivariate analysis of social demographic characteristics of PC survivors and PHU.**

| | PRIMARY HEALTHCARE UTILIZATION | | |
|---|---|---|---|
| **VARIABLES** | **Yes[N(%)]** | **No[N(%)]** | **p-value** |
| **Age** | | | 0.258 |
| 50-59 | 19 (55.9) | 15 (44.1) | |
| 60-69 | 49 (70.0) | 21 (30.0) | |
| 70-79 | 60 (70.6) | 25 (29.4) | |
| 80+ | 19 (79.2) | 5 (20.8) | |
| **Education** | | | 0.453 |
| Non/primary | 116 (67.8) | 55 (32.2) | |
| Sec/col/He | 31 (73.8) | 11 (26.2) | |
| **Occupation** | | | .006* |
| Retired | 25 (75.8) | 8 (24.2) | |
| Peasants | 89 (75.4) | 29 (24.6) | |
| Unemployed | 33 (53.2) | 29 (46.8) | |
| **Marital status** | | | 0.421 |
| Married/cohabiting | 128 (68.1) | 60 (31.9) | |
| Single/widowed/divorced | 19 (76.0) | 6 (24.0) | |
| **Residence** | | | .002* |
| Rural | 81 (61.4) | 51 (38.6) | |
| Township | 66 (81.5) | 15 (18.5) | |

*$p$-value <0.25

### 4.3 Bivariate analyses of the clinical characteristics that independently associated with primary healthcare utilization among prostate cancer survivors.

Table 4 examines the significant differences among clinical variables in PHC use.

All patients (100%) with stage I-II reported visiting PHC, compared to 61.4% of patients in stages III-IV ($p = .0001$). Patients receiving ADT utilized PHC at a rate of 64.8%, compared to 81.5% for those not receiving ADT ($p = .022$). Patients without hypertension utilized PHC (75.8%), compared to 58.0% for those with hypertension ($p = .007$). Patients with normal/moderate urinary symptoms utilized PHC at a rate of 80.5%, compared to 61.8% for those with severe/quite often symptoms ($p = .004$). Patients with normal/moderate treatment symptoms utilized PHC at a rate of 55.6%, compared to 78.9% for those with severe/quite often symptoms ($p = .0001$). Patients with normal/moderate sexual activity symptoms utilized PHC at a rate of 55.8%, compared to 79.7% for those with severe/quite often symptoms ($p = .0001$).

**Table 4: Bivariate analysis of the clinical characteristics of the PC survivors with PHU.**

| | PRIMARY HEALTHCARE UTILIZATION | | |
|---|---|---|---|
| **VARIABLES** | **Yes[N(%)]** | **No[N(%)]** | **p-value** |
| **Stage** | | | .0001* |
| I-II | 42 (100.0) | 0 (0.0) | |
| III-IV | 105 (61.4) | 66 (38.6) | |
| **Surgery** | | | 0.885 |
| Yes | 37 (69.8) | (30.2) 16 | |
| No | 110 (68.8) | 50 (31.3) | |
| **ADT** | | | .022* |
| Yes | 103 (64.8) | 56 (35.2) | |
| No | 44 (81.5) | 10 (18.5) | |
| **Chemo** | | | 0.932 |
| Yes | 57 (68.7) | 26 (31.3) | |
| No | 90 (69.2) | 40 (30.8) | |
| **Hypertension** | | | .007* |
| No | 100 (75.8) | 32 (24.2) | |
| Yes | 47 (58.0) | 34 (42.0) | |
| **Diabetics** | | | 0.305 |
| No | 121 (67.6) | 58 (32.4) | |
| Yes | 26 (76.5) | 8 (23.5) | |
| **Back/Joint pain** | | | 0.118* |
| No | 38 (61.3) | 24 (38.7) | |
| Yes | 109 (72.2) | 42 (27.8) | |
| **HIV** | | | 0.314 |
| No | 128 (70.3) | 54 (29.7) | |
| Yes | 19 (61.3) | 12 (38.7) | |
| **Duration since diagnosis** | | | 0.531 |
| One year | 48 (71.6) | 19 (28.4) | |
| Two years | 71 (70.3) | 30 (29.7) | |
| Three years | 28 (62.2) | 17 (37.8) | |
| **Urinary Symptoms** | | | .004* |
| Normal/moderate | 66 (80.5) | 16 (19.5) | |
| Severe/Quite often | 81 (61.8) | 50 (38.2) | |
| **Bowel Symptoms** | | | .840 |
| Normal/moderate | 137 (68.8) | 62 (31.2) | |
| Severe/Quite often | 10 (71.4) | 4 (28.6) | |
| **Treatment Symptoms** | | | .0001* |
| Normal/moderate | 50 (55.6) | 40 (44.4) | |
| Severe/Quite often | 97 (78.9) | 26 (21.1) | |
| **Sexual Activity symptoms** | | | .0001* |
| Normal/moderate | 53 (55.8) | 42 (44.2) | |
| Severe/Quite often | 94 (79.7) | 24 (20.3) | |

*p-value <0.25

**Multivariable logistic regression**

Occupation, residence, stage of disease, ADT, HT, back/joint pain, urinary symptoms, treatment symptoms, and sexual symptoms were entered in multivariable logistic regression. Hierarchical logistic regression was run according to the conceptual framework of this study. In the initial model (Baseline Model-Block A), Occupation, residence, stage of disease, ADT, HT, and back/joint pain were entered. And model accuracy and fit were assessed.

In the first model, without symptoms, the analysis shows that rural residence (AOR = 3.02, 95% CI [1.47, 6.19], p = 0.003), early-stage disease (Stage I-II) (AOR = 0.08, 95% CI [0.02, 0.43], p = 0.003), and Non-hypertension (AOR = 2.06, 95% CI [1.06, 4.02], p = 0.033) are significant predictors. In the second model, upon adding symptoms (urinary, treatment, and sexual activity symptoms) in Block B, rural residence (AOR = 3.34, 95% CI [1.48, 7.57], p = 0.004), early-stage disease (Stage I-II) (AOR = 0.09, 95% CI [0.02, 0.47], p = 0.005), and hypertension (AOR = 2.138, 95% CI [1.02, 4.48], p = 0.044) remain significant. Additionally, treatment symptoms (AOR = 4.75, 95% CI [2.16, 10.46], p = 0.001) and sexual symptoms (AOR = 5.44, 95% CI [2.44, 12.14], p = 0.001) are significant predictors.

Rural residence is associated with higher odds of utilization (AOR = 3.343, p = 0.004) compared to township/urban residence. Early-stage disease (Stage I-II) is associated with lower odds of utilization (AOR = 0.086, p = 0.005) compared to advanced stages (Stage III-IV). Hypertension is also associated with higher odds of utilization (AOR = 2.14, p = 0.044) compared to those without hypertension. Regarding symptoms, normal/moderate treatment symptoms significantly increase the odds of utilization (AOR = 4.75, p = 0.001) compared to severe symptoms. Similarly, normal/moderate sexual symptoms significantly increase the odds of utilization (AOR = 5.44, p = 0.001) compared to severe symptoms. Urinary symptoms, however, do not show a significant effect on utilization (AOR = 0.50, p = 0.093).

**Table 5: Social demographic and clinical factors associated with PHU among PC survivors, [N=213].**

| Variables | BLOCK A 95% C.I. for AOR (Lower-Upper) | BLOCK A p value | BLOCK B 95% C.I. for AOR (Lower-Upper) | BLOCK B p value |
|---|---|---|---|---|
| **Occupation** | | | | |
| Retired | Ref | 1 | Ref | 1 |
| Peasants | 0.46 (0.14 —1.51) | 0.2 | 0.59 (0.16 —2.21) | 0.433 |
| Unemployed | 1.00 (0.29 —3.43) | 0.998 | 0.95 (0.24 —3.73) | 0.946 |
| **Residence** | | | | |
| Rural | 3.016 (1.47 —6.19) | 0.003 | 3.34 (1.48 —7.57) | 0.004 |
| Township | Ref | 1 | Ref | 1 |
| **Stage** | | | | |
| I-II | 0.08 (0.02 —0.43) | 0.003 | 0.09(0.02 —0.47) | 0.005 |
| III-IV | Ref | 1 | Ref | 1 |
| **ADT** | | | | |
| Yes | 0.85 (0.28 —2.59) | 0.772 | 0.91 (0.27 —3.03) | 0.873 |
| No | Ref | 1 | Ref | 1 |
| **Hypertension** | | | | |
| No | 2.06 (1.06 —4.02) | 0.033 | 2.14 (1.02 —4.48) | 0.044 |
| Yes | Ref | 1 | Ref | 1 |
| **Back joint pain** | | | | |
| No | Ref | 1 | Ref | 1 |
| Yes | 0.59 (0.29 —1.21) | 0.149 | 0.63 (0.29 —1.39) | 0.251 |
| **Urinary symptoms** | | | | |
| Normal/moderate | | | 0.50 (0.23 —1.12) | 0.093 |
| Severe/Quite often | | | Ref | 1 |
| **Treatment symptom** | | | | |
| Normal/moderate | | | 4.75 (2.16 —10.46) | 0.001 |
| Severe/Quite often | | | Ref | 1 |
| **Sexual symptom** | | | | |
| Normal/moderate | | | 5.44 (2.44 —12.14) | 0.001 |
| Severe/Quite often | | | Ref | 1 |

# CHAPTER FIVE

## DISCUSSION

The study found that 69.0% of prostate cancer survivors had been visiting primary healthcare, with the majority visiting district hospitals (82.3%), followed by healthcare centers (15%) and dispensaries (2.7%). The research also revealed that prostate cancer survivors residing in rural areas were more likely to utilize primary healthcare, while those with early-stage disease, hypertension, and severe treatment and sexual symptoms were less likely to seek primary healthcare. These findings suggest that geographical location and disease severity, along with associated symptoms, play crucial roles in the utilization of primary healthcare services by prostate cancer survivors.

This result indicates a significant reliance on primary healthcare services among prostate cancer survivors. The high utilization of district hospitals suggests that these facilities are crucial in providing accessible care for this population. Similar studies have shown that primary healthcare can effectively manage chronic conditions and follow-up care, reducing the burden on specialized centers (34,57). However, the proportion of primary healthcare use in this study is relatively lower compared to other studies (4,48), which have reported that nearly all cancer survivors returns in primary healthcare after active treatment. This finding underscores the importance of strengthening primary healthcare systems to support ongoing care for cancer survivors, thereby alleviating the pressure on specialized centers.

The study found that rural residence was associated with higher odds of primary healthcare utilization compared to township/urban residence. This means that prostate cancer survivors living in rural areas are more likely to use primary healthcare services than those in urban areas. This result aligns with study conducted by Heins et al., 2012 that have shown rural residents often rely more on primary healthcare due to limited access to specialized care facilities (41). The reliance on primary healthcare can help alleviate the burden on specialized centers, which are often overloaded with patients undergoing active treatment (58). Equipping primary healthcare (PHC) to care for cancer survivors is essential for ensuring comprehensive and continuous care, which can improve health outcomes and reduce the strain on specialized centers, highlighting the need for targeted practice and policy interventions.

Early-stage disease was associated with lower odds of primary healthcare utilization compared to advanced stages. This indicates that prostate cancer survivors with early-stage disease are

less likely to use primary healthcare services than those with advanced disease. These findings are in line with others such as Arora et al., 2011 and Miller et al., 2022 which reported that patients with more advanced disease stages often require more frequent medical attention and follow-up (4,59). By encouraging early-stage patients to utilize primary healthcare, the burden on specialized centers can be reduced, allowing these centers to focus on patients with more complex needs or on the active treatment.

The finding that participants without hypertension were almost twice as likely to visit primary healthcare compared to those with hypertension is intriguing and warrants further exploration. This trend may suggest that individuals with hypertension are either more likely to receive specialized care directly related to their condition, thereby reducing their need for primary healthcare services, or they may face barriers that limit their access to primary care. It is also possible that hypertensive patients are more frequently managed through secondary or tertiary care settings, where their condition is monitored and treated more intensively. Additionally, the presence of hypertension might be associated with a higher burden of comorbidities, which could complicate their healthcare pathways and reduce their engagement with primary healthcare services. Understanding these dynamics is crucial for developing targeted interventions to improve primary healthcare utilization among hypertensive patients, ensuring they receive comprehensive and continuous care. Further research should investigate the specific barriers and facilitators influencing primary healthcare utilization in this population to inform policy and practice improvements.

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The study found that normal or moderate treatment symptoms significantly increase the odds of primary healthcare utilization compared to severe symptoms. This indicates that patients with less severe treatment symptoms are more likely to seek primary healthcare. This may be because those with severe symptoms might seek specialized or emergency care instead. These results are similar with previous studies conducted by Grunfeld et al., 1999 and Love et al., 2022 that reported that patients with severe symptoms visit specialized care setting than those with less severe symptoms**.** Equipping primary healthcare (PHC) to manage cancer survivors is crucial, especially since normal or moderate symptoms significantly increase PHC visits compared to severe symptoms. This ensures comprehensive care and improves health outcomes while reducing the burden on specialized centers. Targeted practice and policy interventions are essential to strengthen PHC services.

Normal or moderate sexual symptoms significantly increase the odds of primary healthcare utilization compared to severe symptoms. This indicates that prostate cancer survivors with less severe sexual symptoms are more likely to use primary healthcare services. Studies have shown that patients with manageable sexual symptoms often seek primary care for advice and management (61–63). This highlights the importance of primary healthcare in providing support for sexual health issues, thereby reducing the load on specialized centers and ensuring comprehensive care for survivors.

The study provides a detailed insight into healthcare patterns among prostate cancer survivors who completed radiotherapy and are on specialized follow-up. It includes a wide range of variables and adjusted odds ratios to highlight factors influencing healthcare utilization. The study also offers evidence on how primary healthcare can enhance care continuity and alleviate the burden on specialized centers. Overall, the study has the potential to inform policy and practice in healthcare management for prostate cancer survivors.

**Limitation and mitigation**

The study acknowledges a potential selection bias due to the methodology of participant selection. Patients who were reachable via telephone and those with complete medical records were included, which may not represent the entire population of interest. This raises the question of whether individuals not accessible by phone, or those without comprehensive medical records, differ significantly in terms of post treatment cancer survivorship and PHU experience. It is conceivable that these unrepresented groups may exhibit different health-seeking behaviors or access to healthcare services, which could lead to an underestimation or overestimation of the true association between post treatment survivorship and PHU. Therefore, the results should be interpreted with caution, as they may not fully account for the experiences and outcomes of the entire target population. Future research should aim to include a more representative sample of the population to validate and extend these findings.

# CHAPTER SIX

## CONCLUSION AND RECOMMENDATION

### CONCLUSION

This study underscores the critical role of primary healthcare in the follow-up care of prostate cancer survivor's post-radiotherapy. A significant proportion of these survivors depend on primary healthcare services, especially district hospitals, for their ongoing medical needs. Key factors such as rural residence, advanced disease stage, non-hypertension, and moderate treatment and sexual symptoms drive higher utilization of primary healthcare. These findings highlight the potential of primary healthcare to significantly reduce the burden on specialized centers by offering accessible, effective, and continuous care for cancer survivors. Strengthening primary healthcare services is essential to ensure comprehensive care and improve health outcomes for this growing patient population.

### RECOMMENDATIONS

1. Improving the availability and accessibility of services at healthcare centers and dispensaries to encourage more survivors to seek care, especially those who are currently less likely to visit district hospitals.
2. Future research should explore the barriers faced by individuals with early-stage diseases and severe symptoms when accessing primary healthcare services. By comprehending these challenges, primary healthcare facilities can enhance support, ensure continuous care, and coordinate effectively for post-treatment cancer survivors. This focus is essential to improve health outcomes and the quality of life for this vulnerable population.
3. Advocate for policies and funding that support primary healthcare services for cancer survivors. This includes allocating resources for training, infrastructure, and patient support programs to ensure that primary healthcare can adequately meet the needs of prostate cancer survivors.

## REFERENCES


1. Wang L, Lu B, He M, Wang Y, Wang Z, Du L. Prostate Cancer Incidence and Mortality: Global Status and Temporal Trends in 89 Countries From 2000 to 2019. Front Public Heal. 2022;10(February).
2. Adeloye D, David RA, Aderemi AV, Iseolorunkanmi A, Oyedokun A, Iweala EEJ, et al. An estimate of the incidence of prostate cancer in Africa: A systematic review and meta-analysis. PLoS One. 2016;11(4):1–18.
3. International Council for Building. Tanzania, United Republic of (TZA). Int Dir Build Res Inf Dev Organ. 2020;220–220.
4. Miller KD, Nogueira L, Devasia T, Mariotto AB, Yabroff KR, Jemal A, et al. Cancer treatment and survivorship statistics, 2022. CA Cancer J Clin. 2022;72(5):409–36.
5. Noone AM et al. (eds). Cancer Statistics Review, 1975–2015 - SEER Statistics. SEER Cancer Statistics Review. 2018. p. 1975_2008.
6. Søgaard M, Thomsen RW, Bossen KS, Sørensen HT, Nørgaard M. The impact of comorbidity on cancer survival: A review. Clin Epidemiol. 2013;5(SUPP 1):3–29.
7. Taylor KL, Luta G, Miller AB, Church TR, Kelly SP, Muenz LR, et al. Long-term disease-specific functioning among prostate cancer survivors and noncancer controls in the prostate, lung, colorectal, and ovarian cancer screening trial. J Clin Oncol [Internet]. 2012 Aug 1 [cited 2024 Jan 14];30(22):2768–75. Available from: https://pubmed.ncbi.nlm.nih.gov/22734029/
8. Carter J, Lacchetti C, Andersen BL, Barton DL, Bolte S, Damast S, et al. Interventions to address sexual problems in people with cancer: American society of clinical oncology clinical practice guideline adaptation of cancer care Ontario guideline. J Clin Oncol [Internet]. 2018 Feb 10 [cited 2024 Jan 14];36(5):492–511. Available from: https://ascopubs.org/doi/10.1200/JCO.2017.75.8995
9. Nguyen C, Lairson DR, Swartz MD, Du XL. Risks of Major Long-Term Side Effects Associated with Androgen-Deprivation Therapy in Men with Prostate Cancer. Pharmacother J Hum Pharmacol Drug Ther [Internet]. 2018 Oct 1 [cited 2024 Jan 14];38(10):999–1009. Available from: https://onlinelibrary.wiley.com/doi/full/10.1002/phar.2168
10. Hebdon M, Abrahamson K, McComb S, Sands L. Transitioning patients to survivorship care: A systematic review. Oncol Nurs Forum. 2014;41(6):615–25.
11. Chan RJ, Crawford-Williams F, Crichton M, Joseph R, Hart NH, Milley K, et al.

Effectiveness and implementation of models of cancer survivorship care: an overview of systematic reviews. J Cancer Surviv [Internet]. 2023;17(1):197–221. Available from: https://doi.org/10.1007/s11764-021-01128-1

12. Lisy K, Langdon L, Piper A, Jefford M. Identifying the most prevalent unmet needs of cancer survivors in Australia: A systematic review. Asia Pac J Clin Oncol. 2019;15(5):e68–78.
13. Howell D, Hack TF, Oliver TK, Chulak T, Mayo S, Aubin M, et al. Models of care for post-treatment follow-up of adult cancer survivors: A systematic review and quality appraisal of the evidence. J Cancer Surviv. 2012;6(4):359–71.
14. Lisy K, Kent J, Dumbrell J, Kelly H, Piper A, Jefford M. Sharing cancer survivorship care between oncology and primary care providers: A qualitative study of health care professionals' experiences. J Clin Med. 2020;9(9):1–17.
15. Lewis RA, Neal RD, Williams NH, France B, Hendry M, Russell D, et al. Follow-up of cancer in primary care versus secondary care: Systematic review. Br J Gen Pract. 2009;59(564):525–32.
16. Lewis RA, Neal RD, Hendry M, France B, Williams NH, Russell D, et al. Patients' and healthcare professionals' views of cancer follow-up: Systematic review. Br J Gen Pract. 2009;59(564):533–40.
17. Grunfeld E, Mant D, Yudkin P, Adewuyi-Dalton R, Cole D, Stewart J, et al. Routine follow up of breast cancer in primary care: Randomised trial. Br Med J. 1996;313(7058):665–9.
18. Grunfeld E, Levine MN, Julian JA, Coyle D, Szechtman B, Mirsky D, et al. Randomized trial of long-term follow-up for early-stage breast cancer: A comparison of family physician versus specialist care. J Clin Oncol. 2006;24(6):848–55.
19. Grunfeld E, Fitzpatrick R, Mant D, Yudkin P, Adewuyi-Dalton R, Stewart J, et al. Comparison of breast cancer patient satisfaction with follow-up in primary care versus specialist care: Results from a randomized controlled trial. Br J Gen Pract. 1999;49(446):705–10.
20. Emery JD, Jefford M, King M, Hayne D, Martin A, Doorey J, et al. ProCare Trial: a phase II randomized controlled trial of shared care for follow-up of men with prostate cancer. BJU Int. 2017;119(3):381–9.
21. Murchie P, Norwood PF, Pietrucin-Materek M, Porteous T, Hannaford PC, Ryan M. Determining cancer survivors' preferences to inform new models of follow-up care. Br J Cancer [Internet]. 2016;115(12):1495–503. Available from:

http://dx.doi.org/10.1038/bjc.2016.352

22. Mayer DK, Alfano CM. Personalized Risk-Stratified Cancer Follow-Up Care: Its Potential for Healthier Survivors, Happier Clinicians, and Lower Costs. J Natl Cancer Inst. 2019;111(5):442–8.
23. Hudson S V., Miller SM, Hemler J, Ferrante JM, Lyle J, Oeffinger KC, et al. Adult Cancer Survivors Discuss Follow-up in Primary Care: 'Not What I Want, But Maybe What I Need.' Ann Fam Med. 2012;10(5):418.
24. Kenzik KM. Health care use during cancer survivorship: Review of 5 years of evidence. Cancer. 2019;125(5):673–80.
25. Joly F, Henry-Amar M, Arveux P, Reman O, Tanguy A, Peny AM, et al. Late psychosocial sequelae in Hodgkin's disease survivors: A French population-based case-control study. J Clin Oncol. 1996;14(9):2444–53.
26. Kline RM, Arora NK, Bradley CJ, Brauer ER, Graves DL, Lunsford NB, et al. Long-term survivorship care after cancer treatment - Summary of a 2017 national cancer policy forum workshop. J Natl Cancer Inst. 2018;110(12):1–11.
27. Salako O, Okediji PT, Habeebu MY, Fatiregun OA, Awofeso OM, Okunade KS, et al. The pattern of comorbidities in cancer patients in Lagos, South-Western Nigeria. Ecancermedicalscience [Internet]. 2018;12(November):1–12. Available from: https://doi.org/10.3332/ecancer.2018.843
28. Mendenhall E. Living with Cancer amidst Comorbidity in a South African Township Emily. Soc Sci Med. 2019;237(5):29.
29. Mollica MA, Mayer DK, Oeffinger KC, Kim Y, Buckenmaier SS, Sivaram S, et al. Follow-Up Care for Breast and Colorectal Cancer Across the Globe: Survey Findings From 27 Countries. JCO Glob Oncol. 2020;(6):1394–411.
30. Russell L, McIntosh R, Martin C, Soo WK, Ugalde A. Implementation of a referral pathway for cancer survivors to access allied health services in the community. BMC Health Serv Res [Internet]. 2023;23(1):1–10. Available from: doi:10.1186/s12913-023-09425-4.
31. Roorda C, Berendsen AJ, Groenhof F, Van Der Meer K, De Bock GH. Increased primary healthcare utilisation among women with a history of breast cancer. Support Care Cancer. 2013;21(4):941–9.
32. Forsythe LP, Arora NK, Alfano CM, Weaver KE, Hamilton AS, Aziz N, et al. Role of oncologists and primary care physicians in providing follow-up care to non-Hodgkin lymphoma survivors within 5 years of diagnosis: A population-based study. Support

Care Cancer. 2014;22(6):1509–17.

33. Carrie N. Klabunde, Ph.D.1, Paul K. J. Han, M.D.2, Craig C. Earle, M.D.3 TS, M.A.4, John Z. Ayanian, M.D.5, 6, Richard Lee7, Anita Ambs, M.P.H.8, Julia H. Rowland, Ph.D. 9, and Arnold L. Potosky PD. Physician Roles in the Cancer-Related Follow-Up Care of Cancer Survivors. PMC [Internet]. 2013;83(1):1–11. Available from: http://dx.doi.org/10.1016/j.earlhumdev.2015.09.003%5Cnhttp://dx.doi.org/10.1016/j.earlhumdev.2014.01.002%5Cnhttp://dx.doi.org/10.1016/S0378-3782(12)70006-3%5Cnhttp://www.sciencedirect.com/science/article/pii/S2341287914000763%5Cnhttp://dx.doi.org/10.1016/
34. Nyarko E, Metz JM, Nguyen GT, Hampshire MK, Jacobs LA, Mao JJ. Cancer survivors' perspectives on delivery of survivorship care by primary care physicians: an internet-based survey. BMC Fam Pract [Internet]. 2015;16(1):1–8. Available from: http://dx.doi.org/10.1186/s12875-015-0367-x
35. Chait I, Glynne-Jones R, Thomas S. A pilot study exploring the effect of discharging cancer survivors from hospital follow-up on the workload of general practitioners. Br J Gen Pract. 1998;48(430):1241–3.
36. Krebs P, Coups EJ, Feinstein MB, Burkhalter JE, Steingart RM, Logue A, et al. Health behaviors of early-stage non-small cell lung cancer survivors. J Cancer Surviv. 2012;6(1):37–44.
37. Potosky AL, Han PKJ, Rowland J, Klabunde CN, Smith T, Aziz N, et al. Differences between primary care physicians' and oncologists' knowledge, attitudes and practices regarding the care of cancer survivors. J Gen Intern Med. 2011;26(12):1403–10.
38. Dahlhaus A, Vanneman N, Guethlin C, Behrend J, Siebenhofer A. German general practitioners' views on their involvement and role in cancer care: A qualitative study. Fam Pract. 2014;31(2):209–14.
39. Low CA, Beckjord E, Bovbjerg DH, Dew MA, Posluszny DM, Schmidt JE, et al. Correlates of positive health behaviors in cancer survivors: Results from the 2010 LIVESTRONG survey. J Psychosoc Oncol. 2014;32(6):678–95.
40. Russell L, McIntosh R, Martin C, Soo WK, Ugalde A. Implementation of a referral pathway for cancer survivors to access allied health services in the community. BMC Health Serv Res. 2023;23(1):1–10.
41. Heins M, Schellevis F, Rijken M, Van Der Hoek L, Korevaar J. Determinants of increased primary health care use in cancer survivors. J Clin Oncol [Internet]. 2012;30(33):4155–60. Available from: doi:10.1200/JCO.2012.41.9101.

42. Jabaaij L, Van Den Akker M, Schellevis FG. Excess of health care use in general practice and of comorbid chronic conditions in cancer patients compared to controls. BMC Fam Pract. 2012;13.
43. Duan L, Xu Y, Li M. Effects of Mind-Body Exercise in Cancer Survivors: A Systematic Review and Meta-Analysis. Evidence-based Complement Altern Med. 2020;2020.
44. Fan R, Wang L, Bu X, Wang W, Zhu J. Unmet supportive care needs of breast cancer survivors: a systematic scoping review. BMC Cancer. 2023;23(1):1–24.
45. Kent EE, Mitchell SA, Oakley-Girvan I, Arora NK. The importance of symptom surveillance during follow-up care of leukemia, bladder, and colorectal cancer survivors. Support Care Cancer [Internet]. 2014;22(1):163–72. Available from: doi:10.1007/s00520-013-1961-x.
46. Bl H, Pe B, Rv K, As F, Albieri V, So D, et al. treatment in adult cancer survivors ( Review ). Eur J Surg Oncol [Internet]. 2018;2019(5):559–65. Available from: https://doi.org/10.1016/j.ejso.2018.01.004
47. Tomasone JR, Brouwers MC, Vukmirovic M, Grunfeld E, O'Brien MA, Urquhart R, et al. Interventions to improve care coordination between primary healthcare and oncology care providers: A systematic review. ESMO Open. 2016;1(5).
48. Pinheiro LC, Rajan M, Safford MM, Nanus DM, Kern LM. Nearly All Cancer Survivors Return to Primary Care. J Am Board Fam Med. 2022;35(4):827–32.
49. Field TS, Doubeni C, Fox MP, Buist DSM, Wei F, Geiger AM, et al. Under utilization of surveillance mammography among older breast cancer survivors. J Gen Intern Med. 2008;23(2):158–63.
50. Una M, Ross S, Watt GCM, Twelves C, George WD, Gillis C. Primary and secondary care management of women with early breast cancer from affluent and deprived areas: Retrospective review of hospital and general practice records. Br Med J. 2000;320(7247):1442–5.
51. Roy S, Vallepu S, Barrios C, Hunter K. Comparison of Comorbid Conditions Between Cancer Survivors and Age-Matched Patients Without Cancer. J Clin Med Res. 2018;10(12):911–9.
52. Love M, Debay M, Hudley AC, Sorsby T, Lucero L, Miller S, et al. Cancer Survivors, Oncology, and Primary Care Perspectives on Survivorship Care: An Integrative Review. J Prim Care Community Heal [Internet]. 2022;13(March):1–9. Available from: doi: 10.1177/21501319221105248.

53. Wang L, Lu B, He M, Wang Y, Wang Z, Du L. Prostate Cancer Incidence and Mortality: Global Status and Temporal Trends in 89 Countries From 2000 to 2019. Front Public Heal. 2022;10(February):1–18.
54. Smith TG, Strollo S, Hu X, Earle CC, Leach CR, Nekhlyudov L. Understanding Long-Term Cancer Survivors' Preferences for Ongoing Medical Care. J Gen Intern Med. 2019;34(10):2091–7.
55. Brandenbarg D, Roorda C, Groenhof F, de Bock GH, Berger MY, Berendsen AJ. Primary healthcare use during follow-up after curative treatment for colorectal cancer. Eur J Cancer Care (Engl). 2017;26(3):1–9.
56. Chu D, Popovic M, Chow E, Cella D, Beaumont JL, Lam H, et al. Development, characteristics and validity of the EORTC QLQ-PR25 and the FACT-P for assessment of quality of life in prostate cancer patients. J Comp Eff Res [Internet]. 2014 Sep 1 [cited 2024 Feb 17];3(5):523–31. Available from: https://pubmed.ncbi.nlm.nih.gov/25350803/DOI:10.2217/CER.14.41
57. Carrie N. Klabunde, Ph.D.1, Paul K. J. Han, M.D.2, Craig C. Earle, M.D.3 TS, M.A.4, John Z. Ayanian, M.D.5, 6, Richard Lee7, Anita Ambs, M.P.H.8, Julia H. Rowland, Ph.D. 9, and Arnold L. Potosky PD. Physician Roles in the Cancer-Related Follow-Up Care of Cancer Survivors. PMC [Internet]. 2013;83(1):1–11. Available from: doi:10.1016/j.earlhumdev.2006.05.022.
58. Zhao Y, Brettle A, Qiu L. The effectiveness of shared care in cancesurvivors—a systematic review. Int J Integr Care. 2018;18(4).
59. Arora NK, Reeve BB, Hays RD, Clauser SB, Oakley-Girvan I. Assessment of quality of cancer-related follow-up care from the cancer survivor's perspective. J Clin Oncol. 2011;29(10):1280–9.
60. Jefferson M, Drake RR, Lilly M, Savage SJ, Price ST, Halbert CH. Co-morbidities in a retrospective cohort of prostate cancer patients. Ethn Dis [Internet]. 2020 Feb 17;30:185–92. Available from: DOI 10.18865/ed.30.S1.185
61. Johnston D. Current State of Care Transitions and Cancer Survivorship. J Oncol Navig Surviv. 2013;4(4):11.
62. Brandenbarg D, Roorda C, Groenhof F, de Bock GH, Berger MY, Berendsen AJ. Primary healthcare use during follow-up after curative treatment for colorectal cancer. Eur J Cancer Care (Engl) [Internet]. 2017;26(3):1–9. Available from: doi:10.1111/ecc.12581
63. In C, Aftercare C. PROVIDING INTEGRATED CARE FOR CANCER

SURVIVORS : THE PRIMARY-CARE PERSPECTIVE Primary-healthcare professionals face growing demands on their time and training needs and often lack the infor- mation for integrated care . 1 This article focuses on these INF. 2017;(January 2012):1–2.

# APPENDICES

## Appendix I: English version of the consent form.

THE MUHIMBILI UNIVERSITY OF HEALTH AND ALLIED SCIENCES

RESEARCH AND PUBLICATION DIRECTORATE

**Index Number _____**

**Research Study Participation Consent Form**

I am Rabson R. Nakey, a postgraduate student in the Master of Public Health program at MUHAS. I am studying at the School of Public Health and Social Sciences (SPHSS). I am doing research on the use of primary health care services among prostate cancer survivors after a course of radiation treatment at Besta Super Specialized Polyclinic, located in the Kinondoni Municipal area of Dar es Salaam.

**The objective of the study**

The research aims to determine the frequency of contact between prostate cancer survivors and primary healthcare providers, as well as the characteristics associated with these visits. The results of this research will provide preliminary data to inform potential policy or behavioral intervention strategies that aim to improve the continuity of care among cancer survivors amidst a fragmented healthcare system.

**Procedure**

I request your participation in this research. We selected you because you have successfully undergone radiation treatment for prostate cancer at Besta and consistently attend your scheduled follow-up appointments with an oncologist at Besta Polyclinic. If you decide to take part, you will need to answer the questions posed by the researcher after giving your permission, either in writing or verbally.

**Privacy**

All responses will remain private. This implies that your replies will only be utilized for research purposes and shared with MUHAS if needed. I will make sure that any material in my report does not identify you as the respondent. No identities will be used during the interview

or while reporting the results. To handle this, you will be given a unique identity code that will be used throughout the research.

**Rights to decline or retract**

You have the option to participate or not in this investigation. You retain complete autonomy to decline to answer any question that makes you uncomfortable, and you may discontinue doing so at any moment and without consequence. Despite this, I inspire you to join in in this study, as your responses are vital.

**Benefits**

While you may not experience personal benefits from participating in this research, it has the potential to provide valuable information that can enhance the quality of care for prostate cancer survivors and other cancer survivors after they complete their main cancer treatment.

**Risks**

While some of the questions might seem personal, participation in this study will not cause you any damage.

**Inquiry**

If you have any questions, please contact the researcher, Rabson R. Nakey of MUHAS, P.O. Box 65001, Dar es Salaam, at the following mobile number: 0768314239 or through email: nakey79rabson@gmail.com.

For Further explanation, you can contact supervisor of this study, Professor Gideon Kwesigabo, Department of Epidemiology and Biostatistics, MUHAS P.O. Box 65001, Dar es Salaam, at the following mobile number: 0768314239 or email 0713443212.

For any questions about participants' rights, please feel free to contact the Director of Research and Publications at MUHAS, P.O. Box 65001 in Dar es Salaam, Tanzania.

**Appendix II: Consent form Swahili Version**

CHUO KIKUU CHA AFYA NA SAYANSI VISHIRIKA MUHIMBILI

MKURUGENZI WA UTAFITI NA UCHAPISHAJI MUHAS

Nambari ya mshiriki: _____

**Fomu ya Idhini ya Kushiriki katika Utafiti**

Mimi ni Rabson R. Nakey, mwanafunzi wa shahada ya uzamili katika programu ya Uzamili ya Sayansi katika Afya ya Umma katika MUHAS. Ninasoma katika Shule ya Afya ya Umma na Sayansi ya Jamii (SPHSS). Nafanya utafiti kuhusu matumizi ya huduma za afya ya msingi kwa waathirika wa saratani ya tezi dume baada ya kozi ya matibabu ya mionzi katika kituo cha Besta Super Specialized Polyclinic, kilichopo eneo la Manispaa ya Kinondoni jijini Dar es Salaam.

**Lengo la utafiti**

Utafiti unalenga kubainisha mara kwa mara mawasiliano kati ya waathiriwa wa saratani ya tezi dume na watoa huduma za afya ya msingi, pamoja na sifa zinazohusiana na ziara hizi. Matokeo ya utafiti huu yatatoa data ya awali ili kufahamisha mikakati inayoweza kutekelezwa ya sera au tabia ambayo inalenga kuboresha mwendelezo wa huduma miongoni mwa walionusurika na saratani huku kukiwa na mfumo wa afya uliogawanyika.

**Utaratibu**

Naomba ushiriki wako katika utafiti huu. Tulikuchagua kwa sababu umefanikiwa kupata matibabu ya mionzi ya saratani ya kibofu huko Besta na huhudhuria mara kwa mara miadi yako ya kufuatilia na daktari wa magonjwa ya saratani katika Besta Polyclinic. Ukiamua kushiriki, utahitaji kujibu maswali yaliyoulizwa na mtafiti baada ya kutoa ruhusa yako, ama kwa maandishi au kwa maneno.

**Faragha**

Majibu yote yatasalia kuwa ya faragha. Hii ina maana kwamba majibu yako yatatumika tu kwa madhumuni ya utafiti na kushirikiwa na MUHAS ikihitajika. Nitahakikisha kuwa nyenzo yoyote katika ripoti yangu haikutambui kama mhojiwa. Hakuna vitambulisho vitatumika wakati wa mahojiano au wakati wa kuripoti matokeo. Ili kushughulikia hili, utapewa msimbo wa kipekee wa utambulisho ambao utatumika katika utafiti wote.

**Haki za kukataa au kujiondoa**

Una chaguo la kushiriki au kutoshiriki katika uchunguzi huu. Unabaki na uhuru kamili wa kukataa kujibu swali lolote linalokukosesha raha, na unaweza kuacha kufanya hivyo wakati wowote na bila matokeo. Licha ya hili, ninakuhimiza ujiunge katika utafiti huu, kwa kuwa majibu yako ni muhimu.

**Faida**

Ingawa huenda usipate manufaa ya kibinafsi kutokana na kushiriki katika utafiti huu, una uwezo wa kutoa maelezo muhimu ambayo yanaweza kuimarisha ubora wa huduma kwa manusura wa saratani ya tezi dume na manusura wengine wa saratani baada ya kukamilisha matibabu yao kuu ya saratani.

**Hatari**

Ingawa baadhi ya maswali yanaweza kuonekana kuwa ya kibinafsi, kushiriki katika utafiti huu hakutakuletea madhara yoyote.

**Kwa Maelezo kuhusu Utafiti huu**

Ikiwa una maswali yoyote, tafadhali wasiliana na mtafiti, Rabson R. Nakey wa MUHAS, P.O. Box 65001, Dar es Salaam, kwa nambari ya simu ifuatayo: 0768314239 au barua pepe: nakey79rabsongmail.com.

Kwa maelezo Zaidi, unaweza kuwasiliana na msimamizi wa utafiti huu, Profesa Gideon Kwesigabo, Idara ya Epidemiology na Biostatistics, MUHAS P.O. Box 65001, Dar es Salaam, kwa nambari ya simu ifuatayo: 0768314239 au barua pepe 0713443212.

Kwa maswali yoyote kuhusu haki za washiriki, tafadhali jisikie huru kuwasiliana na Mkurugenzi wa Utafiti na Machapisho katika MUHAS, P.O. Box 65001 jijini Dar es Salaam, Tanzania.

**Appendix III: English Version of Questionnaire**

**Participant ID _____ RT number _____ Phone number _____**

**Demographic and clinical information.**

1. Age
2. Level of education a) Informal b) Primary c) Secondary d) College e) Higher
3. Marital status a) married b) widow c) divorced d) cohabiting e) single
4. Occupation _____
5. Treatment received _____
6. Duration since diagnosis _____
7. TNM stage at diagnosis a) I b) II c) III D) IV

**Utilisation of primary healthcare**

8. Did you have contact with your primary healthcare provider in the period you were recovering from your cancer treatment? Yes/No.
9. Would you like to have had (more) contact with your primary healthcare provider during the follow-up phase? Yes/No
10. Do you remember the level of primary healthcare facility you have been visiting?

    a) Dispensary (village/street level
    b) Healthcare center (ward level)
    c) District hospital (district level)

**11. EORTC QLQ - PR25**

Patients may report the following symptoms or difficulties. Please mention how much you have encountered these symptoms or issues throughout the last week. Please respond by circling the number that best suits you.

| ***1-Not at all; 2-A bit little; 3-Quite a bit; 4-Very Much*** | | | | | |
|---|---|---|---|---|---|
| **During the past week** | | | | | |
| 31. | Have you had to urinate frequently during the day? | 1 | 2 | 3 | 4 |
| 32. | Have you had to urinate frequently at night? | 1 | 2 | 3 | 4 |
| 33. | When you felt the urge to pass urine, did you have to hurry to get to the toilet? | 1 | 2 | 3 | 4 |
| 34. | Was it difficult for you to get enough sleep, because you needed to get up frequently at night to urinate? | 1 | 2 | 3 | 4 |

| | | | | | |
|---|---|---|---|---|---|
| 35 | Have you had difficulty going out of the house because you needed to be close to a toilet? | 1 | 2 | 3 | 4 |
| 36 | Have you had any unintentional release (leakage) of urine? | 1 | 2 | 3 | 4 |
| 37 | Did you have pain when you urinated? | 1 | 2 | 3 | 4 |
| 38 | Answer this question only if you wear an incontinence aid: Has wearing an incontinence aid been a problem for you? | 1 | 2 | 3 | 4 |
| 39 | Have your daily activities been limited by your urinary problems? | 1 | 2 | 3 | 4 |
| 40 | Have your daily activities been limited by your bowel problems? | 1 | 2 | 3 | 4 |
| 41 | Have you had any unintentional release (leakage) of stools? | 1 | 2 | 3 | 4 |
| 42 | Have you had blood in your stools? | 1 | 2 | 3 | 4 |
| 43 | Did you have a bloated feeling in your abdomen? | 1 | 2 | 3 | 4 |
| 44 | Did you have hot flushes? | 1 | 2 | 3 | 4 |
| 45 | Have you had sore or enlarged nipples or breasts? | 1 | 2 | 3 | 4 |
| 46 | Have you had swelling in your legs or ankles? | 1 | 2 | 3 | 4 |
| **During the last 4 weeks:** | | | | | |
| 47 | Has weight loss been a problem for you? | 1 | 2 | 3 | 4 |
| 48 | Has weight gain been a problem for you? | 1 | 2 | 3 | 4 |
| 49 | Have you felt less masculine as a result of your illness or treatment? | 1 | 2 | 3 | 4 |
| 50 | To what extent were you interested in sex? | 1 | 2 | 3 | 4 |
| 51 | To what extent were you sexually active (with or without intercourse)? | 1 | 2 | 3 | 4 |
| **Please answer the next four questions only if you have been sexually active over the last 4 weeks** | | | | | |
| 52 | To what extent was sex enjoyable for you? | 1 | 2 | 3 | 4 |
| 53 | Did you have difficulty getting or maintaining an erection? | 1 | 2 | 3 | 4 |
| 54 | Did you have ejaculation problems (e.g., dry ejaculation)? | 1 | 2 | 3 | 4 |
| 55 | Have you felt uncomfortable about being sexually intimate? | 1 | 2 | 3 | 4 |

**Appendix IV: Dodoso**

**Kitambulisho cha mshiriki _____ Nambari ya RT _____**

**Nambari ya simu _____**

**Maelezo ya idadi ya watu na kliniki.**

1. Umri wa sasa _____
2. Ngazi ya elimu a) Isiyo rasmi b) Msingi c) Sekondari d) Chuo e) Elimu ya juu
3. Hali ya ndoa a) ndoa b) mjane c) talaka d) cohabiting e) single
4. Unajishugulisha na nini_____
5. Matibabu ya saratani ulizopata _____
6. Muda tangu utambuzi wa saratani _____
7. Hatua ya ugonjwa wakati wa utambuzi a) I b) II c) III d) IV

**Utumiaji wa huduma za afya za msingi.**

8. Je, uliwasiliana na mtoa huduma wako wa afya ya msingi katika kipindi ulipokuwa ukipona kutokana na matibabu yako ya saratani? Ndio/Hapana
9. Je, ungependa kuwa na mawasiliano (zaidi) na mtoa huduma wako wa afya ya msingi wakati wa awamu ya ufuatiliaji? Ndio/Hapana
10. 10. Je, unakumbuka aina cha kituo cha afya ambacho umekuwa ukitembelea?
    a) Zahanati (ngazi ya kijiji/mtaa)
    b) Kituo cha afya (ngazi ya kata)
    c) Hospitali ya Wilaya (Ngazi ya Wilaya)

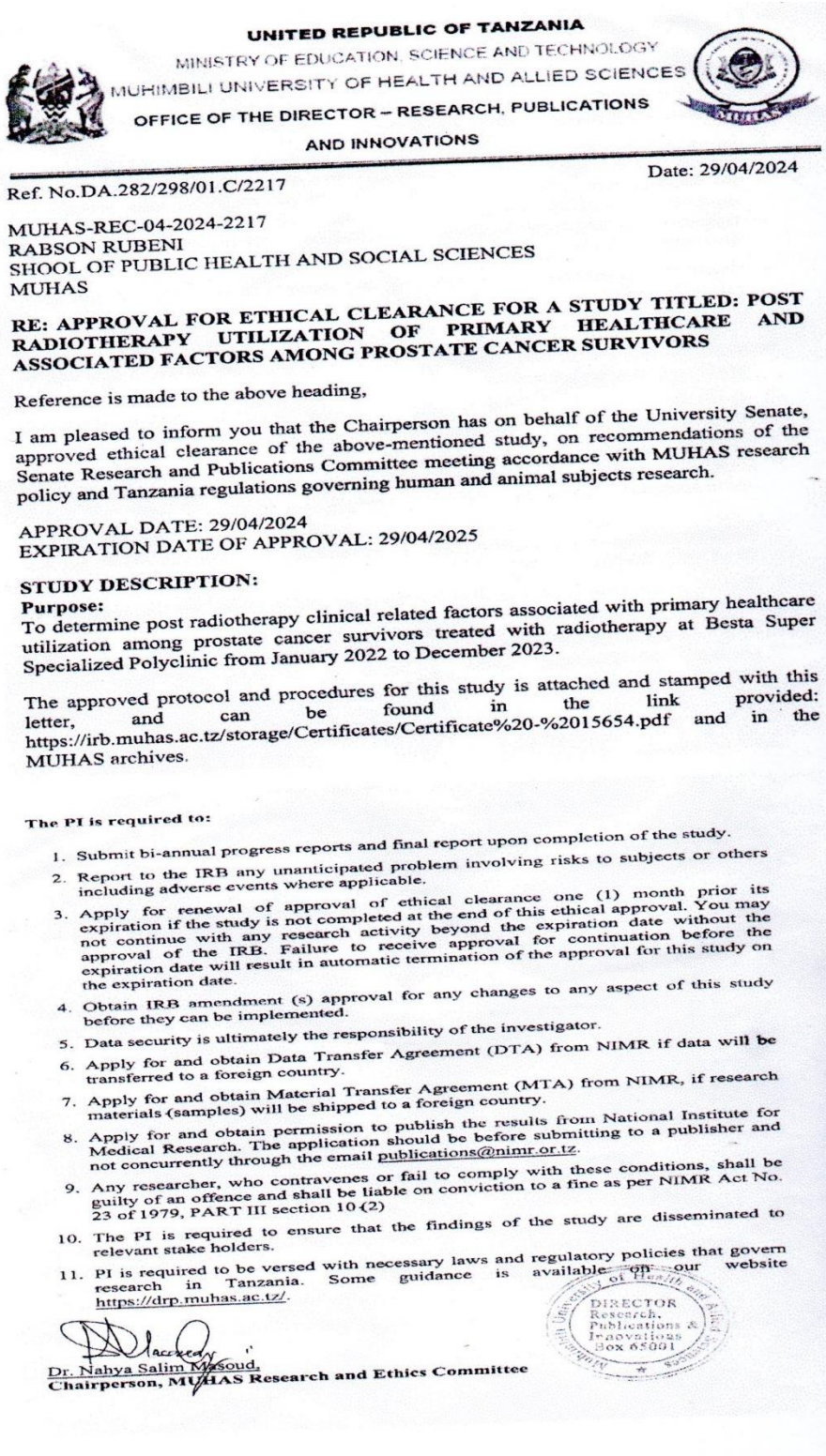
**11. EORTC QLQ - PR25**

Wakati mwingine wagonjwa huripoti kuwa wana dalili au matatizo yafuatayo. Tafadhali onyesha ni kwa kiwango gani umekumbana na dalili hizi au matatizo katika wiki iliyopita. Tafadhali jibu kwa kuzungushia nambari inayokufaa zaidi

| 1-Sio kabisa; 2-Kidogo kidogo; 3-Kidogo kabisa; 4- Sana | | | | | |
|---|---|---|---|---|---|
| **Katika wiki iliyopita** | | | | | |
| 31. | Je, ulilazimika kukojoa mara kwa mara wakati wa mchana? | 1 | 2 | 3 | 4 |

| | | | | | |
|---|---|---|---|---|---|
| 32. | Je, ulilazimika kukojoa mara kwa mara usiku ? | 1 | 2 | 3 | 4 |
| 33. | Ulipohisi hamu ya kutoa mkojo, ulilazimika kuharakisha kupata choo? | 1 | 2 | 3 | 4 |
| 34. | Je, ilikuwa vigumu kwako kupata usingizi wa kutosha, kwa sababu ulihitaji kuamka mara kwa mara usiku ili kukojoa? | 1 | 2 | 3 | 4 |
| 35 | Umekuwa na ugumu wa kutoka nje ya nyumba kwa sababu ulihitaji kuwa karibu na choo? | 1 | 2 | 3 | 4 |
| 36 | Je, umetolewa bila kukusudia (kuvuja) kwa mkojo? | 1 | 2 | 3 | 4 |
| 37 | Je, ulikuwa na maumivu wakati wa kukojoa? | 1 | 2 | 3 | 4 |
| 38 | Jibu swali hili tu ikiwa unavaa misaada ya kutoweza kujizuia: Je, kuvaa misaada ya kutoweza kujizuia kumekuwa tatizo kwako? | 1 | 2 | 3 | 4 |
| 39 | Je, shughuli zako za kila siku zimepunguzwa na matatizo yako ya mkojo? | 1 | 2 | 3 | 4 |
| 40 | Je, shughuli zako za kila siku zimepunguzwa na matatizo ya utumbo wako? | 1 | 2 | 3 | 4 |
| 41 | Je, umetolewa bila kukusudia (kuvuja) kwa kinyesi? | 1 | 2 | 3 | 4 |
| 42 | Umekuwa na damu kwenye kinyesi chako? | 1 | 2 | 3 | 4 |
| 43 | Je, ulikuwa na hisia ya uvimbe kwenye tumbo lako? | 1 | 2 | 3 | 4 |
| 44 | Je! ulikuwa na maji moto? | 1 | 2 | 3 | 4 |
| 45 | Je, umekuwa na kidonda au kupanuka kwa chuchu au matiti? | 1 | 2 | 3 | 4 |
| 46 | Je, umekuwa na uvimbe kwenye miguu au vifundo vyako? | 1 | 2 | 3 | 4 |
| **Katika wiki 4 zilizopita:** | | | | | |
| 47 | Je, kupungua uzito kumekuwa tatizo kwako? | 1 | 2 | 3 | 4 |
| 48 | Je, ongezeko la uzito limekuwa tatizo kwako? | 1 | 2 | 3 | 4 |
| 49 | Je, umejihisi kupungua kiume kutokana na ugonjwa au matibabu yako? | 1 | 2 | 3 | 4 |
| 50 | Ulivutiwa na ngono kwa kiwango gani? | 1 | 2 | 3 | 4 |
| 51 | Je, ulikuwa unafanya ngono kwa kiwango gani (pamoja na au bila kujamiiana)? | 1 | 2 | 3 | 4 |
| **Tafadhali jibu maswali manne yanayofuata ikiwa tu umekuwa na shughuli za ngono kwa muda wa wiki 4 zilizopita** | | | | | |
| 52 | Ni kwa kiwango gani ngono ilikufurahisha? | 1 | 2 | 3 | 4 |
| 53 | Je, ulikuwa na ugumu wa kupata au kudumisha mshindo? | 1 | 2 | 3 | 4 |
| 54 | Je, ulikuwa na matatizo ya kumwaga manii (km kumwaga kavu)? | 1 | 2 | 3 | 4 |
| 55 | Je, umejisikia kukosa raha kuhusu kujamiiana? | 1 | 2 | 3 | 4 |

## Appendix V: Ethical Clearance Letter



UNITED REPUBLIC OF TANZANIA
MINISTRY OF EDUCATION, SCIENCE AND TECHNOLOGY
MUHIMBILI UNIVERSITY OF HEALTH AND ALLIED SCIENCES
OFFICE OF THE DIRECTOR – RESEARCH, PUBLICATIONS AND INNOVATIONS

Ref. No.DA.282/298/01.C/2217

Date: 29/04/2024

MUHAS-REC-04-2024-2217
RABSON RUBENI
SHOOL OF PUBLIC HEALTH AND SOCIAL SCIENCES
MUHAS

**RE: APPROVAL FOR ETHICAL CLEARANCE FOR A STUDY TITLED: POST RADIOTHERAPY UTILIZATION OF PRIMARY HEALTHCARE AND ASSOCIATED FACTORS AMONG PROSTATE CANCER SURVIVORS**

Reference is made to the above heading,

I am pleased to inform you that the Chairperson has on behalf of the University Senate, approved ethical clearance of the above-mentioned study, on recommendations of the Senate Research and Publications Committee meeting accordance with MUHAS research policy and Tanzania regulations governing human and animal subjects research.

APPROVAL DATE: 29/04/2024
EXPIRATION DATE OF APPROVAL: 29/04/2025

**STUDY DESCRIPTION:**
**Purpose:**
To determine post radiotherapy clinical related factors associated with primary healthcare utilization among prostate cancer survivors treated with radiotherapy at Besta Super Specialized Polyclinic from January 2022 to December 2023.

The approved protocol and procedures for this study is attached and stamped with this letter, and can be found in the link provided: https://irb.muhas.ac.tz/storage/Certificates/Certificate%20-%2015654.pdf and in the MUHAS archives.

**The PI is required to:**

1. Submit bi-annual progress reports and final report upon completion of the study.
2. Report to the IRB any unanticipated problem involving risks to subjects or others including adverse events where applicable.
3. Apply for renewal of approval of ethical clearance one (1) month prior its expiration if the study is not completed at the end of this ethical approval. You may not continue with any research activity beyond the expiration date without the approval of the IRB. Failure to receive approval for continuation before the expiration date will result in automatic termination of the approval for this study on the expiration date.
4. Obtain IRB amendment (s) approval for any changes to any aspect of this study before they can be implemented.
5. Data security is ultimately the responsibility of the investigator.
6. Apply for and obtain Data Transfer Agreement (DTA) from NIMR if data will be transferred to a foreign country.
7. Apply for and obtain Material Transfer Agreement (MTA) from NIMR, if research materials (samples) will be shipped to a foreign country.
8. Apply for and obtain permission to publish the results from National Institute for Medical Research. The application should be before submitting to a publisher and not concurrently through the email publications@nimr.or.tz.
9. Any researcher, who contravenes or fail to comply with these conditions, shall be guilty of an offence and shall be liable on conviction to a fine as per NIMR Act No. 23 of 1979, PART III section 10 (2)
10. The PI is required to ensure that the findings of the study are disseminated to relevant stake holders.
11. PI is required to be versed with necessary laws and regulatory policies that govern research in Tanzania. Some guidance is available on our website https://drp.muhas.ac.tz/.

DIRECTOR Research, Publications & Innovations Box 65001

Dr. Nahya Salim Mabroud,
**Chairperson, MUHAS Research and Ethics Committee**

## Appendix VI: Permission Letter

Besta Diagnostic Centre Ltd

6th May 2024

RABSON RUBEN NAKEY,
Email: nakey79rabson@outlook.com
Mobile: +255768314239.

Dear Rabson Ruben,

**Subject: Permission to Conduct Research at Besta Super Specialized Polyclinic.**

We are pleased to inform you that your request to conduct research at Besta Super Specialized Polyclinic has been granted. After careful consideration of your research proposal titled "Post Radiotherapy Utilization of Primary Healthcare among Prostate Cancer Survivors" we believe that your study aligns with our institution's mission and ethical standards.

Details of the approved research:

- **Research Title:** Post Radiotherapy Utilization of Primary Healthcare among Prostate Cancer Survivors
- **Study Duration:** Two months from the date you receive this letter.
- **Methodology:** Cross section design with primary and secondary data collection.

Please adhere to the following conditions during your research:

1. Obtain informed consent from participants.
2. Maintain participant confidentiality and data privacy.
3. Coordinate with the polyclinic staff for access and scheduling.

We appreciate your commitment to advancing knowledge in the field and wish you success in your research endeavours.

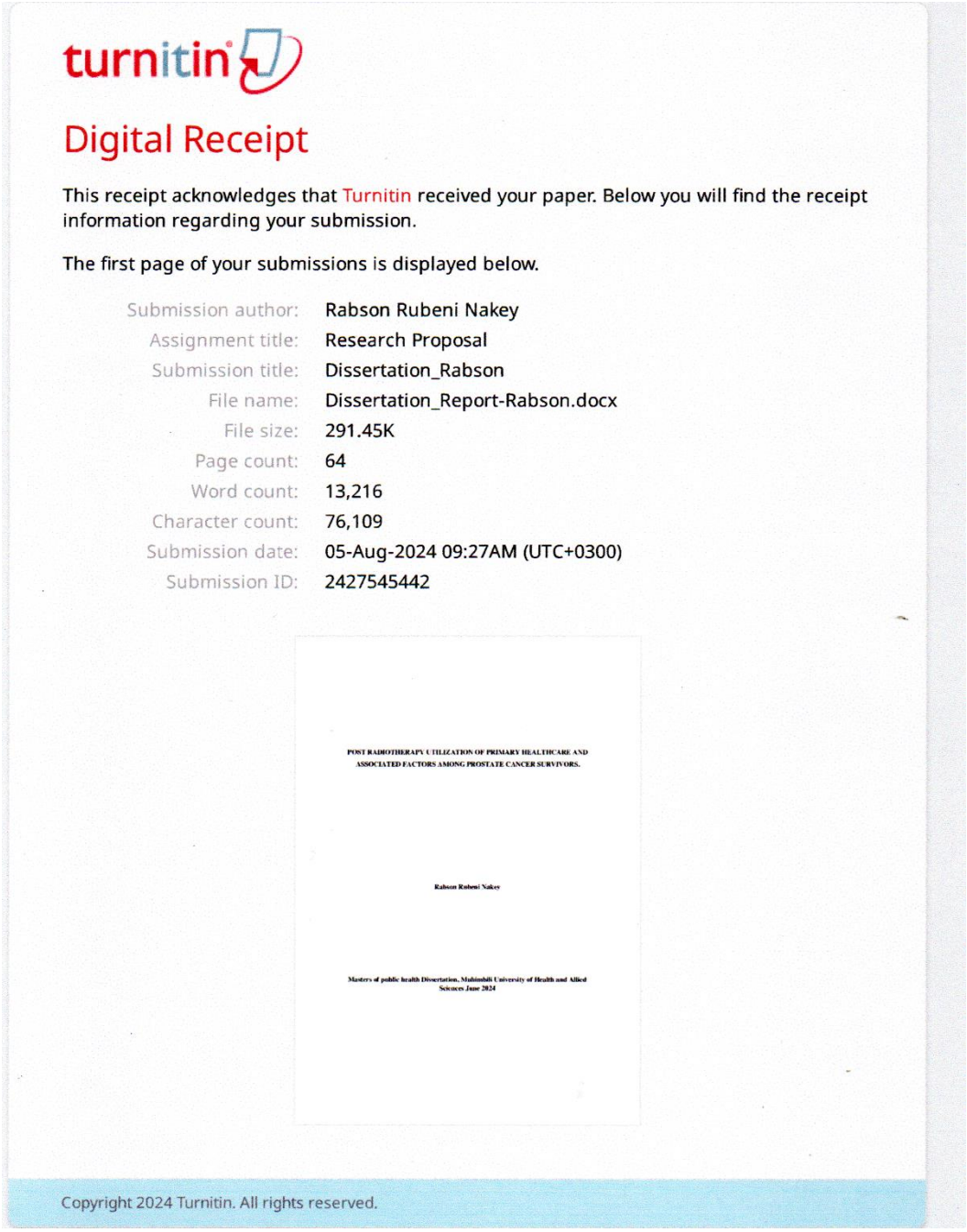
Regards,



Reuben Mringo, Operational Manager, Besta Diagnostic Company.

Tel +255 655 663738/ +255 654 801888, +255 715 281921, +255 656 774099
Plot No. 122 Tunisia Road, Kinondoni - Dar es Salaam
Email: besta2012tz@gmail.com

## Appendix VII: Turnitin Receipt



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Digital Receipt

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The first page of your submissions is displayed below.

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| Assignment title: | Research Proposal |
| Submission title: | Dissertation_Rabson |
| File name: | Dissertation_Report-Rabson.docx |
| File size: | 291.45K |
| Page count: | 64 |
| Word count: | 13,216 |
| Character count: | 76,109 |
| Submission date: | 05-Aug-2024 09:27AM (UTC+0300) |
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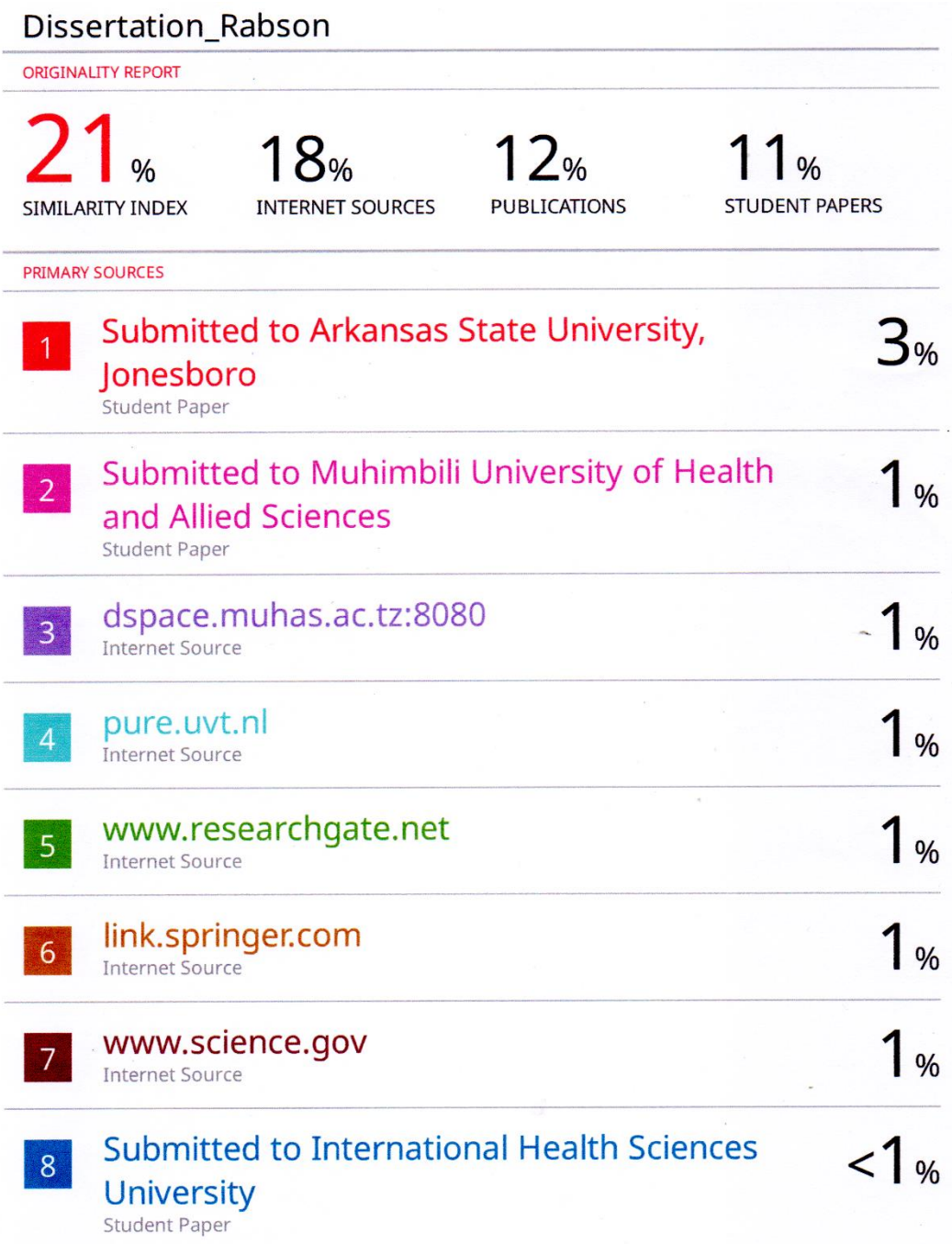
POST RADIOTHERAPY UTILIZATION OF PRIMARY HEALTHCARE AND ASSOCIATED FACTORS AMONG PROSTATE CANCER SURVIVORS.

Rabson Rubeni Nakey

Masters of public health Dissertation, Muhimbili University of Health and Allied Sciences June 2024

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**Appendix VIII: Plagiarism Report**



Dissertation_Rabson

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