PREVALENCE AND ASSOCIATED FACTORS OF CHRONIC KIDNEY DISEASE AMONG HYPERTENSIVE PATIENTS ATTENDING CARDIAC CLINIC AT MUHIMBILI NATIONAL HOSPITAL-MLOGANZILA, TANZANIA

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By

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A Dissertation Submitted in (Partial) Fulfillment of Requirements for the Degree of Master of Science (Nursing Nephrology) of

Muhimbili University of Health and Allied Sciences
October, 2024

CERTIFICATION

The undersigned certify that they have read and hereby recommend for acceptance by Muhimbili University of Health and Allied Sciences a dissertation entitled; **‘‘Prevalence and associated factors of Chronic Kidney Disease among hypertensive patients attending cardiac clinic at Muhimbili National Hospital-Mloganzila’’,** in (partial) fulfillment of the requirements for the degree of Master of Science (Nephrology Nursing) of Muhimbili University of Health and Allied Sciences.

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Date

DECLARATION AND COPYRIGHT

I, **Jamila Abdallah Mwinyimvua**, declare that this **dissertation** is my own original work and that it has not been presented and will not be presented to any other University for similar or any other degree award.

Signature …… **Date** ……..…..

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I am also profoundly grateful to my family for their support and love.

DEDICATION

This dissertation is dedication to my lovely husband Mr. Said S.Said for his social, psychological and physical support during course of study. Also, to my lovely children (Haulat and Hamiar) and whole family for their support during this preparation of my dissertation.

ABSTRACT

Background: Chronic Kidney disease (CKD) is a disease of major public health importance and affects many people globally. Hypertension and Diabetes are major causes of CKD Worldwide. Early detection and prevention of CKD plays a big role in reducing the burden and progression of CKD. Little is known about the prevalence and associated factors of chronic kidney disease among Hypertensive Patients attending cardiac clinic at Muhimbili National Hospital-Mloganzila.

Objectives: To determine the prevalence and associated factors of chronic kidney disease among Hypertensive Patients attending cardiac clinic at Muhimbili National Hospital-Mloganzila

Material and Methods: This was descriptive cross-sectional study design with quantitative approach. The study population included hypertensive patients who were attending Muhimbili National Hospital Mloganzila with estimated sample size of 162. Simple random sampling technique was used to recruit participants. Multivariate and univariate analysis were used to determine the association between factors and CKD status. The p value of less than **0.05** was considered significant.

Results: The proportion of patients with CKD among hypertensive patients was 34 (21%), Male 11 (32.4%), female 23(67.6%) Patients with primary and secondary education had a significantly lower risk of CKD compared to those with no formal education with aOR =0.201, 95% CI: 0.054-0.750, p=0.017 and aOR =0.157, 95% CI: 0.036-0.696, p=0.015 respectively. Additionally, patients without diabetes had a significantly lower risk of CKD compared to those with diabetes (aOR= 0.290, 95% CI: 0.113-0.747, p=0.012) while uncontrolled hypertension have increased risk of CKD (adOR=3.851, 95% CI 0.167-0.921 p=0.045)

Conclusion: There are significant burden of CKD among hypertensive patients. Higher education level, having no diabetic mellitus reduces the risk of CKD while uncontrolled hypertension increases the risk of CKD. There is a need for further studies to explore the underlying causes and progression of CKD among hypertensive patients.

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LIST OF ABBREVIATIONS

ACR	Albumin Creatinine Ratio
BMI	Body Mass Index
BP	Blood pressure
CKD	Chronic Kidney Diseases
CVD	Cardiovascular Disease
DM	Diabetes Mellitus
EGFR	Estimated Glomerular Filtration Rate
ESRD	End Stage Renal Disease
GFR	Glomerular Filtration Rate
HPM	Health Promotion Mode
HTN	Hypertension
IRB	Institutional Review Board
LMIC	Lower Middle Income Country
MNH	Muhimbili National Hospital
MUHAS	Muhimbili University of Heath and Allied Science
NCD	Non Communicable Disease
RRT	Renal Replacement Therapy
UACR	Urine Albumin Creatinine Ratio

OPERATIONAL DEFINITION

Chronic kidney disease (CKD): CKD is defined by the presence of kidney damage or decreased kidney function with an estimated glomerular filtration rate (eGFR) <60 ml/min/1.73m^2 of ACR>30mg/dl for at least 3 months irrespective of cause(Damianaki*et al.*, 2022).

Estimated GFR: Is the test that measures level of kidney function and determines the stage of kidney disease**.** It can be measured by using CKD EPI creatinine equation (2021)

GFR = 142 × min (Standardized Scr/κ, 1) α × max (Standardized Scr/κ, 1)-1.200 × 0.9938Age × 1.012 [if female]

Abbreviations and units

-eGFR (estimated glomerular filtration rate) = ml/min/1.73m2

-Scr (serum creatinine) =mg/dl or µmol/l

-K= 0.7 (females) or 0.9 (males)

α =-0.241 (females) or -0.302 (males)

min = indicates the minimum of Scr/K OR 1

max =indicates the maximum of Scr/K or 1

(Zhao *et al.*, 2022)(KDIGO EXCUTIVE COMMITEE, 2017).

Hypertension: Hypertension was defined as systolic BP >140 mmHq and diastolic BP >90mmHq, or for patient undergoing current treatment of antihypertensive drugs, based on the average of equal or above two accurate blood pressure measurements taken at least in two visits(Tylicki *et al.*, 2015).

Control blood pressure: BP<140/90 mmHg in the last follow up using a digital sphygmomanometer for adult hypertensive clients without diabetes mellitus and chronic kidney disease and BP <130/80mmHg for adult client with DM and CKD in the follow up clinic(Kedokteran, 2021).

BMI (body mass index): a measures of the person's weight in kilogram divided by his height in meter square, based on calculation, body weight was classified as underweight

for a patient with less than 18.5 kg/m^2, normal weight 18.5-24.9kg/m^2, overweight 25-29.9kg/m^2, and obese for patients with BMI >30kg/m^2(Akpor *et al.*, 2022).

Proteinuria: according to the laboratory result, if a patient had plus one and above, we classify as having proteinuria in the laboratory result. Persistent proteinuria is defining as a marker of renal injury regardless of eGFR(Hailu *et al.*, 2024).

CHAPTER ONE

1.0 INTRODUCTION

1.1 Background

Chronic kidney disease (CKD) is common, costly, and associated with tremendous morbidity and mortality. The prevalence and burden of CKD are increasing most rapidly in low and middle income countries (LMIC), and the corresponding increase in the demand for expensive kidney replacement therapies is a major challenge for health systems worldwide(Tonelli *et al.*, 2020**).**

In higher income countries the burden of CKD is also high and costly, about2-3% of their annual country budget is reported to be spent on the treatment of end stage renal disease (ESRD), however the percentage of population which receives such treatment is less than 0.03% of the population(Neale, Middleton and Lambert, 2020)**.**

Kidney Disease Improving Global Outcome (KDIGO) classifies patients with CKD into stages according to level of estimated glomerular filtration rate (eGFR) and albuminuria based on the risk of progression to ESRD. Most patients with CKD are usually asymptomatic until the disease become advanced, when eGFR< 30ml/min/1.73m^2 (Ramakrishnan *et al.*, 2022).

The prevalence of CKD risk factors, such as diabetes, obesity and hypertension is high in African continent (Ngendahayo *et al.*, 2019).However, there is a low habit of screening for early detection of CKD among at risks patient in African countries (Eze, 2017).The role of screening for CKD among high risk groups such as the elderly and patients with co morbid conditions such as diabetes, hypertension and CVD, or a family history of CKD, has been noted to be efficient in developed countries, its efficacy in developing countries has not yet been evaluated in detail (Al-ghamdi*et al.*, 2023).

The presence of CKD increases the risk of hospitalization, cardiovascular events, also can progress to advanced renal failure, ESRD, and even death. Early detection is critical for initiating timely therapeutic interventions, limiting nephrotoxin exposure, preventing further reduction in GFR and preparing for renal replacement therapy(Beniboba *et al.*, 2023).

Inexpensive treatments can slow the rate of kidney function loss, and since CKD is asymptomatic until its later stages, there is some enthusiasm for at risk group based screening to enable early intervention in both Lower Income Countries (LMICs) and high Income countries (HICs)(Tonelli and Dickinson, 2020).

Effective early screening and detection of CKD among hypertensive patients will increasingly recognized as a key strategy to ensure the delivery of efficient and safe care and has been shown to contribute to greater rates of assessment and treatment(Greer *et al.*, 2019).

As chronic kidney disease (CKD) is asymptomatic in nature at early stage, it take long time to be recognized, early detection through screening of at risk group is of great significance(Wolide *et al.*, 2020).

Early identification of CKD by screening for kidney disease, followed by risk stratification and treatment, offers the potential to substantially reduce the morbidity and mortality from CKD and its related complication, such as cardiovascular disease(Shlipak *et al.*, 2021).

Hypertension (HTN) is a well-known risk factor for the development of CKD, progression to end stage Renal Disease (ESRD), cardiovascular disease (CVD) and mortality (Weldegiorgis, 2020). It is therefore crucial that hypertensive patients should be screened for early detection of CKD(Chow *et al.*, 2012)**.**

CKD prevention internationally has been focused on screening programs that increase awareness and early detection of CKD among at risk population.

1.2 Problem statement

CKD is the major public health concern in Sub Saharan Africa including Tanzania among patients with hypertension (Oluwademilade *et al.*, 2020) There was high prevalence of hypertension (25.7-45%), in Tanzania, hence made people to be at high risk of CKD (Katatwire, 2022). The prevalence of CKD in Tanzania was between 7% to 15%among adults living in urban and 2% in rural areas. Hypertension-related diseases are the most common cause of CKD accounting for most of deaths in Tanzania (Katatwire, 2022). Chronic Kidney Disease detected late, causes many complications such as anemia, cardiovascular disease, hypertension, volume overload, electrolyte imbalance, mineral bone problem, and abnormalities in the acid-base balance (Al-zaman *et al.*, 2023). CKD when it is in advance stage can cause catastrophic health expenditure such as the costs of dialysis and transplantation consume(Kam *et al.*, 2020)**.** Even though renal transplant and dialysis services have been recently become available, they are very expensive and majority cannot afford it. Despite that, there was high prevalence of CKD among hypertensive patients; there was high financial burden of treatment in terms of dialysis, and kidney transplant. Little was known on the prevalence and associated factors of CKD among hypertensive patients in Tanzania. This study aimed at determining the prevalence and associated factors of CKD among hypertensive patients attending cardiac clinic at MNH Mloganzila.

1.3 Conceptual framework

The conceptual framework in this study was adapted from the Health Promotion Model (HPM) (Figure 1). The HPM was created in 2011by Pender, N.J., Murdaugh provide basis for investigative work on health behavior(Pender, 2013). The model identifies background factors that influence health behavior. The central focus by the model is on eight beliefs that can be assessed by the nurse. Using the model and working collaboratively with the patient or client, the nurse can assist the client in changing behaviors to achieve a healthy lifestyle(Pender, 2011).

This study used adapted HPM to assess the association of social demographic, clinical profile and behavioral factors on CKD status (health outcome) among hypertensive patients attending cardiac clinic at MNH Mloganzila.

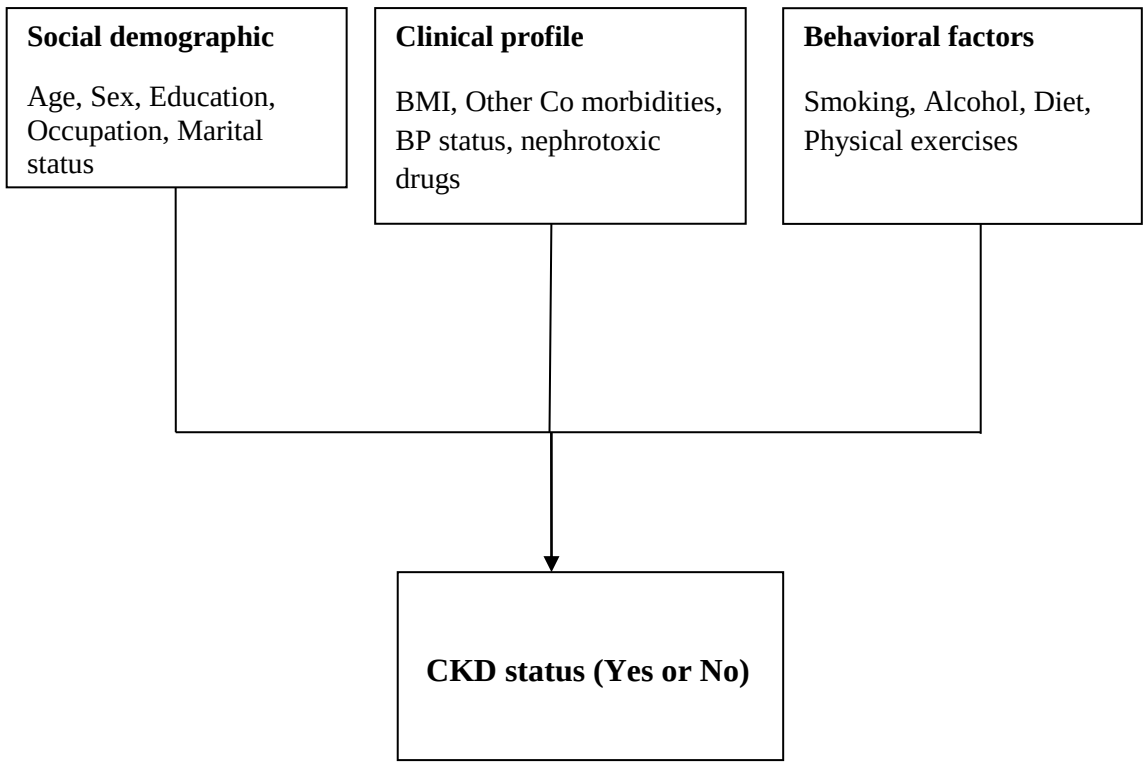


Figure 1: Conceptual framework adapted from Health Promotion Model (HPM)(Pender, 2011)

1.4 Rationale

Understanding the prevalence and associated factors of CKD among hypertensive patient was vital because if detected early CKD progression can be impeded. The approaches to prevent CKD risks both traditional and nontraditional are cost effective and reduce the overall non communicable disease burden, due to disease burden, patients in the earlier stages of CKD are more likely to die from the disease than progress to ESRD. The study provided valuable data to health professional so as they can prevent CKD. Secondary prevention strategies of CKD is done through early detection by screening high risk individuals and providing them with early treatment , this provides a positive impact on both morbidity and mortality outcome in Tanzania like LMIC the enormous cost of RRT prohibit their accessibility. For the health practitioner understanding the factors associated with CKD among hypertensive patients provided opportunity to provide targeted therapy implementation, which subsequently will reduce the incidence of adverse and costly effects such as progression to end stage renal disease, which will lead to reduction of morbidity and mortality.

This study is part of partial fulfillment of Master of Science of Nursing in Nephrology Degree at Muhimbili University of Health and Allied Science.

1.5 Research questions

1.5.1 Main Research question

What is the prevalence of CKD and associated factors among hypertensive patients attending cardiac clinic at MNH Mloganzila

1.5.2 Specific Research questions

i. What is the proportion of CKD among Hypertensive patients attending cardiac clinic at MNH Mloganzila.
ii. What are the clinical profiles of hypertensive patients attending cardiac clinic at MNH Mloganzila
iii. What are the factors associated with CKD among hypertensive patients attending cardiac clinic at MNH Mloganzila.

1.6 Objectives

1.6.1 Main Objective

To determine the prevalence of CKD and associated factors among hypertensive patients attending cardiac clinic at MNH Mloganzila

1.6.2 Specific Objectives

i. To determine the proportion of patients with CKD among hypertensive patients attending cardiac clinic at MNH Mloganzila
ii. To determine the clinical profile of hypertensive patients attending cardiac clinic at MNH Mloganzila
iii. To determine factors associated with CKD among hypertensive patients attending cardiac clinic at MNH Mloganzila.

CHAPTER TWO

2.0 LITERATURE REVIEW

2.1 Proportion of CKD among Hypertensive Patients

2.1.1 Overview of CKD

Chronic kidney disease (CKD) is a multifactorial condition, resulting from reduced number of nephrons in response to an ongoing inflammatory process. With non-communicable diseases (NCD) such as hypertension (HTN), Diabetes Mellitus (DM) and Cardiovascular diseases and infection like HIV, CKD remain as silence epidemiology disease and of affluence in the 21st century (Jazienicka-kiełb *et al.*, 2022).

CKD is a progressive disease, with five stages, that affects all bodily systems. Most patients are asymptomatic in the early stages and begin to develop nonspecific symptoms such as tiredness, as result diagnosis is often delayed (Stanifer *et al.*, 2018).

In the early stage of CKD which are asymptomatic, the only marker which suggest the damage of kidney is presence of proteinuria which done by urinalysis and Albumin Creatinine Ratio(ACR) (Tylicki *et al.*, 2015).

The progression of CKD can often lead to numerous complications that are noted at lower levels of kidney function. Some of these complications include Hypertension, Cardiovascular Disease (CVD), mineral bone disorder, anemia and volume overload along with acid base and electrolyte abnormalities. Some of these complications can worsen kidney function as resulting in morbidity, poor quality of life and mortality (Alghamdi *et al.*, 2023).

2.1.2 Hypertension and CKD

Nearly 700 million persons worldwide have chronic Kidney disease (CKD), and the burden fall disproportionately upon socially disadvantaged and other vulnerable group (Shlipak *et al.*, 2021). In many regions, persons with lower social economic status have higher prevalence of CKD, limited access to treatment and poor outcome which end up with ESRD(Thomas, Kanso and Sedor, 2008).The prevalence of hypertension in Tanzania between 25.7-45% (Katatwire, 2022).

Chronic Kidney Disease (CKD) and Hypertension (HTN) are two diseases with strong cause and effect interrelationship, Hypertension is a typically recognized principal risk factor of CKD while in reciprocal, a decrease in renal function lead to hypertension which in turn accelerates the progression to renal failure(Chu *et al.*, 2021).

In Sub Saharan Africa about 32.3% among hypertensive patients have CKD, and 6% of patients with essential hypertension have chronic kidney disease (CKD) who are at risk of develop progression of end stage renal disease (Bahrey *et al.*, 2019).The prevalence of CKD in Tanzania is 7% to 15% among adults living in urban areas while is 2% in rural areas (Katatwire, 2022).

Hypertension is a major risk factor for cardiovascular and renal disease, even though, chronic kidney disease (CKD) is the most common form of secondary Hypertension and evidence suggests it is an independent risk factor for cardiovascular morbidity and mortality (Tedla *et al.*, 2011).

Hypertension is the second leading risk factors for CKD; it occurs in 67% to 92% of patient with CKD, with increase prevalence of renal function declines. Hypertension for 28% of CKD cases, and treatment of HTN among CKD patients is challenging by directional cause (Tegegne *et al.*, 2020).

The burden of both Hypertension and uncontrolled hypertension is expected to increase significantly due to increasing urbanization and ongoing epidemiological transition in Tanzania and the rest of LMICs (Katatwire, 2022).Despite knowing the overall prevalence of CKD, there was limited information on the prevalence of CKD among hypertensive patients in Tanzania. This study determined the prevalence of CKD among hypertensive patients in Tanzania.

2.2 Clinical profile of hypertensive patients

2.2.1 Magnitude of hypertension

Hypertension is a chronic disease that is increasing in prevalence worldwide; an estimated 1.13 billion people worldwide have hypertension. Most (two thirds) of them are living in low and middle income countries (Oluwademilade *et al.*, 2020).It is expected that by 2025

number of people with hypertension will increase to 1.56 billion people, and the prevalence of hypertension is predicted to increase by 24% and 80% in developed and developing countries (Asmelash *et al.*, 2020).

2.2.2 Classification of hypertension

According to Seventh report of the Joint National Committee on Prevention and Detection, Evaluation and treatment of High Blood Pressure (JNC7) classify hypertension with BP as

Normal patient present with SBP <120mmHg and DBP <80 mmHg

Prehypertension SBP 120-139mmHg and DBP 80-89mmHg

Stage 1 hypertension SBP 140-159mmHg and DBP 90-99mmHg

Stage 2 hypertension SBP >160mmHg and DBP > 100mmHg

Severe hypertension SBP >180mmHg or DBP >110mmHg(Pressure *et al.*, 2016)

2.2.3 Characteristics of patients with hypertension

Studies investigated there's relationship between level of education with hypertension, those with higher education have the lowest prevalence of hypertension(Tedesco *et al.*, 2001). Further studies show that, the prevalence of Hypertension in individuals with 40 years and older increased significantly (Sun *et al.*, 2022).

In additional study, show that the prevalence of hypertension is higher among men compared women age 18-39 compared with age 40-59 years (States *et al.*, 2020).

2.2.4 Pathophysiology of Hypertension in CKD

Pathophysiology of hypertension and chronic kidney disease related in such that, long term HTN can lead to poor kidney function, and renal function decline can lead to worsening blood pressure control. Other mechanism contributes the hypertension include increased salts absorption resulting in volume expansion, an impaired response of the rennin angiotensin aldosterone systems (RAAS) and increase activation of the sympathetic nervous system. These changes lead to the development of increased total peripheral resistance and increased after load, which in turn leads to the development of hypertension (Kam *et al.*, 2020).

2.2.5 Management of Hypertension in Chronic Kidney Disease

Accordingly, several guidelines recommended early detection and treatment of HTN to delay the disease's progression and reduce its complications (Weldegiorgis, 2020).

Treating albuminuria, lowering cardiovascular risk, avoiding nephrotoxic medications, and modifying dosages in accordance with renal function are all part of the therapy of CKD (Chen TK, 2019).

An Angiotensin converting enzyme (ACE) inhibitors or Angiotensin receptor blockers (ARB), Diuretics together with medications such as beta blocker or calcium channel blocker help to protect kidney functions and lower risk for heart disease(People and Stages, 2019),to achieve treatment goal of BP less than 130/80mmHq for CKD patients(Ku *et al.*, 2019).

In hypertensive patient with CKD, diuretic therapy can be used to reduce volume expansion, in proteinuric CKD loop diuretic such as Furosemide can be used while in non proteinuric CKD Thiazide such as Bendroflumethiazide can be used(Kelepouris, St and Joshua, 2023).

Calcium channel blocker Dihydropyridine (Amlodipine) can be used as first line therapy of hypertension in CKD patient with non proteinuric, while in proteinuric CKD guideline allow combination therapy with ACE inhibitors and Calcium Channel Blocker (CCB) (Kelepouris, St and Joshua, 2023).

Non pharmacological management for hypertensive patient with CKD includes reducing dietary salts, weight loss, life styles modification, shared decision making and continuity of care(Pugh, Gallacher and Dhaun, 2019).

2.3 Factors associated with CKD

2.3.1 Social Demographic factors

CKD can develop in any age, however it become common with increasing age, after the age of 40, kidney filtration begins to fall by approximately 1% per year(Hojs, 2023). Older age with increased BP uncontrolled, among the risk factors of developing chronic kidney diseases for hypertensive patients.(Partial and Of, 2012) .CKD also affect economically mainly productive young societies between ages of 20-50 years (Meskelu Kidu Weldentensae, 2022). In low income countries, age>60, was associated with increase risks of CKD (Hospital and Ababa, 2018)

Studies on gender and CKD have shown that male are more at risk of developing hypertension and chronic kidney disease than female sex (Kedokteran, 2021; Katatwire, 2022). Furthermore, poor literacy level contribute to the burden of Hypertension and CKD (Akpor *et al.*, 2022).

2.3.2 Clinical factors associated with CKD

Obesity have risk factors for development of cardiovascular and renal disease through several mechanism including hypertension, dyslipidemia, inflammation, atherosclerosis, vasoconstriction, salts and water retention caused by obesity. Also, worsen hypertension and increase insulin resistance and glucose intorelence are risk factors of CKD (Hall *et al.*, 2014) Study show that people with BMI >30kg/m^2 have high risk of developing hypertension and CKD (Bahrey *et al.*, 2019)

In low income countries, infectious disease and use of nephrotoxin drugs were associated with increase risks of CKD (Hospital and Ababa, 2018).Furthermore, Diabetes Mellitus HIV and Chronic Gromerulanephritis among the leading cause of Chronic Kidney Disease in Sub Saharan Africa (Wolide *et al.*, 2020).

2.3.3 Behavioral factors associated with CKD

Studies show that smoking has been linked with increased risk of hypertension and chronic kidney disease (Katatwire, 2022).In addition to smoking**,** heavy alcohol consumption is also a major risk factors on development of hypertension and CKD (Region, 2023).Furthermore**,** physical inactivity has contributes factors in developing of hypertension and chronic kidney disease (Katatwire, 2022).Despite high prevalence of CKD in Tanzania, factors associated with CKD among hypertensive patients are not well known, hence this study will address the social, clinical and behavioral factors associated with CKD among hypertensive patients.

CHAPTER THREE

3.0 METHODOLOGY

3.1 Study design

Descriptive Cross-sectional study design with quantitative approach was used to determine the prevalence of CKD and associated factors among hypertensive patients attending cardiac clinic at Muhimbili National Hospital Mloganzila.

3.2 Study population

The study population included all hypertensive patients attending cardiac clinic at Muhimbili National Hospital Mloganzila with the age of 18 years and above. There were about 40 to 50 hypertensive patients for each clinic.

3.3 Study area

Muhimbili National Hospital Mloganzila located in Kibamba Ward Mloganzila Street at Ubungo Municipal in Dar Es Salaam. The hospital has a capacity of 608 beds. It has different departments and receives Referral from different hospitals in Tanzania. The research was carried out at the department of Internal Medicine in Cardiology Unit. Within there is an outpatient clinic for hypertensive patients which is conducted five days a week, from Monday to Friday according to available clinic timetable. This clinic serves 40 to 50people per day according to JEEVA system.

3.4 Sample size estimation

Formula for sample size $N = \frac{Z^2 P(1-P)}{E^2}$

Where by N= Sample size

Z= value for confidence level 95% (1.96)

P= previous of other study (prevalence of CKD in hypertensive patients in Africa 24.7, (Oluwademilade *et al.*, 2020))

E= margin of error e=5

Half of previous study 12

$$N = \frac{(1.96)^2 \times 12\ (100-12)}{5^2}$$

$$=\frac{3.8 \times 12 \times 88}{25}$$

=162

Therefore, the calculated sample size for hypertensive patients in this study will be 162.

3.5 Sampling procedure

The participants were recruited during the study period by simple random technique. All hypertensive patients who attending were given a unique numbers which are continuing chronologically to the next collection day. Information about study was given to patients before service, and patients were inverted to participate. Patients that agree to participate and who meet the inclusion criteria were randomly chosen by using a lottery random number and put in a box. The lottery method was used to pick 25 patients in each day until the sample size was reached.

3.6 Inclusion and Exclusion criteria

3.6.1 Inclusion criteria

The inclusion criteria for enrolment included patients with 18 years and above attending at cardiac clinic at MNH Mloganzila, and diagnosed with hypertension for at least three months or more, and consented to participate in the study

3.6.2 Exclusion criteria

Pregnant women who were diagnosed with pregnancy-induced Hypertension were excluded.

3.7 Study Variables

3.7.1 Dependent variable

The presence or absence of chronic Kidney disease was the dependent variable.

3.7.2 Independent variable

The independent variables were Socio-demographic information (age, sex, education, occupation, and marital status), clinical profile (BMI, Comorbidities, BP status, nephrotoxic drugs) and behavioral factors (smoking, diet, alcohol, physical exercise).

Operational definition of independent variable

Hypertension: According to JNC7 guideline individual who have systolic BP >140 mmHg and diastolic BP >90 mmHg, or systolic BP >130mmHq and diastolic BP 80mmHq for patient undergoing current treatment of antihypertensive drugs, based on the average of equal or above two accurate blood pressure measurements taken at list two visit (Tylicki *et al.*, 2015).

Controlled hypertension

According to JNC7 guideline define individual have BP<140/90mmHg for adult hypertensive clients without diabetes mellitus and chronic kidney disease and BP <130/80mmHg for adult client with DM and CKD in the follow up clinic (Oluwademilade *et al.*, 2020).

Uncontrolled hypertension

Is an average systolic pressure >140mmHg or an average diastolic pressure >90mmHg among those with hypertension based on average of three measurements with patient with or without antihypertensive treatment (Kedokteran, 2021).

BMI : a measures of the person's weight in kilogram divided by his height in meter square, based on calculation, body weight was classified as underweight for a patient with less than 18.5kg/m^2, normal weight 18.5-24.9kg/m^2, overweight 25-29.9kg/m^2, and obese for patients with BMI >30kg/m^2 (Belachew *et al.*, 2018).

Alcohol exposure: participant intake of alcohol or consumption of local or manufactured alcohol beverage on daily, 2 drinks or less than in a day for men or 1 drink or less in a day for women. More than that will be considered as alcohol consume r(Akpor *et al.*, 2022).

Smoking: the patient's response/ record of who smokes or ever smoke, participant who smoke more than one cigarette per day term as smoker and who never smoke term as non-smoker (Region, 2023).

Physical activity: adult with chronic condition advise to get at least 150 minutes (30 minutes 5 days a week) of moderate intensity aerobic physical activity and get 2 days a week of muscle strengthening activities.

Co morbidity: is presence of any health conditions other than hypertension DM,HIV(Meskelu Kidu Weldentensae, 2022).

Non steroid anti inflammatory drugs (NSAID) used: if patient taken ibuprofen, diclofenac, indometicin or aspirin for at least 2 weeks they consider NSAID user and at risks of nephrotoxic drugs (Hailu *et al.*, 2024).

Proteinuria: participant consider have proteinuria if the laboratory results show +1 and above for the urinalysis test(Region, 2023).

3.8 Data collection methods

Data were collected by using a modified questionnaire from (Al-Zaman, 2023) which was translated from English to Kiswahili, and patient review medical chart from the JEEVA system. The questionnaire was divided into four parts. The first part includes Socio-demographic information of study participants and second part included clinical profile, the third part included behavioral characteristics and the fourth part included the clinical evaluation and assessment of CKD by using the results from patient medical review record. The assessment of CKD will be done by observing presence of proteinuria in the urinalysis results in the JEEVA system of the nearest last visit, not more than 3/12 date of enrollment to the study. The presence protein of plus 1 or greater in urine was considered as kidney injury regardless of eGFR while the absence of protein in urine was considered as no sign of kidney injury. CKD EPI creatinine equation calculator used serum creatinine results in the JEEVA system of the nearest last visit, not more than 3/12 date of enrollment to the study to calculate the eGFR.

Blood pressure measurements

BP measurement was taken after patient had rested quietly in sitting position for at least five minutes with arm at the level of heart and the feet together. An appropriate cuff size with digital BP machine used depending on the size of the participant arm. Both mean systolic BP and mean diastolic BP were defined as average of the first three measurements. The current weight in kilogram and height in centimeter were recorded to calculate BMI.

Researcher collected data and 1 trained research assistant. The research assistant was a health professional who received 2 days training on the use of data collection tool. At the nursing station, the participant's measurements of BP, weight, height were taken and interviewed in private space to allow privacy before they went to for their doctors' consultation room.

Univariate analysis used to determine the association between BP status (controlled or uncontrolled) and CKD. P value is less than 0.2 on univariate analyses was assessed on multivariate analysis to determine if the association is true and was not confounded by other factors.

Estimation of Glomerular Filtration rate

eGFR was used to estimate how well kidneys are functioning. By using CKDEPI creatinine equation 2021

$GFR = 142 \times \min(Scr/\kappa, 1)\alpha \times \max(Scr/\kappa, 1)-1.200 \times 0.9938Age \times 1.012$[if female]

Abbreviation and units

eGFR (estimated glomerular filtration rate) =ml/min/1.73m2

-Scr (serum creatinine) mg/dl or µmol/l

-K= 0.7 (females) or 0.9(males)

α =-0.241(females) or -0.302 (males)

min =indicates the minimum or Scr/K OR 1

max= indicates the maximum of Scr /K or 1

The eGFR would be used to determine the CKD status

Anthropometric measures

Height was measured by using height scale with stadiometer and recorded in nearest centimeter and weight by using calibrated digital weighing scale and recorded in kilograms

Height

Patient informed to be in standing position put off shoes, hat on head keep his legs straight, arms are at sides and shoulders at level and straight ahead. The height was used to calculate Body Mass Index (BMI)

Weight

Weight was measured using digital weigh scale participant should remove shoes, outer clothes like jackets, heavy contents like handbag, mobile phones, scale was reset to show 0.0kg, participant was told to stands at the centre of the scales with arms hanging loosely by their sides, head should face forward and not looking down. The weight was used to calculate Body Mass Index (BMI)

BMI

BMI obtained by calculating weight in kilogram and divided by height in meter square (kg/m^2), height was measured when patient in standing position. Univariate analysis used to determine the association between BMI and CKD. P value of less than 0.2 on univariate analysis were assessed on multivariate analysis to determine if the association was true and was not confounded by other factors.

3.9 Reliability and Validity issues

Validity: The questionnaire was developed after a thorough review of the previously published studies in other settings on the same topic. The content validity was checked. To check whether the questionnaire was well understood a pilot study of 15 hypertensive patients was done at Muhimbili National Hospital Mloganzila at cardiac clinic, as pre test to validate and check the reliability of the instrument prior to the real study. In terms of validity, the supervisor and nephrologists checked the suitability to adopt the questionnaire for the current study to check the language and terms used if fit the current situation. The modified English questionnaire translated to Swahili since the medium of instruction in our country is Kiswahili. The tool was pretested to assess if they could be understood by the respondents.

Reliability

Reliability refers to the consistency or stability of the questionnaire measuring variables. The questionnaire should provide the same results (consistent) to be reliable. The questionnaire was administered by researcher on two different days at MNH Mloganzila to 15 hypertensive patients and the compare the response to check test-retest reliability. The questionnaire was corrected after pilot study.

3.10 Data analysis plan

All data managed and analyzed by using SPSS version 23. Data cleaning was done before analysis. Mean and standard deviation was used for normally distributed continuous data while median and range was used for asymmetrical continuous data. Proportion and frequencies were used for categorical data. Univariate and Multivariate analysis was used to determine the association between social demographic characteristics, clinical profile and behavioral factor with CKD status.

3.11Ethical consideration

The ethical approval was obtained from Institution Review Board (IRB) of Muhimbili University of health and Allied Sciences (MUHAS), reference no DA.282/298/01.C/2308 and permission to collect data was obtained from management of Muhimbili National Hospital-Mloganzila, ref No.JA.294/428/01C/005 Written informed consents were given to every participant who was participated to the study before the commencement of data collection. Privacy and confidentiality of study participants were observed and a coding system was used for identification instead of patient's names. Care was taken to ensure that this study does not harm the participant in any way, whether physical, psychological, or social. Informed consent was in English and translated into Swahili, which is the common language used by most Tanzanians.

3.12 Study limitations and mitigation

Potential to recall bias since data collection was involved recalling some past information (review of medical record chart) and the structured questionnaire was not giving chance to the participants to explore more on behavioral factors. It is difficult to establish causal relationship because the outcome and exposure variables measures at the same time. To mitigate both recall bias and limitation of exploring more information, the well-designed structured questionnaire was used in interviewing the participants.

3.13 Dissemination of findings

Following the completion of this study, a copy of the research findings will be presented to MUHAS - School of Nursing. In addition, study results will be shared to the Directorate of Research and Training at MNH Mloganzila where the study will be carried out.

Moreover, the findings will be presented in academic journals, scientific conferences, professional gatherings, conferences and symposiums.

CHAPTER FOUR

4.0 RESULTS

4.1 Socio-demographic characteristics

A total of 162 hypertensive patients were recruited in the study 60(37%) were male and 102(63%) were female. The mean age of this study was 61.2±13.67 years, more than half of study population being in age of ≥ 61(55.6%) majority of patients 138(85.2%) were insured.

Table 1: Social demographic characteristics

S/N	Variable	Category	CKD	NO CKD	Frequency	Percent (%)
1.	Age (years)	18-35	1	8	9	5.5
		36-45	2	11	13	8.0
		46-60	12	38	50	31
		≥ 61	19	7	90	55.5
2.	Sex	Male	11	49	60	37
		Female	23	79	102	63
3.	Insurance status	Insured	28	110	138	85
		Not insured	6	18	24	15
4.	Marital status	Married	20	94	114	70
		Single	2	6	8	5
		Divorce/separate	1	2	3	2
		Cohabit	1	0	1	1
		Widow/widower	10	26	36	22
5.	Education level	No formal education	6	5	11	7
		Primary	16	72	88	54
		Secondary	7	41	48	30
		Collage/ university	4	11	15	9
6.	Occupation	Peasant	22	71	93	57.4
		Business/self-employee	7	44	51	31.5
		Employed	5	11	16	9.9
		Unemployed	0	2	2	1.2

4.2 The prevalence of CKD among hypertensive

The proportion of patients with CKD among hypertensive patients was 34 (21%) male11 (32.4%) and female 23(67.6%), with 95% CI (14.8-27.2). The results are in figure 2.

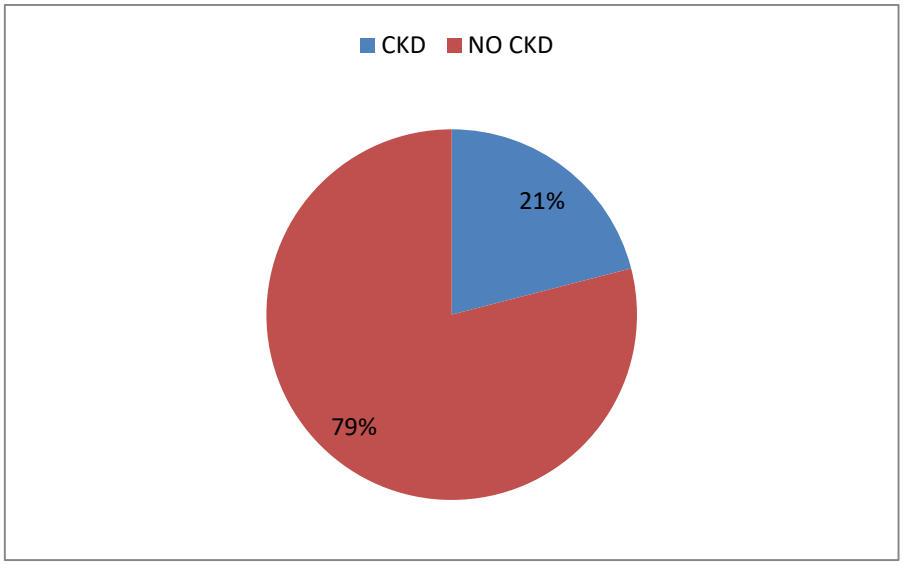


Figure 2: The proportion of patients with CKD among hypertensive patients

4.3 The clinical profile

4.3.1 Clinical characteristics

The clinical profile of hypertensive patients attending the cardiac clinic revealed a mean BMI of 27.24±5.61 kg/m², with 61 (37.7%) having normal BMI and overweight. Most patients, 155 (95.7%), were on oral antihypertensive medications. About 26(16%), were diabetic. HIV positive was reported in 8 (3.7%) of the patients. NSAID use was common, with 112 (69.1%) of the patients, 67 (41.4%) used herbal medicine. Most patients, 140 (86.4%), had no proteinuria, and serum creatinine levels were normal in 120 (74.1%). Hemoglobin levels were low in 92 (61.7%) of the patients. Echocardiography results were abnormal in 4(4.2%) of the cases. Other results are in table 2.

Table 2: Clinical characteristics

S/N	Variable	Category	CKD	NO CKD	Frequency	Percent (%)
1.	BMI(kg/m^2)	<18.5 (Underweight)	1	3	4	2.4
		18.5-24.9 (Normal)	12	49	61	37.7
		25-29.9 (Overweight)	15	46	61	37.7
		≥30 (Obese)	6	30	36	22.2
2.	Duration of hypertension (years)	≤1	0	12	12	7.4
		>1 to 3	14	39	53	32.7
		>3 to 5	5	34	39	24.1
		>5	15	43	58	35.8
3.	Management of hypertension	Conservative management	3	4	7	4
		Oral ant hypertensive	31	124	155	96
4.	Diabetic	Yes	11	15	26	16
		No	23	113	136	84
5.	Duration of diabetic (years)	≤2	2	0	2	7.7
		>2 -5	4	7	11	42.3
		>5 -10	4	5	9	34.6
		>10	1	3	4	15.4
6.	Diabetic management	Lifestyle modification	0	0	0	0
		Oral hypoglycemic	8	15	23	88.5
		Injection insulin	3	0	3	11.5
7.	HIV status	Negative	31	114	145	89.5
		Positive	0	6	6	3.7
		Unknown	3	8	11	6.8
8.	Use of NSAID	Yes	26	86	112	69
		No	8	42	50	31
9.	Duration of NSAID (month)	≤1	17	67	84	75
		2-3	5	16	21	19
		>3	4	3	7	6
10.	Use of herbal usage	Yes	14	53	67	41
		No	20	75	95	59

11.	Duration of herbal use (months)	≤1	8	20	28	40
		2-3	5	32	37	53
		>3	1	4	5	7
12.	Protein in urine	Negative	26	114	140	86.4
		+1	4	8	12	7.4
		+2 and above	4	6	10	6.2
13.	Hemoglobin level	Low	19	73	92	61.7
		Normal	11	46	57	38.3
14.	Cholesterol	Normal	14	34	48	57.1
		Elevated	4	32	36	42.9
15.	Echo results	Normal	18	73	91	95.8
		Abnormal	2	2	4	4.2
16.	Hypertension status	Control Hypertension	12	65	77	47.5
		Uncontrolled Hypertension	22	63	85	52.5

4.3.2 Behavioral characteristics

The behavioral factors among hypertensive patients attending cardiac clinic showed that, half of patients 87(53.7%) was reported have alcohol consumption, above three quarter 159 (98.1%), reported engaging in regular physical exercise while half of study participants 82(50.6%) was received nutritional counseling. Other behavior characteristics shown on the table 3.

Table 3: Behavioral characteristics

S/N	Variable	Category	Frequency	Percent (%)
1.	Ever smoked	Yes	20	12.3
		No	142	87.7
2.	Duration of smoking	<2	7	35.0
		2 -<5	3	15.0
		5-<10	6	30.0
		10 and above	4	20.0
3.	Still smoking	Yes	3	15.0
		No	17	85.0
4.	Ever drink alcohol	Yes	87	53.7
		No	75	46.3
5.	Duration of drinking	2 or less	22	25.3
		3-5	37	42.5
		6-10	22	25.3
		above 10	6	6.9
6.	Still drinking	Yes	25	28.7
		No	62	71.3
7.	Doing regular physical exercise	Yes	159	98.1
		No	3	1.9
8.	Duration of physical exercise (hours/week)	30 minutes	56	35.2
		31-60	51	32.0
		61-120	49	30.8
		121 and above	3	2.0
9.	Use of regular table salt	Yes	22	13.6
		No	140	86.4
10.	Received Nutritional counseling	Yes	82	50.6
		No	80	49.4

4.4 Predictors of CKD among hypertensive patients

4.4.1 The socio-demographic and behavioral factors associated with CKD among hypertensive patients

The study showed social demographic and behavioral factors associated with CKD among hypertensive patients, education level was a significant factor. Patients with primary education had a significantly lower risk of CKD compared to those with no formal education (aOR =0.201, 95% CI: 0.054-0.750, p=0.017). Similarly, those with secondary education also had a significantly lower risk (aOR =0.157, 95% CI: 0.036-0.696, p=0.015). No significant associations were observed for age, sex, insurance status, marital status, occupation, smoking, alcohol consumption, regular use of table salt, and receipt of nutritional counseling, as indicated by their p-values being greater than 0.05.

Table 4: Social demographic and behavioral factors associated with CKD among hypertensive

S/N	Variable	Category	Univariate				Multivariate			
			unOR	95% CI		P value	aOR	95% CI		P value
				Lower	Upper			Lower	Upper	
1.	Age (years)	18-35	Ref							
		36-45	1.455	.112	18.956	.775				
		46-60	2.526	.286	22.300	.404				
		≥ 61	2.141	.252	18.189	.486				
2.	Sex	Male	Ref							
		Female	1.297	.582	2.892	.525				
3.	Insurance status	Insured	Ref							
		Not insured	.1.310	.476	3.606	602				
4.	Marital status	Married/cohabit	Ref							
		Single	1.492	.281	7.916	.638				
		Divorce/separate	2.238	.194	25.848	.519				
		Widow/widower	1.722	.722	4.106	.221				
5.	Education level	No formal education	Ref				Ref			
		Primary	.185	.050	.683	.011	.201	.054	.750	.017
		Secondary	.142	.034	.596	.008	.157	.036	.696	.015
		Collage/ university	.417	.084	2.064	.284	.370	.071	1.916	.236
6.	Occupation	Peasant	Ref				Ref			
		Business/self-employee	.528	.208	.208	.178	.689	.257	1.847	.459
		Employed	1.508	.473	.473	.487	1.512	.423	5.402	.525
7.	Ever smoked	Yes								
		No	2.618	.577	11.887	0.212				
8.	Ever drink alcohol	Yes	Ref							
		No	1.207	.566	2.573	0.626				
9.	Use of regular use of table salt	Yes	Ref							
		No	1.227	.386	3.900	.728				
10.	Received Nutritional counseling	Yes	Ref							
		No	1.032	.484	2.198	.935				

4.4.2 The clinical factors associated with CKD among hypertensive patients

The study showed that patients without diabetes had a significantly lower risk of CKD compared to those with diabetes (aOR= 0.290, 95% CI: 0.113-0.747, p=0.012). Additionally, participants with uncontrolled hypertension have increased risk of CKD (adOR=3.851, 95% CI 0.167-0.921 p=0.045). Other variables, including BMI categories, duration of hypertension, abnormal echocardiography, total cholesterol level, use of NSAIDs, use of herbal medicines and hemoglobin levels did not show significant associations with CKD in the multivariate analysis ($p > 0.05$).

Table 5: Clinical factors associated with CKD among hypertensive

S/N	Variable	Category	Univariate				Multivariate			
			unOR	95% CI		P value	adOR	95% CI		P value
				Lower	Upper			Lower	Upper	
1	BMI(kg/m^2)	<18.5 (Underweight)	Ref							
		18.5-24.9(Normal)	.797	.070	7.700	.735				
		25-29.9(Overweight)	.985	.095	10.125	.978				
		≥30 (Obese)	.680	.053	6.795	.600				
2	Duration of hypertension (years)	≤3	Ref							
		>3 to 5	.536	.177	1.625	.270				
		>5	1.271	.552	2.925	.573				
3	Diabetic	Yes	Ref							
		No	.278	.113	.681	0.005	**0.290**	0.113	0.747	.012
4	Use of NSAID	Yes	Ref							
		No	.630	.263	1.510	0.300				
5	Use of herbal usage	Yes	Ref							
		No	1.010	.468	2.176	0.981				
6	Hemoglobin level	Low	Ref							
		Normal	0.919	.401	2.105	.841				
7	Cholesterol	Normal	Ref							
		Elevated	0.304	.090	1.020	.054	0.381	0.081	1.792	0.222
8	Echo results	Normal	Ref							
		Abnormal	4.056	.534	30.777	.176	2.630	0.133	51.96	0.525
9	Hypertension status	Controlled	Ref							
		Uncontrolled	1.892	.864	4.143	.111	3.851	0.167	0.921	0.045

CHAPTER FIVE

5.0 DISCUSSION

This study aimed to determine the prevalence and associated factors of chronic kidney disease (CKD) among hypertensive patients attending the cardiac clinic. Several socio-demographic, clinical, and behavioral factors were associated with CKD among these patients.

The proportion of hypertensive patients with CKD in this study (21%) is high but slightly lower than the findings from previous studies in Sub-Saharan Africa which reported a prevalence of 32.3% among hypertensive, which underscores the significant burden of CKD in this population (Bahrey *et al.*, 2019). Similarly, in another cross sectional study showed found a prevalence range of 7% to 15% in Tanzania, indicating variability based on different study settings and populations (Katatwire, 2022). The slightly higher prevalence in our study could be attributed to the specialized nature of the cardiac clinic, where patients with more severe forms of hypertension and Comorbidities are likely to be referred.

Low hemoglobin levels were observed in 61.7% of patients, indicating a high prevalence of anemia, which is a common complication of CKD and can exacerbate cardiovascular problems (Alghamdi *et al.*, 2023). This similar with the study done by (Al-khoury, 2006) which shown in all CKD stages include normal and mild impaired renal function, there's greater significant of anemia and mean hemoglobin level was low for patient with hypertension and diabetes.

The relatively low prevalence of current smoking (15%) among those with a history of smoking is a positive finding, given that smoking is a known risk factor for CKD (Katatwire, 2022). According to the study done by (Tengel, Ouchoud and Ylvie, 2000)show similar finding no relationship was observed between smoking and hypertensive patients and diabetes. The cessation of smoking among the majority of former smokers suggests effective smoking cessation interventions or self-motivation to improve health outcomes.

Alcohol consumption remains a concern, as it is a risk factor for hypertension and CKD (Region, 2023). However, the high proportion of patients who stopped drinking indicates a potential positive impact of behavioral interventions or self-awareness regarding the risks of alcohol consumption. In the other study done at China, show that, participant with moderate alcohol consumption were associated with lower likelihood of CKD compared with non drinker(Li *et al.*, 2022)

Physical activity is an important modifiable risk factor for both hypertension and CKD. The high percentage of patients engaging in regular exercise is encouraging and aligns with recommendations for lifestyle modifications to manage hypertension and reduce CKD risk (Katatwire, 2022). However, the finding that only 34.6% exercised for at least 30 minutes per week suggests that there is room for improvement in promoting adequate physical activity levels.

Education level emerged as a significant socio-demographic factor associated with CKD. Patients with primary and secondary education had a significantly lower risk of CKD compared to those with no formal education. This finding aligns with a cross sectional study on education level and hypertension which showed that the higher education levels are associated with a lower prevalence of hypertension(Tedesco *et al.*, 2001). This is supported with the study conducted by (Tegegne *et al.*, 2020) which show that hypertensive patient with no formal education has more risk factors of develop CKD compare with primary and secondary level. Education may influence health literacy, enabling individuals to better manage their hypertension and reduce the risk of developing CKD.

The study showed that there is no significant association in age, sex, insurance status, marital status, or occupation with CKD among hypertensive patients. This contrasts with some studies that have reported age and male gender as significant risk factors for CKD(Katatwire, 2022; Hojs, 2023). The lack of association in our study could be due to the relatively homogenous age and gender distribution of the study population, with a majority being older adults and females.

Diabetes was a significant clinical factor associated with CKD. Patients without diabetes had a significantly lower risk of CKD, which is consistent with the well-established link between diabetes and CKD (Wolide *et al.*, 2020). This finding was similar to the study done by (Hunegnaw *et al.*, 2021) patients with diabetes have 7 times more likely to develop chronic kidney disease compare with no diabetes. It is different with other study done Northern Ethiopia (Meskelu Kidu Weldentensae, 2022) which show diabetes was not significant association with CKD. Diabetes is known to cause diabetic nephropathy, a leading cause of CKD.

Uncontrolled hypertension was also significantly associated with an increased risk of CKD. This finding supports the bidirectional relationship between hypertension and CKD, where poorly controlled hypertension exacerbates kidney damage and vice versa (Chu *et al.*, 2021). The management of hypertension is crucial in preventing the progression of CKD.

Other clinical factors, such as BMI, duration of hypertension, abnormal echocardiography findings, total cholesterol level, use of NSAIDs, use of herbal medicines, and hemoglobin levels, did not show significant associations with CKD. These findings are partially consistent with previous literature, which indicates that while factors like obesity and anemia are associated with CKD, their impact may vary based on the population studied and the presence of other co morbid conditions (Hall *et al.*, 2014; Bahrey *et al.*, 2019).

Behavioral factors such as smoking, alcohol consumption, regular use of table salt, and receipt of nutritional counseling did not show significant associations with CKD. This contrasts with the study done in central Tanzania, which reported smoking and heavy alcohol consumption as significant risk factors for CKD (Katatwire, 2022).The discrepancy could be due to differences in the study populations and methods of assessing these behaviors.

CHAPTER SIX

6.0 CONCLUSION AND RECOMMENDATIONS

6.1 Conclusion

The study highlights the significant burden of CKD among hypertensive patients and the importance of managing hypertension and diabetes to prevent CKD. The study identified key socio-demographic and clinical factors associated with CKD, including education level, diabetes, and uncontrolled hypertension.

The significant association between education level and reduced CKD risk underscores the importance of health literacy in managing chronic conditions like hypertension and CKD. Diabetes and uncontrolled hypertension emerged as critical clinical factors, emphasizing the need for comprehensive management strategies for these conditions to prevent the onset and progression of CKD.

Overall, the study contributes to the understanding of CKD prevalence and its associated factors in the Tanzanian context, providing valuable insights for healthcare providers and policymakers to develop targeted interventions aimed at mitigating the burden of CKD among hypertensive patients.

6.2 Recommendations

The study has provided information on various aspects of prevalence and associated factors of CKD among hypertensive patients attending cardiac clinic at MNH Mloganzila. Therefore the following are recommendations for improving these problems:

- Health professional should initiate educational programs aimed at improving health literacy among hypertensive patients, focusing on the importance of blood pressure control and diabetes management in preventing CKD.
- Promote regular screening for CKD among hypertensive patients, particularly those with diabetes and uncontrolled hypertension, to enable early detection and timely intervention.
- Integrate CKD screening into routine care for hypertensive patients at all levels of the healthcare

- Further researches are needed to explore the underlying causes and progression of CKD among hypertensive patients, as well as the effectiveness of various intervention strategies.

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APPENDICES

Appendix I: Questionnaires

PART A; DEMOGRAPHIC CHARACTERISTIC

1. What's your age ……..(years)
2. Height …. (cm)
3. Weight …….(kg)
4. BMI----------m^2/kg
5. Sex
   i. Male
   ii. female
6. What's your health insurance status
   i. insured
   ii. not insured
7. Marital status
   i. Single
   ii. Married
   iii. Divorce/separated
   iv. Cohabit
   v. Widow/widower

8. Education level
   i. No formal education
   ii. Primary
   iii. Secondary
   iv. Collage/university
9. Occupation
   i. Peasant
   ii. Business/self employee
   iii. Employed
   iv. Unemployed

PART B; CLINICAL PROFILE

10. How long since you have been diagnosed with hypertension. ……. (Months)

11. What management of hypertension you receiving?

i. conservative management/ life style modification

ii. Oral antihypertensive drugs ……

iii. Other, specify ……..

12. How many oral antihypertensive drugs are you using?

……

13. Can you please mention the drugs you are using?

i.……..

ii.…….

iii.……..

iv.……

v.…….

vi.……..

14. Are there times when you skip your antihypertensive?

i. Yes

ii. No

15. What was the longest time that you forgot /skipped your medication mention ……

16. What was the reason for not taking /skipping your medication?

i.……..

ii.…….

iii……

17. Do you have diabetes (If no skip qns 18&19)

i. Yes

ii.No

18. If Yes for question 17How long since you have been diagnosed with diabetic …….. (Months)

19. Which diabetic treatment are you receiving?

i. Conservative management/ lifestyle modification

ii. Oral hypoglycemic drugs

iii. Injection Insulin

iv. Other, specify ……

20. Have ever tested for HIV? (If no skip qns 21, 22& 23)

i. Yes

ii. No

21. What were the results of HIV? (If negative, skip 22&23)

i. Negative

ii. Positive

22. Are you on ARV medication?(If no skip qn 23)

i.Yes

ii. No

23. How long do you are on medication for HIV?……..(years)

24. Have you use anti pain medication such asdiclofec or diclopar or ibuprofen?(If no skip qn25)

i. Yes

ii.No

25. How long did you use diclofenac, or diclopar or ibuprofen? …… (Months)

26. How often do you use them?

    i. daily

    ii. every month

    iii. Occasionally

27. Have ever used herbal medication? (If no skip qn 28)

    i.Yes

    ii.No

28. How long did you use herbal medication? ……. (Months)

PART C; BEHAVIOUR CHARACTERISTICS

29. Have you ever smoked? (If no, skip qns 30, 31 32& 33

    i. Yes

    ii.No

30. If yes for how long have you been smoking? …… (Months/years)

31. How many cigarettes where you smoking per day ……

32. Are you still smoking? (If no, skip qns 33)

    i. Yes

    ii. No

33. How long since did you stop smoking? …….. (Years)

34. Have you ever drink alcohol? (If no, skip 35-36)

    i. Yes

    ii.No

35. For how long did you drink alcohol? …… (Months)

36. How many bottles per day? ……..

37. Are you still drinking? (If no, skip 38)

    i. Yes

    ii.No

38. How long since you stopped drinking alcohol. …….. (Months)

39. Are you doing regular physical exercise? (If no skip qn 40)

i. Yes

ii. No

40. What type of exercise are you doing (Multiples response- answer can be more than one option)

i. Walking,

ii. Jogging

iii. Aerobics

iv. Football/Netball/ Basket ball

v. Other, specify ……

41. How long do you spending for physical exercise per week? ……. (Hours)

……..

42. Are you regularly using table salt?

i. Yes

ii.No

43. Have you ever received nutritional counseling since diagnosed of hypertension?

i.Yes

ii. No

PART D: CLINICAL EVALUATION;

44. The level of serum creatinine in the last visit ……..ummol/l

45. eGFR calculated ……..Stage ……

46. HB----------

47. Cholesterol …….

48. ECHO done (within 1 year)

i.Yes…

ii.No…

49. ECHO findings
    i. normal
    ii. Abnormal

50. Protein in urine
    i. negative
    ii. Positive

i. +1
ii. +2
iii. + 3
iv. +4 …….

51. The current height of the patient …… (cm)

52. The current weight of the patient …… (kg)

53. The calculated BMI …….

54. The reading of blood pressure
    i. BP < 140/90mmHq
    ii.BP< 130/80mmHq
    iii. BP>140/90mmHq
    iv. BP>130/80mmHq

55. The conclusion on the stage of Hypertension
    i. controlled hypertension
    ii. Uncontrolled hypertension

56. CKD status
    i. CKD
    ii. No CKD

Appendix II: Dodoso

PART A: SIFA ZA KIDEMOGRAFIA

1. Umri wako ……..(Miaka)

2. Urefu …….. (cm)

3. Uzito …….. (kg)

4. BMI …… (m^2/kg)

5. Jinsia
    i. Mwanaume
    ii. Mwanamke

6. Umejiunga na bima ya afya
    i. Ndio ninatumia
    ii. Hapana, situmii

7. Haliyakoyandoa
    i. Nimeoa/nimeolewa
    ii. Sijao/sijaolewa
    iii. Nimeachika/nimeachana
    Iv.Ninaishi na mwenzi bila ndoa
    v. Mjane/mgane

8. Kiwango cha elimu
    i. Sifuri/ asiojua kusoma
    ii. Msingi
    iii. Sekondari
    iv.Chuo

9. Unafanyakaziipi?
    i. Mkulima
    ii. Biashara/ Mjasiriamali
    iii. Mfanyakazi wa kudumu
    iv. Hajaajiriwa

SEHEMU B: MUONEKANO WA HALI YA MGONJWA

10. Lini uligundulika una shinikizo la damu? …….. (Miezi)

11. Unapokea usimamizi gani kwa shinikizo la damu?

i. usimamizi wa kawaida wa maisha/ mabadiliko ya mtindo wa maisha

ii. Dawa za kushusha shinikizo la damu

iii. Nyingine, elezea …….

12.Dawa gani za kumeza kwa ajili ya shinikizo la damu una tumia?

13. Unaweza kunitajia daw aunazo tumia?

i. ……..

ii. ……

iii…….

iv…….

v……. …….

vi……..

14. Je, kuna siku uliacha kutumia dawa za shinikizo la damu?

i. Ndio

ii. Hapana

15. Muda gani mrefu uliacha kutumia dawa zako?

……

16. Nini sababu ya kuacha kutumia dawa zako za shinikizo la damu

i…….

ii…….....

iii……

17. Je, unatatizo la kisukari? (Kamahuna, rukaswali la 18na 19)

i. Ndio

ii. Hapana

18. Kama ndio kwa swali no. 17, umekuwa na kisukari kwa muda gani …….. (Miezi)

19. Matibabu gani ya kisukari unapokea?

i. Usimamizi wa kawaida wa maisha/ mabadiliko ya mtindo wa maisha

ii. Dawa za kupunguza sukari kwenye damu kwa njia ya mdomo

iii. Sindano ya Insulin

iv. Nyingine, fafanua ……

20. Umewahi kupima maambukizi ya virusi vyaUkimwi (HIV)? (Kama la, ruka swali21, 228&23)

i. Ndiyo

ii. Hapana

10. 21. Matokeo ya vipimo vya HIV yalikuwaje? (Kama nihasiruka 22&23)

i. Hasi

ii. Chanya

22.Je, unatumia dawa za kupunguza makali ya HIV? (Kama la, ruka swali23)

i. Ndiyo

ii. Hapana

23. Umekuwa kwenye dawa za HIV kwa muda gani? ……(miezi)

24. Je, umewahi kutumia dawa kama diclofenac, diclopar au ibuprofen kwa ajili ya maumivu(kama la ruka swali 25)

i. Ndiyo

ii. Hapana

25. Umekuwa ukitumia diclofenac, diclopar au ibuprofen kwa muda gani? …….(miezi)

26. Kwa kipindi gani unatumia dawa hizo?

i. Kwa siku

ii. Kila mwezi

iii. Muda wowote

27. Je, umewahi kutumia tiba za mitishamba? (Kama la rukaswali 28)

i. Ndiyo

ii. Hapana

28. Umekuwa ukifanya matumizi ya tiba za mitishamba kwa muda gani? …….(miezi)

SEHEMU C: SIFA ZA KITABIA

29. Umewahi kuvuta sigara? (Kama la, rukaswali 30, 31, 32&33)

i. Ndiyo

ii.Hapana

30. Umehudumu kuvuta sigara kwa muda gani? …… (Miezi)

31. Sigara ngapi ulikuwa unavuta kwa siku ……..

32. Je, bado unavuta? (Kama la ruka swali la 33)

i. Ndiyo

ii. Hapana

33. Umeacha kuvuta sigara kwa muda gani? ……. (Miezi)

34. Umewahi kunywa pombe? (Kama la ruka swali35-36)

i. Ndiyo

ii. Hapana

35. Umekuwa ukinywa pombe kwa muda gani? …… (Miaka)

36. Chupa ngapi kwa siku? ……

37. Je, bado unakunywa pombe? (Kama la ruka swali 38)

i. Ndiyo

ii. Hapana

38. Umeacha kunywa pombe kwa muda gani? …… (Miezi)

39. Je, unafanya mazoezi ya viungo mara kwa mara? (Kama la, ruka swali 40)

    i. Ndiyo

    ii. Hapana

40. Ni ainaganiyamazoeziunayofanya (Jibulinawezakuwazaidiyamoja)

    i. Kutembea

    ii. Kukimbia

    iii.Aerobics

    Iv. Mpira wa miguu/netiboli/kikapu

    v. Nyingine, eleza …….

41. Unatumia muda gani kufanya mazoezi ya viungo kwa wiki? …… (Masaa)

42. Je, unatumia chumvi yamezani mara kwa mara?

    i. Ndiyo

    ii. Hapana

43. Je, umewahi kupata ushauri wali sheta nguugunduli weku wana shinikizo la damu?

    i. Ndiyo

    ii. Hapana

SEHEMU D: TATHMINI YA KLINIKI

44. Kiwango cha creatinine kwenye damu katika ziara ya mwisho …… umol/l

45. Kiwango cha eGFR……hatua …….

46. HB ……

47. Cholesterol …….

48.Kipimo cha ECHO kimefanyika (ndani ya mwaka)

    i. Ndio

    ii. Hapana

49. Majibuya ECHO
    i. Iposawa
    ii. Haipo sawa

50. Kiasi cha protini kwenye mkojo kwenye ziara ya awali ……..
    i. Hakuna
    ii.Ipo
    i. +1
    ii. +2
    iii. +3
    iv. +4

51. Urefu wa sasa wa mgonjwa…… (cm)

52. Uzito wa sasa wa mgonjwa…… (Kg)

53. BMI iliyohesabiwa …… (kg/m^2)

54. Kusoma shinikizo la damu
    i. BP<140/90mmHq
    ii.BP<130mmHq
    iii.BP>140/90mmHq
    iv. BP>130/80mmHq

55. Hitimisho kuhusu shinikizo la damu na hatua zake
    i. Shinikizo la damu lililodhibitiwa
    ii.Shinikizo la damu lisilodhibitiwa

56. Haliya CKD (ugonjwa wa figo)
    i. Ana CKD
    ii. Hakuna CKD

Appendix III: Consent Form

CONSENT TO PARTICIPATE IN STUDY OF PREVALENCE AND ASSOCIATED FACTORS OF CKD AMONG HYPERTENSIVE PATIENT ATTENDING CARDIAC CLINIC AT MUHIMBILI NATIONAL HOSPITAL MLOGANZILA

Greeting, My name is Jamila Abdallah Mwinyimvua; Currently I am student at Muhimbili University of Health and Allied Science, pursuing Master of Science in Nephrology Nursing. Iam conducting a research with the title of prevalence and associated factors of CKD among Hypertensive patient attending cardiac clinic at Muhimbili National Hospital Mloganzila

Purpose of study

This study will help to determine the prevalence and associated factors of CKD among Hypertensive patient. In addition, to address that CKD among Hypertensive patients can be prevented if early detection like screening and simple laboratory measure like urinalysis will be done.

Involved Participation

This study will involve all hypertensive patients who attending at cardiac clinic for treatment. Iam ask you to participate in this research study and you are free to decide either to participate or not. If your agree to participate in this study, I will request to read carefully the research question before answering and for those who don't know to read and write I will ask for assistance support.

Confidentiality

Information which provide in this study will be confidentiality and will be used for research purpose only and not for other reason.

Number will be used for identification instead of names during data analysis and report development

Risk

I expect no harm will occur to you when participate in this research study

Benefits

Although there is no direct benefit as if financial but your participation in this research study will help to improve your status on early identification of CKD through recommendation that will made for improvement

Right to withdraw

To participate in this research study is voluntary, so you are free to participate or not. Refusal to participate or withdraw in this research study cannot interfere with your treatment.

Whom to contact

If you have any question or would like more information about this research study contact through

i. Jamila Abdallah Mwinyimvua Researcher mobile number 0716902412. 0764169909
ii. Dr Jacqueline Shoo Supervisor of this study mobile number 0716505241 or
iii. Dr. Nahya Salim; Director of Research and Publications and Innovation (DRPI), -Direct Line: +255-22-2152489 Telefax: +255-22-2152489 E-mail: drp@muhas.ac.tz

Agreement of participation

I ……, identification number ……..,

age ……Years old. I am willing to participate in this study.

Respondents signatures ……. Date ……..

Researchers signatures …… Date ……

Appendix IV: Fomu ya ridhaa

RUHUSA YA KUSHIRIKI KATIKA UTAFITI WA UPEO NA VIASHIRIA VYA UGONJWA WA FIGO (CKD) MIONGONI MWA WAGONJWA WA SHINIKIZO LA JUU LA DAMU WANAOHUDHURIA KLINIKI YA MOYO KATIKA HOSPITALI YA TAIFA YA MUHIMBILI MLOGANZILA.

Salamu, Jina langu ni Jamila Abdallah Mwinyimvua, kwa sasa mimi ni mwanafunzi katika Chuo Kikuu cha Afya na Sayansi Muhimbili, nasoma Shahada ya Uzamiliya Sayansi ya Uuguziwa masuala ya Figo (Nefrolojia). Nafanya utafiti wenye kichwa cha habari "Upeo na viashiria vya ugonjwa wa Figo(CKD) miongoni mwa wagonjwa wa shinikizo la damu wanaohudhuria kliniki ya moyo katika hospitali ya Taifa ya Muhimbili Mloganzila"

Lengo la Utafiti

Utafiti huu utasaidia kutambua Upeo na viashiria vya ugonjwa wa Figo miongoni mwa wagonjwa wa shinikizo la damu. Pia, kufafanua kwamba ugonjwa wa Figo kati ya wagonjwa wa shinikizo la damu unaweza kuzuilika ikiwa ugunduzi wa mapema kama uchunguzi na vipimo rahisi vya maabara kama uchunguzi wa mkojo kwa kutumia kibanzivitafanyika.

Ushiriki wa kushirikishwa

Utafiti huu utahusisha wagonjwa wote wa shinikizo la damu wanaohudhuria kliniki ya moyo kwa matibabu. Nakusihi kushiriki katika utafiti huu na uko huru kuchagua kushiriki au kujitoa. Ikiwautakubalianakushirikikatikautafitihuu, nitakuomba kusoma kwa uangalifu maswali ya utafiti kabla ya kujibu, nakwa wale wasiojua kusoma na kuandika nitajitahidi kuwapa usaidizi.

Utunzaji wa siri

Taarifa zitakazo tolewa katika utafiti huu zitahifadhiwa kwa siri na kutumika kwa madhumuni ya utafititu na sio kwa sababu nyingine yoyote. Namba zitatumika kama kitambulisho badala ya majina wakati wa uchambuzi wa data na maendeleo ya ripoti.

Hatari

Natarajia hakuta kuwa na madhara kwako unaposhiriki katika utafiti huu

Manufaa

Ingawa hakuna faida ya moja kwa moja, kama kifedha, Ushiriki wako katika utafiti huu utasaidia kuboresha hali yako kwa kutambua mapema ugonjwa wa Figo kupitia mapendekezo yatakayotolewa kwa uboreshaji.

Haki ya kujitoa

Kushiriki kwenye utafiti huu ni kwahiari, hivyoukohurukuchaguakushiriki au kujitoa. Kutokubaliana kushiriki au kujitoa katika utafiti huu haiwezi kuingiliana matibabu yako.

Mawasiliano

Ikiwa una swali lolote au ungependa habari Zaidi kuhusu utafiti huu, wasiliana na:

i. Jamila Abdallah Mwinyimvua –namba za simu ya Mtafiti 0716902412, 0764169909.
ii. Dk. Jacqueline Shoo- Msimamizi wa utafiti huu- namba za simu 0716505241
iii. Dr. Nahya Salim; Mkurugenziwa Utafiti ,Machapisho na Ubunifu, -Simu: +255-22-2152489 Faxi: +255-22-2152489 baruapepe: drp@muhas.ac.tz

Mkataba wa kushiriki

Mimi ……..Namba ya kitambulisho……

Umri…… miaka. Nina nia ya kushiriki katika utafiti huu.

Sahihi ya mshiriki …… tarehe ……

Sahihi ya mtafiti ……tarehe ……

Appendix V: Ethical clearance

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/2308 Date: 07/06/2024

MUHAS-REC-06-2024-2308
JAMILA ABDALLAH MWINYIMVUA
SCHOOL OF NURSING
MUHAS

RE: APPROVAL FOR ETHICAL CLEARANCE FOR A STUDY TITLED: PREVALENCE AND ASSOCIATED FACTORS OF CKD AMONG HYPERTENSIVE PATIENTS ATTENDING CARDIAC CLINIC AT MUHIMBILI NATIONAL HOSPITAL-MLOGANZILA

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: 07/06/2024
EXPIRATION DATE OF APPROVAL: 07/06/2025

STUDY DESCRIPTION:
Purpose:
This study aims at determining the prevalence and associated of CKD among hypertensive patients attending cardiac clinic at MNH Mloganzila.

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-%2015671.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/.

Muhimbili University of Health and Allied Sciences
DIRECTOR
Research, Publications & Innovations
Box 65001

Dr. Nahya Salim Masoud,
Chairperson, MUHAS Research and Ethics Committee

Appendix VI: Introduction letter

UNITED REPUBLIC OF TANZANIA
MINISTRY OF EDUCATION, SCIENCE AND TECHNOLOGY
MUHIMBILI UNIVERSITY OF HEALTH AND ALLIED SCIENCES
OFFICE OF THE DIRECTOR – POSTGRADUATE STUDIES

In reply quote;
Ref. No. HD/MUH/T.462/2022 10th June, 2024

The Executive Director,
Muhimbili National Hospital,-Mloganzila,
P.O. Box 65000,
DAR ES SALAAM

Re: INTRODUCTION LETTER Jamila Abdallah Mwinyimvua

We would like to inform you that the bearer of this letter is **Jamila Abdallah Mwinyimvua** with Reg. No. **HD/MUH/T.462/2022** is a student at Muhimbili University of Health and Allied Sciences (MUHAS) "pursuing **MSc. Nephrology Nursing.**

As part of her studies, she will be doing an elective research titled: "**Prevalence and Associated Factors of CKD Among Hypertensive Patients Attendign Cardiac Clinic at Muhimbili National Hospital-Mloganzila".** She is being supervised by Jacqueline Shoo from MUHAS and Godfrey Malangwa from Mloganzila.

The research has been approved by the Chairman of University Senate.

Kindly provide her the necessary assistance to facilitate the conduct of her research.

We thank you for your cooperation.

Ms. Victoria Mwanilwa
For: DIRECTOR, POSTGRADUATE STUDIES

c.c **Jamila Abdallah Mwinyimvua**

9 United Nations Road; Upanga West; P.O. Box 65001, Dar Es Salaam: Tel. G/Line: +255-22-2150302/6; Ext. 1015; Direct Line:+255-22-2151378;Telefax:+255-22-2150465;E-mail:dpgs@muhas.ac.tz;Web:https://www.muhas.ac.tz

Appendix VII: Permission letter

THE UNITED REPUBLIC OF TANZANIA

MINISTRY OF HEALTH

MUHIMBILI NATIONAL HOSPITAL
MLOGANZILA

In reply please quote
Ref. No.: JA.294/428/01C/005 **20/06/2024**

Head of Department,
OPD, Emergency and Critical Care
Muhimbili National Hospital-Mloganzila

RE: PERMISSION TO COLLECT DATA AT MNH - MLOGANZILA

Name of Principal Investigator	**Jamila Abdallah Mwinyimvua**
Title	**"Prevalence and Associated Factors of CKD Among Hypertensive Patients Attending Cardiac Clinic at Muhimbili National Hospital-Mloganzila".**
Institution	Muhimbili University of Health and Allied Sciences
Supervisors	Dr. Jacqueline Shoo Dr. Godfrey Malangwa-Mloganzila
Period	20Th June 2024-30th September 2024

Approval has been granted to the above principal investigator to collect data at MNH-Mloganzila. Kindly ensure the named principal investigator abide to the ethical principles and other conditions of the research approval.

HEAD, TEACHING, RESEARCH & CONSULTANCY UNIT
P. O. Box 65000
DAR-ES-SALAAM
MUHIMBILI NATIONAL HOSPITAL-MLOGANZILA

Mbwalila Ng'amilo
For: Executive Director
Muhimbili National Hospital-Mloganzila

c.c. DNS
cc. Jamila Abdallah Mwinyimvua

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