PAYMENT METHODS FOR PATIENTS ON HAEMODIALYSIS PROCEDURES AT MUHIMBILI NATIONAL HOSPITAL AND ITS IMPACT ON ADHERENCE TO DIALYSIS SESSIONS AND ROUTINE LABORATORY TESTING

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By

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"Dissertation Submitted in Partial Fulfillment of the Requirements for Master of Science in Health Economics and Policy at

Muhimbili University of Health and Allied Sciences".

October, 2024

CERTIFICATION

The undersigned certifies that they have read and hereby recommends for acceptance by the University of Muhimbili Health and Allied Sciences a dissertation entitled ***"Payment methods for patients on haemodialysis procedures at Muhimbili National Hospital and its impact on adherence to dialysis sessions and routine laboratory testing"*** in partial fulfillment of the requirements for the degree of Master of Science in Health Economics and policy

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DECLARATION

I, **Bruno J Njonjo**, declare that this dissertation is my original work and that it has not been submitted for a similar degree in any other University.

Signature: _____ Date_____

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ABSTRACT

Background: Haemodialysis (HD) is the primary treatment for end-stage renal disease (ESRD), usually conducted three times a week, with each session lasting four hours. In Tanzania, patients rely on government subsidy, health insurance or out-of-pocket to finance this service. Enhancing the quality of life, patients with end-stage renal diseases need to focus on treatment adherence.

Objective: This study aims to assess how payment methods influence the adherence of ESRD patients to dialysis sessions and routine laboratory testing at Muhimbili National Hospital

Materials and Methods: This was a cross-sectional analytical study designed, conducted among patients undergoing hemodialysis treatment for over a month by May-June 2024 at Muhimbili National Hospital Upanga and Mloganzila units. A total of 221 haemodialysis patients during the data collection period were accessed. Data was collected through structured questionnnaires. Analysis was performed using Stata version 18.0. Descriptive statistics summarized numerical variables using mean and standard deviation, while categorical data were presented as frequency and percentage. Bivariate and multivariate logistic regression models were employed to determine associations between variables.

Results: Among 221 respondents, the mean age was 47 with a standard deviation of 16 years. The majority (60.6%) were male. Regarding occupation, the majority 63.80% were informally employed. Additionally, more than half of respondents 65.60% had health insurance. Furthermore, 68.3% of participants reported having at least one other chronic disease. Most 91% of respondents know the importance of laboratory tests, at least once a month 84.62% of respondents do required tests. Patients with no insurance were less likely to adhere to dialysis sessions (AOR=0.1, 95% CI= 0.002-0.49) compared to patients with insurance. Patients with no health insurance were less likely to adhere to laboratory tests (OR=0.439, 95% CI= O.2-0.4) compared to those with health insurance who were more likely to adhere.

Conclusion: In conclusion, there is a clear need for enhanced insurance coverage and targeted interventions that address both financial challenges and adherence issues. Addressing these factors can contribute to more consistent care and better management of ESRD. The study sheds light on the significant role of health insurance coverage in promoting adherence to dialysis sessions and routine laboratory testing.

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ABBREVIATIONS

CKD Chronic kidney Disease

ESRD End Stage Renal disease

GFR Glomerular Filtration Rate

Qol quality of life

RRT Renal Replacement Therapy

UHC Universal Health Coverage

URR Urea reduction Ratio

DEFINITION OF KEY TERMS

End-stage renal disease (ESRD) is the final and irreversible stage of chronic kidney disease (CKD), where the kidneys can no longer function adequately to maintain the body's average balance of fluids and electrolytes; the glomerular filtration rate (GFR) also indicates the end-stage (GFR <15 mL/min, /1.7 m3) (1). In this advanced stage, the kidneys have lost their ability to perform essential functions such as filtering waste products and excess fluids from the blood, regulating blood pressure, and maintaining the balance of minerals in the body. Management options for individuals with end-stage renal disease include dialysis or kidney transplantation (2)

Adherence to dialysis. Adherence to dialysis sessions is crucial for individuals with end-stage renal disease (ESRD) who rely on dialysis as a life-sustaining treatment. Dialysis is typically performed several times a week, and patients are expected to adhere to their prescribed schedule for optimal health outcomes. Here are some critical factors related to adherence to dialysis sessions (3)

Laboratory testing for dialysis patients. These tests help healthcare providers monitor various parameters to ensure the effectiveness of dialysis treatment and assess the patient's overall health. Here some standard laboratory tests conducted for individuals on dialysis: creatinine, urea, hemoglobin level, electrolytes level, etc.(4).

CHAPTER ONE

1.0 INTRODUCTION

1.1 Background

End-stage-renal disease impacts over 10% of the global population and is more common among the elderly individually, as well as those dealing with diabetes mellitus and high blood pressure[1]. The substantial burden of End Stage Renal Disease (ESRD) remains pronounced in countries with limited resources, with an estimated fourfold higher incidence of ESRD in low and middle-income nations than in developed countries(6). The global rise in ESRD necessitates the implementation of renal replacement therapy such as dialysis(6). Complications resulting from ESRD pose a significant strain on healthcare resources, and only a handful of economically robust countries are equipped to address the challenges posed by this disease effectively[6].

With a population exceeding 55 million, Tanzania has made notable strides in enhancing nephrology services. This progress includes a significant increase in the number of nephrologists, rising from one in 2006 to 14 in 2018. Additionally, there has been an expansion in the availability of dialysis units, and diagnostic services have seen improvement with the introduction of nephrologist's[3].

Haemodialysis (HD) stands out as the prevailing and most frequently utilized treatment for individuals suffering from ESRD. For dialysis to be adequate it should be routinely performed thrice a week for three (3) to four (4) hours. A study done in Rwanda in 2021 patients without national health insurance had poor health outcomes with higher odds (OR 6.6, 95% CI 5.4–1.2, $p< 0.001$)(8). Similarly in Tanzania, most patients with CKD who pay through out-of-pocket (OOP) due to financial constraints receive dialysis twice a week or once, while those with health insurance receive it thrice a week (9).

Payment methods also affect regular laboratory testing for CKD patients on HD, patients need these laboratory tests monthly and others scheduled every three months(10). These laboratory results are crucial in guiding healthcare decisions regarding the ongoing course of treatment and

the overall progression of care for these individuals(11). To alleviate or minimize the costs HD patients incur studies showed that laboratory testing. may change from the interval of four weeks to six weeks without affecting the quality.

In most sub-Saharan African countries haemodialysis remains the primary treatment method for ESRD so knowing the effect of payment methods is very crucial, haemodialysis procedure is supposed to be a transitional treatment method, while a patient is waiting for a renal transplant, and few centers for transplant-made haemodialysis remain the main form of treatment (7). So, several patients while undergoing HD experience some frustration due to reluctance to accept the condition; this may be due to different factors such as the low level of education, gender, multiple commodities diseases, multiple chronic medications, age, etc this results in poor quality of life QoL[12].

Similarly to numerous resource-limited countries, Tanzania needs more comprehensive data on the prevalence of kidney disease(13).Challenges such as the unavailability and high costs associated with accessing haemodialysis services for patients requiring dialysis contribute to suboptimal outcomes. To address these challenges, there is a need to raise public awareness and educate individuals about the options available through participating in health insurance schemes (8). This could improve access to essential healthcare services and outcomes for kidney disease patients.

1.2 Problem Statement

Patients diagnosed with CKD require renal replacement therapy (dialysis) for survival, this procedure is commonly referred to as haemodialysis (8). Muhimbili National Hospital (MNH) being among of the public hospital provide haemodialysis service and is located in Upanga Dar es Salaam with more than 50 dialysis machines (9) Renal Association Clinical Practice Guidelines on Haemodialysis UK recommended haemodialysis to be done three times a week, totaling 12 hours, to effectively eliminate solutes and manage fluid buildup and resulting kidney failure, thus preserving health and quality of life (15).

Adherence to haemodialysis sessions had been influenced by various payment methods, like health insurance, government subsidies (exemptions) and out-of-pocket, to access haemodialysis sessions, Various articles indicate that the cost of dialysis is measured in USD, which varies from 25000 to 55000 US in Nigeria and 7000 USD in South Africa annually (9,16) etc. failure to adhere to the prescribed treatment leads to elevated rates of mortality and hospitalization in individuals with ESRD/CKD (17).

A similar study on the cost of dialysis in Tanzania done in 2015 showed that the respective average unit cost per haemodialysis is 176 USD. Consequently, an average patient requiring three haemodialysis per week (i.e. 156 HD per year) will incur annual costs of 27,440 USD.(16)high cost induce non adherence to those who pay through out of pocket.

Moreover, even among insured patients, adherence to monthly laboratory tests and the prescribed three sessions of hemodialysis per week remains a challenge. Studies have shown that non-adherence is prevalent in both insured and uninsured populations, which adversely affects the achievement of clinical targets and overall treatment efficacy(18). Even with the provisions of insurance, patients are expected to undergo monthly laboratory tests and to adhere to three haemodialysis sessions per week. However, there is a lack of compliance among insured and uninsured individuals in this regard. The failure to adhere to haemodialysis and regular laboratory tests adversely affects the quality of life, preventing the attainment of the planned haemodialysis objectives. This research using statistical methods aims to provide insight into the factors leading to non-adherence to dialysis treatment and routine lab tests, such as payment methods or other underlying causes.

Despite the mode of payment (insured and non-insured), there is a persistent challenge in adhering to monthly laboratory tests and the prescribed three sessions of hemodialysis per week. This identifies a critical issue in patient compliance, which can affect health outcomes, and opens up an avenue for research into factors influencing adherence, even for those with insurance coverage.

1.3 Rationale

Results showed that despite having insurance still some patients failed to adhere to HD treatments and only 7.26% OOP, 92% insured adhered, these results will aid decision makers and policymakers in making informed choices during health budgeting, both at the national and hospital levels. This insight could lead to adjustments in resource allocation, modifying the frequency of dialysis sessions and laboratory testing and implementing patient education initiatives.

1.4 Conceptual framework

Adherence to routine dialysis and routine laboratory testing as prescribed can be influenced by methods of payment, whether through out-of-pocket or health insurance. Other factors beyond payment methods can also impact adherence. These factors fall into two categories: direct and indirect non-medical costs.

The presence of insurance or paying out of pocket influences the direct medical cost, subsequently affecting adherence. Direct costs encompass expenses related to dialysis, diagnostic tests, hospital stays, and the prices of medications, which can either be covered through health insurance or paid for out-of-pocket. Conversely, indirect non-medical costs involve additional expenses such as special low-protein foods, travel, and formal and informal caregiving.

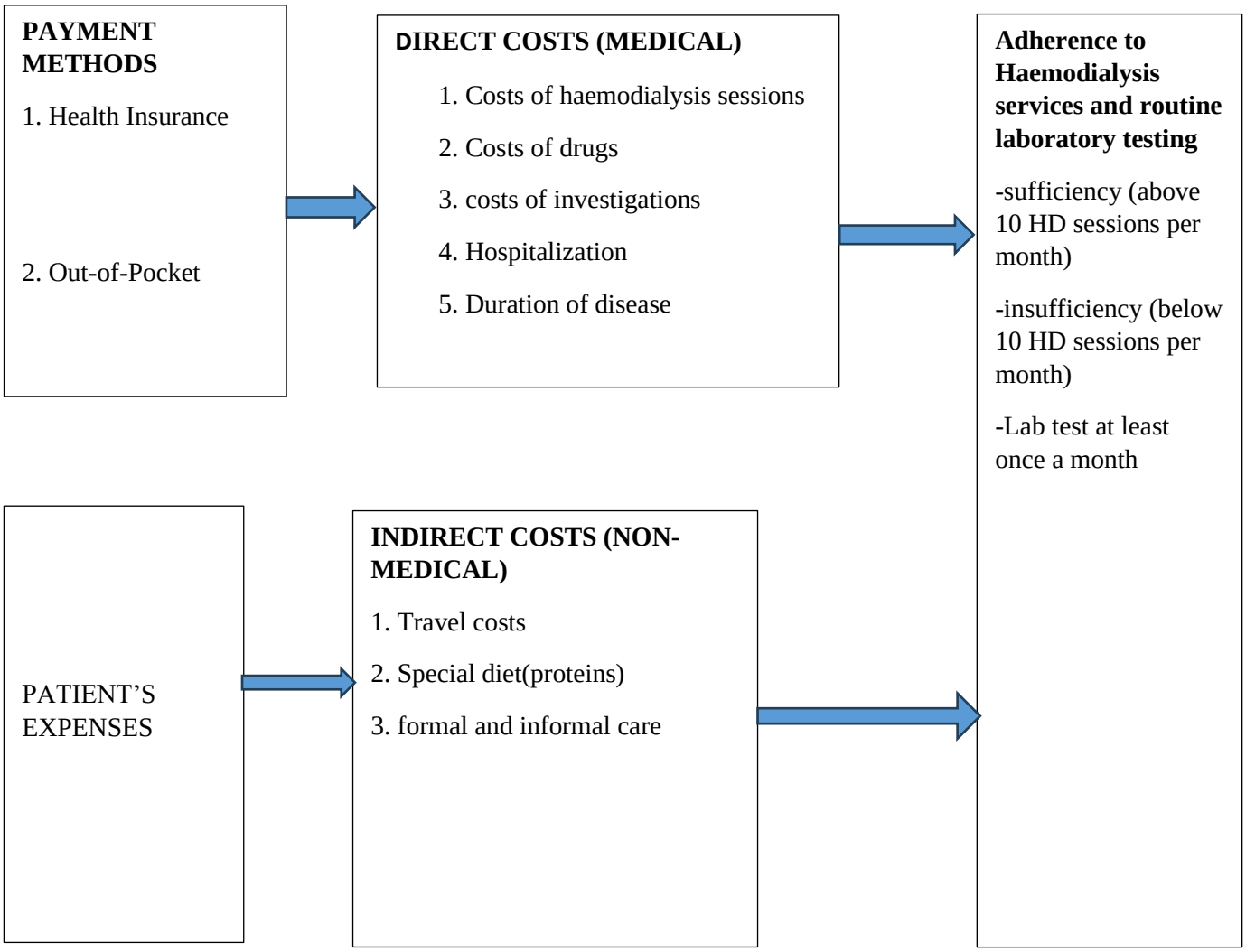


Figure 1: Conceptual framework

1.5 Research Question.

1.5.1 Main research question

How do payment methods influence the adherence of End Stage Renal Disease patients to haemodialysis and routine laboratory tests at Muhimbili National Hospital.

1.5.2 Specific research question

1. How does the mode of payment influence the adherence of end-stage renal disease patients to dialysis sessions?
2. How does the mode of payment influence the adherence of end-stage renal disease patients to routine laboratory testing?
3. Which expenses do End Stage Renal Disease patients incur while attending dialysis sessions at Muhimbili National Hospital that influence their adherence to haemodialysis and routine laboratory tests?

1.6 Main Objective

To assess how payment methods influence the adherence of end-stage renal disease patients to haemodialysis sessions and routine laboratory tests at Muhimbili National Hospital.

1.6.1 Specific Objectives

1. To determine the influence of the mode of payment on the adherence of End Stage Renal Disease patients to dialysis sessions.
2. To assess the effect of the mode of payment on the adherence of End Stage Renal Disease patients to routine laboratory testing.
3. To identify the expenses incurred by End Stage Renal Disease patients while attending dialysis sessions at Muhimbili National Hospital and how these expenses affect their adherence to haemodialysis and routine laboratory tests.

CHAPTER TWO

2.0 LITERATURE REVIEW

This chapter reviews various studies relevant to the research questions and objectives on how payment methods influence the adherence of End Stage Renal Disease (ESRD) patients to haemodialysis (HD) sessions and routine laboratory testing. Key findings from international and local research highlight factors that affect adherence, with a focus on the role of health insurance, out-of-pocket payments, and other expenses related to dialysis treatment. The influence of payment methods on the adherence of ESRD patients to hemodialysis and routine laboratory tests is a critical area of research, particularly in low- and middle-income countries where healthcare financing can significantly impact patient outcomes. This literature review synthesizes existing studies to explore how different payment modalities affect patient adherence to treatment regimens, specifically focusing on hemodialysis sessions and laboratory testing at Muhimbili National Hospital.

2.1 Payment methods and haemodialysis adherence

Payment methods play a crucial role in determining patient adherence to hemodialysis. A study by Emrani et al. highlights that various reimbursement models, including out of pocket and bundled payments (insurance), can influence patient access to necessary treatments (19). In particular, insurance, which cover multiple services under a single payment, may incentivize healthcare providers to ensure that patients adhere to their treatment plans, as adherence directly affects the quality of care and reimbursement rates(20). Conversely, out of pocket models may not provide the same incentives for adherence, potentially leading to missed sessions and poorer health outcomes. Research indicates that financial constraints significantly impact adherence to dialysis. Mukakarangwa et al. found that patients in low-income settings often struggle to afford the costs associated with dialysis, leading to missed sessions (21) This is echoed by Mushi et al., who conducted a systematic review revealing that the cost of dialysis in low- and middle-income countries is a substantial barrier to treatment adherence(16). These findings suggest that payment methods that alleviate financial burdens, such as subsidized or insurance systems, could enhance adherence among ESRD patients

The adherence to dialysis sessions can be significantly influenced by health insurance. In research conducted in the United States of America, barriers to chronic dialysis adherence and health insurance were not a factor affecting attendance; instead, other factors, such as weather conditions (specifically snow), played a role (OR, 2.68; 95 % CI, 1.16 to 1.25) played a role in the absence from dialysis sessions(22)(23)

A systematic review by Ghimire et al. highlights those financial constraints, particularly those associated with out-of-pocket payments, can lead to non-adherence among dialysis patients (18)Patients who are required to pay for their treatments without insurance coverage may prioritize other financial obligations, resulting in missed dialysis sessions. This is corroborated by Gast and Mathes, who found that patients with comprehensive insurance plans tend to have better adherence rates compared to those with high co-payments or limited coverage (24)

A separate investigation titled "Challenges and Results of Haemodialysis Among Chronic Kidney Disease Patients in Dodoma" Moremo et al found that individuals with health insurance demonstrate greater adherence compared to those lacking health insurance coverage where by patients who pay out of pocket had OR 6.6(8)

Conversely investigation conducted by Mohamed et al in 2022 at MNH, about the factors influencing adherence to HD among ESRD patients revealed that individuals with health insurance attending HD had a 70% reduced risk of non-adherence.(25)

Payment method specifically out of pocket Shaik et all in 2018 highlighted the impact of financial strain on adherence to HD, and found that 36.2% of 1836 dialysis patients ceased attendance due to economic challenges(26).

2.2 Payment methods and routine laboratory tests

The mode of payment also influences adherence to routine laboratory testing, which is essential for monitoring the health status of ESRD patients. Wells emphasizes that family support and financial stability are critical predictors of adherence to medical regimens, including laboratory tests (27) . When patients face high out-of-pocket expenses due to their payment method, they may prioritize immediate needs over routine testing, leading to adverse health outcomes.

Alhamad's study supports this by indicating that financial barriers can deter patients from attending necessary follow-up appointments and laboratory tests, which are vital for managing their condition (28).

2.3 Expenses Incurred by ESRD Patients

Understanding the specific expenses incurred by ESRD patients during dialysis sessions is essential for identifying barriers to adherence. According to the findings of Chao and Huang, non-adherence is often linked to the cumulative costs associated with treatment, including transportation, medication, and laboratory tests (29) This is particularly relevant in settings like Muhimbili National Hospital, where patients may face additional logistical challenges and costs. The study by Poveda et al. further illustrates that even minor financial burdens can lead to significant non-adherence, as patients may opt to skip sessions or tests to save money (30).

In the context of Muhimbili National Hospital, where many patients may rely on out-of-pocket payments, the cumulative costs associated with attending dialysis sessions can be prohibitive. A qualitative study by D'Souza et al. emphasizes that adherence is often limited by socioeconomic factors, including the inability to afford transportation and other related expenses (31). This suggests that financial support mechanisms or alternative payment models could enhance adherence by alleviating the economic burden on patients.

In summary, the literature indicates that payment methods significantly influence the adherence of ESRD patients to hemodialysis and routine laboratory tests. Payment systems that reduce financial burdens and promote comprehensive care are likely to enhance adherence, while those that impose high costs may lead to missed treatments and poorer health outcomes. Future research should focus on evaluating the effectiveness of different payment models in improving adherence among ESRD patients in various healthcare settings.

CHAPTER THREE

3.0 MATERIALS AND METHODS

3.1 Study Design

The research was designed as a cross-sectional analytical study employing a quantitative approach. It focussed on ESRD individuals receiving HD at Muhimbili National Hospital (Upanga and Mloganzila) for a duration exceeding one month. Data was collected within one month from the 1st to the 31st of May 2024.

3.2 Study area

The study was conducted at Muhimbili National Hospital Mloganzila and Upanga dialysis units in Dar es Salaam. As a tertiary hospital, MNH sees patients from all over the nation and a few neighboring countries also the hospital performs the role of general hospital and teaching hospital, it has 29 nurses, 3 pharmacist and 6 nephrologists. Based on data collected at the unit, daily HD sessions vary from 90 to 120. Financing/payment methods for ESRD patients included insurance, out of pocket and bill waving for those who failed to pay in full.

3.3 Study population

The study population comprised of all adult ESRD patients and minors under the age of 18 with parental assent and assistance in completing written questionnaires, who had attended hemodialysis treatment at Muhimbili National Hospital Upanga and Mloganzila for more than one month during data collection.

3.4. Eligibility Criteria.

3.4.1 Inclusion criteria

All ESRD participants who had attended hemodialysis sessions for more than a month at both the MNH Upanga and Mloganzila units and consented to participate in the study provided informed consent during data collection.

3.4.2 Exclusion criteria

Patients with dementia, mental impairment or who were not in good mood due to their health status during the data collection period were excluded from this study.

3.5. Sample size estimation

The formula below was used to calculate the selected sample size for this investigation.

$$n = \frac{z^2 \times P\,(1-P)}{\varepsilon^2}$$

Where;

- *P* is the estimated proportion of patients with ESRD on dialysis (58%, expressed as decimal, so P= 0.58
- *Z* is Z-score corresponding to the desired confidence level (1.96 for 95% confidence level).
- *E* is the margin of error (0.65, expressed as decimal so E = 0.0065)

Substituting values in a formula

N= ***1.96x1.96.0.58(1-0.58)/0.65x0.65 = 221***

3.6 Sampling Method

In this study, a systematic sampling approach was utilized, consisting of four main steps:

Step 1: Define the Sampling Frame; The initial step was to establish the sampling frame, which included all registered patients undergoing hemodialysis in the unit. This complete list served as the basis for selecting participants.

Step 2: Determine the Sampling Interval (kth term); To find the sampling interval, the total number of hemodialysis patients (365) was divided by the estimated sample size (221). This calculation yielded a sampling interval of 2, meaning every second patient on the list would be selected for inclusion in the study.

Step 3: Assign Unique Numbers; A list was generated of patients who attended the unit during the data collection period, with each patient assigned a unique identifier. These identifiers ranged from 1 to 90, depending on daily attendance, ensuring that each patient could be distinctly recognized in the sampling process.

Step 4: Select Participants; Participants were selected systematically, beginning with a random choice of the first patient on the list. Following that, every second patient was selected to ensure a fair sampling method. This process continued until the target sample size of 221 patients was reached, providing a representative sample of the patient population.

3.7. Study Variables

3.7.1 Dependent variables

The main variables under examination in the study were the adherence levels to dialysis sessions and routine laboratory tests. All patients who managed to attend more than 10 HD sessions per month were considered as they adhered, similarly once per month for laboratory tests.

3.7.2. Independent variables

The payment methods and other costs ESRD patients incur can be termed independent variables, further explained below.

- Health insurance for patients (premium or non).
- Payment made in pocket (bill waved, exempted or not)
  Other costs patients incur.
- The expenses associated with haemodialysis sessions.
- Cost of medications.
- Patient's educational background (primary, secondary, or above).
- The patient's employment status
- Length of illness (if more than five years)
- Offering health counseling and education (Yes vs. No)
- The environment of education (friendly or not)

- The distance (close or far from the facility) to the hospital or HD care unit
- Travel time from home to the facility (less than one hour, one to two hours, or more

3.8 Data Collection Methods

An interviewer-administered questionnaire was used to gather data from the study participants. The researcher, along with two trained research assistants (nurses), collected the data. They posed specific research questions to the participants, recording the responses carefully. Each question was asked individually, and all responses were documented for every question.

3.9 Data collection tools

The data collection tool consisted of an interviewer-administered questionnaire that included both unstructured and structured questions. Initially created in English, the questionnaire was subsequently translated into Kiswahili to accommodate the primary language of most participants. The survey comprised the following sections: Section A: Participant demographics and history, Section B: Clinical history of the participants, Section C: Adherence to dialysis treatment, Section D: Laboratory testing and attendance at haemodialysis sessions, Section E: Payment methods and the direct and indirect costs incurred by patients for haemodialysis. This structure allowed for comprehensive data collection on various aspects affecting the participants' experiences with haemodialysis.

3.10 Reliability and validity

The evaluation of research quality relied on the application of the concept of reliability and validity

3.10.1 Reliability and validity

The extent to which the results measure what they are intended to measure is referred to as the study’s validity. This was determined by examining the degree of correspondence between the results and previously developed theories and other measurements of the same concept. If a test produces accurate results, then those results should be able to be reproduced by other people. This is what we mean when we talk about valid measurements being reliable.

3.10.2 Reliability

The term "reliability" refers to the degree to which the findings can be replicated when the investigation is carried out again using the same parameters. To evaluate it, we checked to see if the results were the same over time, according to different observers, and in various aspects of the test itself. The consistency of a measure across raters or observers refers to whether or not the same results are obtained when multiple individuals carry out the same measurement. The reliability test is used to compute the coefficient for the consistency of the variables; the reliability coefficient of the variables with a value of 0.7 was considered reliable and determines the degree of consistency of the study parameters.

3.10.3 Pre-testing

Pre-testing was conducted with 25 patients, representing 10% of the target sample, to evaluate the strengths and weaknesses of the study regarding question format, wording, and order. This phase also assessed question variation, clarity, task difficulty, and the interest and attention of study participants. Pre-testing took place MNH before starting data collection, and the insights gained were utilized to enhance the validity and reliability of the study variables. The results from this pre-test were not included in the final report.

3.11 data analysis

The collected data were entered, coded, cleaned, and analyzed using Stata Version 18. Prior to analysis, data cleaning and error range checks were performed to ensure validity and consistency. Each correct response to show adherence was assigned a score of 1 point, while non adherence received a score of 0.

Objective 1 and 2: The impact of health insurance on adherence to haemodialysis (HD) and routine laboratory testing was examined through univariate analysis to show the percentage of patients with insurance versus those using out-of-pocket (OOP) payments. Frequency and proportional analysis were utilized to demonstrate the relationship between different modes of payment and the factors affecting adherence. Similarly, bivariate and multivariate analyses were

employed to determine the significant associations between factors affecting adherence and modes of payment. A bivariate logistic model was used to estimate crude odds ratios (COR) with 95% confidence intervals (CI). Additionally, multivariate logistic regression analysis was conducted to estimate adjusted odds ratios (AOR) with 95% confidence intervals, accounting for potential confounding variables

Objective 3: The costs incurred by ESRD patients when attending dialysis sessions at MNH and their impact on adherence were examined through univariate analysis. This analysis utilized frequency and proportional methods to identify other factors affecting adherence beyond payment methods alone i.e. distance from the facility, cost of medicine, transport etc.

3.12 Ethical consideration

Ethical approval was obtained from the Directorate of Research and Publication of the Muhimbili University of Health and Allied Sciences (MUHAS). Permission to conduct this study was obtained from Muhimbili National Hospital before starting the data collection process.

Voluntary written informed consent was obtained from participants before data collection. Then participants were informed of their freedom to quit the study at any point without explaining the reasons. To maintain privacy and confidentiality, no names or any individual identities were used in this study. Also, the interview was done in an enclosed room to allow clients' attention to respond to the questions.

CHAPTER FOUR

4. 0 RESULTS

4.1 Socio-demographic characteristics of respondent

During the data collection, 244 patients receiving hemodialysis treatment at MNH were approached and invited to participate in the study. Out of these, 23 respondents declined to provide consent. Consequently, a total of 221 participants were included in the final analysis, resulting in a participation rate of approximately 90.57%.

Table 1 presents the demographic characteristics of respondents. The results show that the respondent's ages ranged from 12 to 79 years, with a mean age of 47 (SD 16.08). The majority (60.6%) were male and we had more married respondents (61.47%) in our sample than the unmarried ones. Over half of the respondents (56.6%) had secondary education and the majority (63.80%) were employed in the informal sector. Additionally, most respondents (65.60%) had health insurance. The sample comprised most respondents (71.1%) who had been on haemodialysis for over one year. Furthermore, a large number (68.3%) of respondents reported having at least one other chronic disease.

The majority adhered to laboratory tests (84.62%), at least once a month patient does required tests (84.62%). While haemodialysis adherence was 56.11.

Table 1: Socio-demographic characteristic

Variables	Frequency	Percent %
Age (years)		
below 19	4	1.81
20-33	34	15.38
34-47	46	20.81
48-61	103	56.15
above 61	34	15.84
Gender		
Female	85	39.72
Male	129	60.28
Marital Status		
Married	131	61.47
Single	80	38.53
Mode of Payment		
Insurance	145	66.06
Out-of-Pocket	76	34.94
Highest Education		
Secondary ecucation	125	56.6
College	96	43.4
Occupation		
Civil servant	45	22.28
Private employed	24	11.88
Self employed	54	26.73
Retired	23	11.39
No income	44	21.78
Non-response	12	5.94
Dialysis adherence		
adhered	124	56.11
Non-adhered	97	43.86
Other chronic diseases		
Yes	151	68.33
No	70	31.67
laboratory test adherence		
Adhered	187	84.62
Non-adhered	34	15.38

4.2 The influence of Mode of payment types on the adherence of ESRD patients to dialysis sessions at Muhimbili National Hospital.

To understand the influence of mode of payment I performed chi square test and results were significant as shown in table 2. Table 2 presents the distribution of modes of payments across the dialysis sessions per month. Haemodialysis is adhered to if a patient attends at least 10 sessions within a month. The results from Table 2 show a significant difference for those who adhered to hemodialysis across modes of payment. Patients with health insurance exhibited a high adherence rate, with 92.94 % meeting the criteria, compared to only 7.26% of those paying out-of-pocket. Those who paid using OOP methods indicated a high rate of non-adherence for example, over 70% indicated to have less than eight sessions per month compared to 29% of those insured. The statistical analysis yielded a p-value of 0.000, indicating a strong association between the mode of payment and adherence to the required number of dialysis sessions per month.

Table 2: The relationship between mode of payment and dialysis

	Dialysis Sessions per Month								
	<4		**4**		**8**		**12**		
Mode of payment	**freq**	**%**	**freq**	**%**	**freq**	**%**	**freq**	**%**	**p-value**
Insurance	3	60	2	33.33	25	29.07	115	92.94	0.000
Out-of-pocket	2	40	4	66.67	29.07	70.93	9	7.26	

Pearson chi2= 94.1877 Pr = 0.000

Table 3 The logistic regression analysis identified several factors affecting adherence to hemodialysis (HD). Key findings include: Insurance Status: Patients without insurance were significantly less likely to adhere to HD (OR = 0.04). Occupation: Private sector employees had

lower adherence compared to civil servants (OR = 0.17). Convenience of Schedule: Those who found their dialysis schedule inconvenient were less likely to adhere (OR = 1.4).

Transport Mode: Patients using public transport had lower adherence rates compared to those using private transport (OR = 0.33). Age, gender, education, and other chronic diseases did not significantly impact adherence.

In multivariate analysis variables that remained significant included the following, insurance cover, patients without insurance were less likely to adhere to HD compared to those with insurance (adjusted odds ratio [AOR] = 0.1, 95% confidence interval [CI] = 0.02–0.49). Patients Not having other diseases were less likely to adhere (AOR= 2.6, 95% CI= 1.03-6.9) compared to those with other diseases, patients without dialysis education also were less likely to adhere compared with those with dialysis education (AOR= 0.25, 95% CI= 0.09-0,68).

Table 3: Regression analysis for HD sessions

			Multivallate	
variable	**COR (95% CI)**	**p-value**	**AOR 95% CI**	**p-value**
Insurance cover				
Yes				
No	0.048(0.023-0.1)	0.000	0.1(0.002-0.49)	0.000
Gender				
Female				
Male	1.14(0.66-1.97)	0.065	1.5(0.61-4.0)	0.335
Age	1.01(0.997-1.038)	0.068	0.99(0.94-1.0)	0.882
Marital				
Married				
Single	0.69(0.41-1.2)	0.192	0.54(0.22-1.32)	0.181
Occupation				
civil servant				
Private	0.56(0.174-1.77)	0.321	0.490.11-1.5)	0.205
Self	0.169(0.68-0.41)	0.000	0.21(0.04-1.26)	0.092
Retired	0.4990.15-1.59)	0.238	0.67(0.11-3.9)	0.658
No Income	0.11(0.44-0.317)	0.000	0.14(0.01-1.5)	0.106
Education				
Primary	0.9(0.18-4.50)	0.898	0.25(0.33-1.9)	0.181
Secondary	0.6(0.133-3.04)	0.573	0.15(0.02-0.800	0.027
College	1.3(0.28-6.47)	0.693	0.07(0.01-0.57)	0.013

schedule convenience				
Yes				
No	1.14(.46-2.80)	0.767	4.2(0.99-17)	0.050
Other disease				
Yes				
No	1.13(0.77-2.45)	0.279	2.6(1.03-6.9)	0.042
Dialysis education				
Yes				
No	0.61(0.34-1.09)	0.097	0.25(0.09-0.68)	0.006
Transport				
Private				
Public	0.33 (0.18-0.62)	0.001	0.99(0.36-2.72)	0.981
Taxis	0.51 (0.18-1.45)	0.213	1.58(0.38-6.65)	0.533

4.3 The influence of Mode of payment types on the adherence of ESRD patients to routine laboratory tests at Muhimbili National Hospital.

The distribution of mode of payment types across the Laboratory test is presented in Table 4. Patients undergoing haemodialysis must adhere to routine laboratory tests at least once a month. The study findings from Table 4 revealed a significant difference in adherence based on payment method. Patients with insurance demonstrated higher adherence rates, with 68.98% of respondents undergoing tests once a month, compared to 31.02% of those paying out-of-pocket. Conversely, patients paying out-of-pocket were more likely to forego laboratory tests altogether, with 76.92% reporting non-adherence, compared to 23.08%of insured patients. Statistical analysis showed a significant association (p-value = 0.003) between payment method and adherence to monthly laboratory tests.

Table 4: The distribution of mode of payment types across the Laboratory test frequency

	Laboratory test frequency per Month						
	Rarely		**Once a month**		**none**		
Mode of payment	**freq**	**%**	**freq**	**%**	**freq**	**%**	**p-value**
Insurance	13	61.90	129	68.98	3	23.08	O.003
Out-of-pocket	08	38.10	58	31.02	10	76.92	

Similarly, the key findings as presented in table 5 from bivariate regressions, showed that patients without insurance (OOP) are less likely to adhere to routine laboratory testing (OR=0.44, 95% CI; 0.2-0.9), multivariate analysis did not show any true statistical significance to any of the variables tested.

Table 5: Regression analysis for routine laboratory test adherence.

Lab test adherence			Multivariate	
variable	**crude OR**	**p-value**	**AOR 95% CI**	**p-value**
insurance cover				
Yes				
No	0.439(0.2-0.9)	0.025	0.3(0.13-1.16)	0.091
Gender				
Female				
Male	1.09(0.52-2.29)	0.814	0.69(0.23-2.06)	0.508
Age	1.02(0.99-1.04)	0.197	1.10(0.98-1.05)	0.305
Marital status				
Married				
Single	2.28(0.98-5.23)	0.056	2.3(0.95-5.64)	0.066
Occupation				
Private Employed	0.39(0.11-1.46)	0.164	0.36(0.95-1.410	0.145
Self Employed	0.61(0.20-1.87)	0.393	0.96(0.16-5.46)	0.965
Retired	1			
No Income	0.5(0.15-1.63)	0.251	0.36(0.03-3.91)	0.398
Highest education				
Primary	0.5(0.29-1.57)	0.285	0.45(0.13-1.65)	0.264
Secondary	0.51(0.22-1.12)	0.118	0.45(0.19-1.20)	0.174
College				
House income				
100,000-200,000	0.98(0.28-3.46)	0.986	0.78(0.83-7.27	0.828
200,000-300,000	0.48(0.11-2.016)	0.34	0.19(0.01-3.50	0.266
300,000-400,000	1.12(0.32-3.92)	0.852	0.53(0.38-7.4	0.642
400,000-600,000	0.96(0.20-4.60)	0.961	0.29(0.02-4.36)	0.373
Above 600,000	1.5(0.41-5.98)	0.503	0.44(0.03-6.01)	0.547
Below 50,000	1.15(0.24-5.44)	0.857	0.75(0.95-5.89)	0.786
Duration disease	0.89(0.78-1.02)	0.094	0.85(0.68-1.05)	0.138
other diseases				
Yes				
No	0.82(0.38-1.7)	0.622	0.96(0.36-2.61)	0.939
Dialysis education				
Yes				
No	1.89(0.89-3.99)	0.093	1.88(0.77-4.6)	0.163
Transportation				
Private				
Public	0.68(0.89-1.63)	0.389	0.92(0.30-2.84)	0.897
Taxis	0.3(0.11-1.27)	0.113	0.28(0.06-1.1)	0.079

4.4 ESRD patients' expenses incurred when attending MNH dialysis sessions and its impact.

Table 6 shows the expenses incurred in haemodialysis by patients attending haemodialysis sessions at MNH hospital. The results indicate varying frequencies and percentages across different categories. Medicine costs are the highest at 38.46%, followed by transport costs at 25.34%. Parking fees and co-payments are relatively lower, with percentages of 5.43% and 0.45% respectively. Special diet expenses account for 2.26%, while declined income due to treatment represents 6.79%. Approximately 21.27% of patients reported incurring all mentioned costs. Statistical analysis indicates no significant relationship between patients undergoing hemodialysis and the expenses incurred, with a p-value of 0.163, which exceeds the significance level of 0.05 used in the analysis.

Table 6: Expenses incurred on dialysis by gender

	HAEMODIALYSIS PATIENTS						
	FEMALE		MALE		TOTAL		
Expenses incured	**freq**	**%**	**freq**	**%**	**freq**	**%**	**p-value**
Transport	22	25.29	34	25.37	56	25.34	
Parking fee	2	2.38	10	7.46	12	5.43	
Co-payment	0	0.00	1	0.75	1	0.45	
Medicine cost	42	48.28	43	12.09	85	38.46	0.163
Special diet	1	1.15	4	2.90	5	2.26	
Decline income	4	4.00	11	8.21	15	6.79	
All the above	16	10.39	11	23.13	47	21.27	

CHAPTER FIVE

5.0 DISCUSSION

5.1 Discussion of the key findings

End-stage renal disease (ESRD) requires regular haemodialysis and routine laboratory tests for patient survival. However, financial factors, such as payment methods, can impact adherence to these treatments. This study focuses on how different payment methods, specifically health insurance and out-of-pocket expense influence the adherence of ESRD patients to their dialysis and laboratory test schedules at Muhimbili National Hospital (MNH). By exploring these factors, the research aimed to identify ways to improve access to consistent care (adherence) and better outcomes for ESRD patients in Tanzania.

The results provide insights into the socio-demographic characteristics and adherence patterns of patients undergoing haemodialysis at Muhimbili National Hospital (MNH). With a participation rate of approximately **90.57%,** the sample comprised predominantly male respondents **60.6%** with a mean age of **47** years, indicating a middle-aged population that is typical for end-stage renal disease (ESRD) patients(23) . The high prevalence of health insurance **65.6%** among respondents is noteworthy, as it correlates strongly with adherence to dialysis sessions. Specifically logistic regression analysis highlighted insurance status as the most significant factor influencing adherence to haemodialysis, with uninsured patients being far less likely to comply with treatment. This finding is in line with Ghimire et al.'s study, which identified financial difficulties as a major obstacle to adherence in haemodialysis patients (23). Moreover, patients who reported inconvenient dialysis schedules and those relying on public transport also exhibited lower adherence rates, suggesting that logistical factors play a crucial role in treatment compliance (32). By exploring these factors, the research aimed to identify ways to improve access to consistent care (adherence) and better outcomes for ESRD patients in Tanzania.

Mode of Payment and Their Influence on Haemodialysis Sessions:

This section addresses the first objective, which investigates the impact of payment methods, particularly health insurance and out of pocket, on adherence to haemodialysis sessions among ESRD patients at MNH, the finding from this study reveals the critical role that payment methods particularly health insurance, play in influencing the adherence of ESRD patients to haemodialysis at MNH. The results show a noteworthy adherence rate of **92.4%** to their dialysis sessions, as indicated in **Table 2**. This signifies that most insurance-covered patients comply with their treatment regimen.

Conversely**, only 7.6%** of patients without insurance (OOP) adhered to their dialysis sessions. This is consistent with a 2022 study at MNH showed that insurance patients had a high rate of adherence compared to out-of-pocket, insured patients had **a 70%** lower risk of non-adherence **(RR = 0.70, 95% CI: 0.48, 0.96**) (21). Similar findings were observed in a study from Thailand, where uninsured patients exhibited poor adherence and resorted to coping mechanisms such as reducing visits and medication (33). The challenges faced by uninsured patients in resource-limited countries are further supported by a study from Ghana, where only **three out of 255** patients could afford dialysis for three months, highlighting the financial barriers to treatment adherence (34).

Mode of payment and Adherence to Routine Laboratory Testing

When it comes to routine laboratory testing as the second objective, the bivariate analysis (chi square) shows a notable adherence rate of **68.98%** among patients with health insurance to their laboratory routine tests, this implies that most insured patients are compliant with their scheduled laboratory tests. However, only **31.02%** of patients without insurance (OOP) adhered to these routine tests. Multivariate analysis showed that there is no statistical significance in any of the tested variables, one of the studies done in Korea showed that **85.6%** had regular laboratory tests (adherence)(35) and **14.4%** non-adherence, those who adhered had longer dialysis duration, however, the study was not specific to the mode of payment used.

These finding underscores the importance of health insurance coverage in promoting adherence to dialysis treatment as well as in facilitating adherence to laboratory routine tests. It indicates that while a large proportion of insured patients adhere to their scheduled tests, there remains a minority who struggle to do so. Understanding the factors contributing to this non-adherence among insured patients is essential for developing targeted interventions aimed at improving compliance with routine laboratory testing and haemodialysis adherence, thereby enhancing overall patient care and management.

Expenses Associated with Dialysis and Its Impact on Patients

On the third objective, the key finding from the proportional analysis highlights the significant impact of medical and transportation costs on patients undergoing dialysis, with variations observed between insurance and out-of-pocket (OOP) payment methods. Medicine costs emerge as the most substantial expense, accounting for **38.46%** of their total incurred expenses related to dialysis. Additionally, transportation costs represent a significant financial burden, **with 25.34 %** of all respondents. A similar study was done in Burkina Faso (2020) on costs supported by the family showed that direct costs were 94USd indirect costs 43.5 USD, and 45% paid for their HD(36), another study in Nigeria 2023 on cost analysis revealed a substantial amount of 2693 USD of managing comorbidities mainly medicine cost (37)

5.2 Strength and Weakness of the Study

Strength of the study

These findings underscore the importance of considering the financial implications of dialysis treatment, particularly in terms of medication and transportation costs, and how these expenses vary based on the patient's insurance coverage or the payment method. Understanding these financial challenges can inform the development of support programs or interventions to alleviate the financial burden on patients, thereby improving their overall quality of life, and preventing adverse events and treatment adherence.

Weakness of the study

The research was conducted exclusively at Muhimbili National Hospital, which might restrict the applicability of the results to other healthcare environments or geographical areas. Variations in patient demographics and experiences between this hospital and others could potentially compromise the study's external validity.

The study's reliance on self-reported patient data introduces the possibility of recall bias or social desirability bias. Patients may inadvertently exaggerate or downplay their levels of knowledge, potentially distorting the accuracy of the findings.

Limitations of the cross-sectional design: This design only captures a single moment in patients' knowledge levels, precluding the assessment of knowledge changes over time or the establishment of causal relationships between variables.

Although the study accounts for various individual and organizational factors, there could be additional unmeasured confounding variables influencing patients' adherence to dialysis and routine laboratory testing. Socioeconomic status, cultural beliefs, or access to information are examples of factors that might impact patient knowledge but were not accounted for in the analysis.

CHAPTER SIX

6.0 CONCLUSION AND RECOMMENDATION

6.1. Conclusion

In conclusion, there is a clear need for enhanced insurance coverage and targeted interventions that address both financial challenges and adherence issues. Addressing these factors can contribute to more consistent care and better management of ESRD. The study sheds light on the significant role of health insurance coverage in promoting adherence to dialysis sessions and routine laboratory testing, it also reveals areas for improvement. The findings highlight the importance of understanding and addressing factors contributing to non-adherence among insured patients and the financial burden faced by individuals undergoing dialysis. To improve patient outcomes, there is a clear need for enhanced insurance coverage and targeted interventions that address both financial challenges and adherence issues. Addressing these factors can contribute to more consistent care and better management of ESRD as well as focusing on treatment i.e. kidney transplant.

6.2 Recommendation

Advocating necessity of having Insurance Coverage: Given the high adherence rates observed among patients with health insurance for both dialysis sessions and routine laboratory tests, efforts should be made to expand insurance coverage for renal care. MNH being a national hospital has a great chance of advocation the importance of having health insurance.

Targeted Interventions for Non-Adherent Insured Patients: the presence of a minority not adhering to their scheduled tests suggests the need for targeted interventions. Healthcare providers MNH inclusively should conduct further research to identify the underlying reasons for non-adherence among insured patients and develop tailored interventions to address these issues effectively.

Subsidize Dialysis and Laboratory Costs: Given the substantial financial burden faced by patients, especially those paying out-of-pocket, it is important for MNH and healthcare

policymakers to consider subsidizing the cost of dialysis sessions and routine laboratory tests. This can reduce the financial barriers that prevent consistent adherence to treatment schedules

Encourage Multisectoral Collaboration: The burden of dialysis care goes beyond the healthcare system, with costs associated with transportation, medication, and general access to care. A multisectoral approach involving healthcare providers, insurance companies, government bodies, and transportation services can help alleviate the economic pressures on patients, creating a more comprehensive support system.

Understanding Out-of-Pocket Challenges: For patients paying out-of-pocket (OOP), the study highlights significant financial burdens, particularly with medication and transportation costs. Hospital management particular MNH should explore strategies to alleviate these financial pressures, such as subsidies for essential medications and transportation assistance programs. Additionally, healthcare providers should offer financial counseling and support services to help OOP patients manage their expenses more effectively.

Continued Research and Monitoring: Continued research by MNH and MUHAS is essential to monitor the impact of insurance coverage on dialysis adherence and healthcare expenses. Longitudinal studies can provide insights into the evolving dynamics of adherence behavior among insured and OOP patients, informing ongoing improvements in healthcare delivery and policy development.

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APPENDICES

Appendix 1: Questionnaire (English Version)

Date of Interview; _____Hospital Number_____

A: SOCIO-DEMOGRAPHIC CHARACTERISTICS

1.1	Sex	Male _____ Female. _____
1.2	Age	_____
1.3	What is your marital status?	1 = Married _____ 2 = living together. ___ 3 = Divorced or separated. _____ 4 = widowed. _____ 5 = never married, never living together
1.4	Have you ever attended formal school?	Yes No (Skip next question)
1.5	What is the highest level of school (education) has attended?	0 = Pre-primary 1 = Primary 3 = Secondary 'O' Level 4 = Secondary ''A' Level _____ 5 = college 6= University 7 = Don't Know
1.6	What is your partner's highest education level?	0 = Pre-primary 1 = Primary 3 = Secondary 'O' Level 4 = Secondary ''A' Level

		5 = college 6 = University 7 = Don't Know
1.7	What is your occupation? That is, what kind of work do you mainly do?	1= Civil servant 2= Private employed 3 =Self-employed _____ 4= Retired 5= Not earning any income 6= _____
1.8	What is your (partner's) occupation? That is, what kind of work does he/she mainly do?	1= Civil servant 2= Private employed 3 =Self-employed _____ 4= Retired 5= Not earning any income 6= _____
1.9	Please approximate monthly household income	a) 100,000 – 200,000 Tsh b) 200,000 – 300,000 Tsh c) 300,000 – 400,000 Tsh _____ d) 400,000 - 600,000 Tsh

		e) above 600,000 Tsh f) other _____
1.10	how many meals you family consume every day?	
1.11	What is the primary mode of payment for your dialysis	1 = insurance 2 = out-of-pocket
1.12	What type of Insurance?	1 = Private 2 = NHIF 3= Other: _____
1.13	Does your health insurance cover cost of haemodialysis treatment?	1 = No 2 = Yes

B: CLINICAL HISTORY

2.1 When diagnosed with chronic kidney disease? _____ (DD/MM/YY)

2.2 Duration of illness (CKD) _____ (years) _____ (months) _____ (weeks)

2.3 frequency of dialysis per week (write number) _____

2.4 Duration of dialysis sessions _____ hours

2.5 Have you ever encountered severe complications due to hemodialysis?

Yes..... No.....

2.6 Do you have any other chronic problems besides CKD?

Yes..... No.....

2.7 If YES, what other chronic disease do you have?

Diabetes mellitus..... Cancer ..... HIV/AIDS ..... Cardiac disease

Others mention: _____

Does your insurance cover the cost of treating the mentioned disease?

YES____ NO____

If no, approximate the cost incurred in treating the disease within a month ____

a) 100,000 – 200,000 Tsh

b) 200,000 – 300,000 Tsh

c) 300,000 – 400,000 Tsh _____

d) 400,000 - 600,000 Tsh

e) above 600,000 Tsh

f) other specify _____

C: ADHERENCE ON DIALYSIS SESSIONS

3.1 Is the dialysis schedule convenient for you? (choose the best answer) Yes..... No.....

a) No, because I must come to dialysis too early.

b) No, because I must come to dialysis too late!

c) No, because it's my mealtime, and I get hungry during dialysis.

d) No, because it's my medication time.

e) No, because of (others).....

3.2What transportation do you use to go to the dialysis center?

a) Personal transportation b) Bus c) tax d) Other (specify).....

3.3 Who accompanies you to the dialysis unit?

a) Parents b) Spouse (husband, wife) c) child d) friend e) Others(specify) .....

3.4 When was the last time a medical professional (i.e., doctor, nurse, dietician, or other medical staff) talked to you about the importance of not missing your dialysis treatment?

a) Last week one

b) month ago

c) more than a month ago

d) when I first start treatment

e) never

f) other(specify)

SECTION D; Routine laboratory test

4.1	How frequently do you undergo laboratory tests related to your dialysis treatment?	a)weekly b)monthly c)other (specify)…….
4.2	How do you perceive the importance of routine laboratory testing in managing your dialysis treatment?	a)Very important b)Important c)Neutral d)Not very important e)Not important at all

4.3	Does your health insurance cover the costs of related laboratory testing?	a)Yes, fully covered b)Partially covered c)No, not covered
4.4	Have you ever delayed or skipped a routine laboratory test due to financial constraints? If yes how frequently …….	Yes No
4.5	In your opinion, how can financial support or insurance coverage better assist individuals in maintaining adherence to routine laboratory tests? …….	

SECTION E PAYMENT METHODS

OUT-OF-POCKET.		Tick v	
5.1	Have you ever faced challenges related to out-of-pocket payments for your dialysis treatment? IF YES a) delay in getting control number for payment b) system error after payment so dalayed to enter into dialysis c) other specify…….	YES	NO
5.2	Have you ever missed or delayed a dialysis session due to financial constraints? If yes How many per month……..	Yes	No
5.3	Are there specific aspects of out-of-pocket expenses that pose a greater challenge for you in adhering to dialysis treatment? (e.g., medication costs, transportation, etc.) …….		
5.4	In your opinion, how can financial support or insurance coverage better assist individuals in maintaining adherence to dialysis treatment?		

5.5	Are you aware of any financial assistance programs or resources available to support individuals with chronic kidney disease in managing out-of-pocket costs for dialysis?	Yes	No
5.6	How do you think healthcare policies or insurance plans can be improved to alleviate the financial burden on individuals undergoing dialysis?		
5.7	**HEALTH INSURANCE Tick NHIF…….. Other insurance…….**		
	How many sessions per month does your insurance cover? a) 12 sessions d) other (specify) b) above 12 sessions _____ c) below 12 sessions		
5.8	Have you encountered challenges related to health insurance payments for your dialysis treatment? If yes ; explain …..	YES	NO
5.9	How does health insurance coverage influence your adherence to the prescribed dialysis sessions?		

5.11	Have you ever missed or delayed a dialysis session due to issues related to health insurance coverage? If yes a) network issue b) delay in getting approval c) insurance cover less session. d) other factors ; explain inshort …….	YES	NO
5.12	Are there specific aspects of health insurance payments for dialysis treatment that pose a challenge for you?		

SECTION F

Dialysis-Related Expenses

6.1 Please indicate the types of expenses you incur when attending dialysis. (Check all that apply)

a)Transportation to/from the dialysis center

b)Parking fees

c)Dialysis co-payments

d)Medication costs

e)Specialized dietary expenses

f)Lost wages due to dialysis appointments

g)Other (please specify)……

6.2 On average, how much do you spend on transportation to and from the dialysis center per month?

_____

6.3 How do you manage the cost of dialysis-related medications?

a) Fully covered by insurance

b) Partially covered by insurance

c) Out-of-pocket

d) Others (please specify) …….

Appendix 2: Questionnaire (Swahili Version)

TAREHE **:** **_____Hospital Number_____**

A: SOCIO-DEMOGRAPHIC CHARACTERISTICS

1.1	Jinsia	Mke____ Mme____
1.2	umri	
1.3	Hali ya ndoa?	1 = umeoa/ kuoa _____ 2 = hakuna ndoa
1.4	Una elimu ya darasani	Ndio _____ Hapana_____(usijaze swali linalofuata)
1.5	Elimu ya juu uliyofikia (education) has attended?	0 = Pre-primary 1 = shule ya msingi 3 = sekondari 'O' Level 4 = Sekondari ’‘A' Level _____ 5 = chuo 6= chou kikuu 7 = sifahamu
1.6	Una mwenza?	___Ndiyo ___Hapana(Ruka swali linalofuata)
1.7	Elimu ya juu ya mwenza wako	0 = Pre-primary 1 = shule ya msingi 3 = sekondari 'O' Level 4 = Sekondari ’‘A' Level _____

		5 = chuo 6= chou kikuu 7 = sifahamu
1.8	Unajishughulisha na nini. (kazi) ?	
1.9	Mwenza wako anajishughulisha na kazi ipi?	
1.10	Tafadhari kadilia kipato chako cha mwezi	_____Tsh
1.11	Mnapata milo mingapi kwa siku kwa familia	
1.12	Unatumia utaratibu upi kugharamia uchujaji damu	1 = bima 2 = pesa taslimu.
1.13	Aina ya bima uliyonayo?	1 = Binafsi 2 = NHIF 3= nyinginezo: _____
1.14	Bima yako inalipia gharama za uchujaji ?	1 = Ndio 2 = Hapana

B: HISTORIA

2.1 uligundua lini kua una tatizo lafigo ?_____ (DD/MM/YYYY)

2.2 ulianza lini huduma ya kuchuja damu: _____ (mwaka) _____ (mwezi) ____

2.3 Unafanya dialysis mara ngapi kwa wiki _____

2.4 Unafanya kwa masaa mangapi uchujaji damu _____

2.5 Ushawahi kukutana na changamoto wakati wa kuchuja damu

Ndio..... Hapana.....

2.6 Je una ugonjwa mwingine Zaidi ya huu wa figo(CKD)?

Ndio..... Hapana.....

2.7 Kama ndio, ni upi?

Kisukari..... Kansa ..... HIV/AIDS ..... Moyo mengineyo: _____

C: Mahudhurio ya huduma ya uchujaji damu (dialysis)

3.1 Unaridhika na ratiba ya dialysis? (choose the best answer) ndio..... Hapana.....

f) Hapana, sababu natakiwa kuja mapema sana.

g) Hapna, sababu natakiwa kuja jioni sana!

h) Hapana, ni mda wangu wa chakula na siwezi kufanya nikiwa na njaa

i) Hapana, sababu ni mda wangu wa kutumia dawa

j) Weka sababu nyingine kama ipo_____-

3.2 Unatumia usafiri upi kuja hospital kufanya dialysis center?

b) Usafiri Binafsi b) Basi c) tax d) elezea mwingine_____

3.3 Nani anakusindikiza?

b) mzazi b) mwenza (mke, mme) c) Mtoto d) Rafiki e) wengine (taja). .....

3.4 lini mara ya mwisho mtaalamu wa afya (i.e. doctor, nurse, dietician, or other medical staff) ameongea na wewe umuhimu wa kutokukosa kufanya dialysis?

g) Wiki moja iliyopita

h) Mwez uliopita

i) Zaidi ya mwezi umepita

j) Siku ya kwanza ya matibabu

k) sijawahi

SEHEMU D; VIPIMO VYA MAABARA

4.1	Mara ngapi unafanya vipimo vya maabara vinavyohusiana na tiba ya dialysis	a)wiki b)mwezi c)zaidi(elezea)…….
4.2	Unaonaje utaratibu wa kupata vipimo kama utaratibu unavyotaka katika kuimarisha matibabu yako ya uchujaji damu (dialysis)?	a)Muhimu sana b)muhimu c)kawaida d)sio muhimu sana
4.3	Bima yako inalipia vipimo vya maabara vinavyohusiana na uchujaji damu (dialysis)?	a)Ndio, vipimo vyote b)baadhi ya vipimo

		c)hapana hailipii vipimo
4.4	Je ushawahi kuchelewa au kukosa kufanya vipimo sababu ya kukosa pesa ya kulipia? Kama ndio ni mara ngapi …….	Ndio Hapana
4.5	Kwa maoni yako, msaada unaohitajika kusaidia wagonjwa kuweza kufanya vipimo kadri inavyohitajika ? …….	

SEHEMU E

MALIPO BINAFSI		Tick v	
5.1	Hua unapata changamoto ya malipo kukuwezesha kupata huduma ya uchujaji damu? Kama ndio a) kuchelewa kupata namba ya malipo (control number) b) changamoto ya mfumo kutambua risiti c)changamoto nyinginezo …….	NDIO	HAPANA
5.2	Ushawahi kukosa huduma ya kuchuja damu kutokanan na kukosa fedha? Kama ndio Mara ngapi kwa mwezi……..	Ndio	Hapana
5.3	Kuna changamoto nyinginezo mahsusi za kifedha zinazochangia ukosefu wa fedha yak u;ipia huduma (dialysis)? (mfano, gharama za dawa, usafiri nk) …….		
5.4	Kwa mawazo yako, msaada upi unahitajika kwa wasio na uwezo wa kulipia huduma ya kuchuja damu (dialysis)?		

5.5	Unaufahau na taasisi yoyote inayotoa ufadhiri au unafuu wa gharama za dialysis kwa wagonjwa wanaojilipia ??	Ndio	Hapana
5.6	Unafikiriaje kuboresha sera ya afya na bima kusaidia kupunguza mzigo wa malipo ya hii huduma ?		
5.7	**Wenye Bima ya Afy. Tick NHIF…….. bima nyinginezo…….**		
	Bima yako inagharamia mara ngapi huduma hii kwa mwezi? a) 12 d) taja …….. b) Zaidi ya 12 _____ c) chini ya 12		
5.8	Ushakutana na changamoto ya bima kukuwezesha kupata huduma? Kama ndio elezea_____	Ndio	Hapana
5.9	Kuwa na bima kumekusaidia kuweza kuhudhuria huduma ya kuchuja damu bila kukosa? _____-		
5.11	Ushawahi kukosa kupata huduma iliyosababisha na matatizo ya bima ? Kama ndio a) kukosekana mtandao b) kucheleweshwa kibali c) bima kulipia mahudhurio machache d) eleza kwa kifupi changamoto nyingine …….	Ndio	Hapana
5.12	Kuna Changa moto ya kipee ya bima unayoijua inayosababisha kukosa huduma ya kuchuja damu?		

SEHEMU F

Gharama nyinginezo

6.1 tafadhari weka alama ya vema , gharama nyinginezo unazokutana nazo waka twa kufata huduma ya kuchuja damu.

a) gharama ya usafiri kukuleta na kukurudisha

b) gharama ya maegesho

c)kuchangia huduma ya dialysis pale bima inapolipa kidogo

d) Gharama za dawa

e)gharama ya chakula cha kipekee

f)kupunguwa kwa kipato chako pale unapohudhuria huduma ya dialysis

g)nyinginezo ongeza _____

6.2 kwa wastani kiasi cha fedha gani unatumia kulipia usafiri kwa mwezi ? _____

Gharama za dawa_____

6.3 Gharama za dawa ,unalipiaje?

a) Bima inagharamia

b) bima inalipia ila sio zote

c) malipo binafsi

d)ongezea …….

Appendix 3: Informed Consent (English Version)

MUHIMBILI UNIVERSITY OF HEALTH AND ALLIED SCIENCES (MUHAS)

DIRECTORATE OF RESEARCH AND PUBLICATIONS

MUHAS: INFORMED CONSENT

Participant ID: …….

CONSENT FORM FOR PARTICIPATING IN A RESEARCH STUDY

Greetings! My name is **Bruno J Njonjo,**I am studying for a Master of Health Economics and Policy at the Muhimbili University of Health and Allied Sciences (MUHAS). I am researching **" Payment methods for patients on haemodialysis procedures at Muhimbili national hospital and its impact on adherence to dialysis sessions and routine laboratory testing.**

The aim of the study

This observational study aims to assess payment methods for patients on haemodialysis procedures at Muhimbili national hospital and its impact on adherence to dialysis sessions and routine laboratory testing.

Procedure. I would like you to participate in this study. You have been chosen because you fulfill the specific criteria for participating in this study. Questionnaires will be provided to guide the process, and every effort will be made to ensure your privacy is respected. Your cooperation

in sharing your information with the researcher is greatly appreciated. Please get in touch with the researcher anytime if you have any inquiries regarding this study.

Confidentiality: All information and issues relating to your participation in the study will be treated as confidential, and no unauthorized person will have access to your information. As soon as this process is complete, the material used will be discarded safely to enhance research confidentiality. Furthermore, to protect confidentiality, your names will not be used in the written copy of the discussion.

Right to refuse or withdraw: It is your choice to participate in this study. You don't have to talk about anything you don't want to, and you may end the interview at any time. However, I encourage you to participate because your views are important in this study.

Benefits: You will not receive any direct benefits from the study. However, your participation will aid decision-makers and policymakers in making informed choices during health budgeting, both at the national and hospital levels. This insight could lead to adjustments in resource allocation, such as modifying the frequency of dialysis sessions and laboratory testing and implementing patient education initiatives.

Risks: Participation in this study will not harm you, although some questions will be personal, which might trigger your emotions, feelings, worries, and despair.

Whom to Contact: In case of any inquiry, please contact the principal investigator, the directorate of Research and Publications Committee, MUHAS. P.O. Box 65001, Dar es Salaam-Tanzania **255 0222151596**,

Declaration: I have read and understood the contents of this form. My questions have been answered. I agree to participate in this study.

Signature of participant_____ Date_____ Signature of researcher/research assistant_____ Date: _____

Appendix 4: Informed Consent (Swahiliversion)

CHUO KIKUU CHA AFYA NA SAYANSI SHIRIKISHI MUHIMBILI

KURUGENZI YA UTAFITI NA UCHAPISHAJI

FOMU YA RIDHAA

MSHIRIKI NO: _____

IDHINI YA KUSHIRIKI KATIKA UTAFITI

Habari, Naitwa **Bruno J Njonjo** mwanafunzi wa ubobezi katika sayansi ya uchumi afya na sera ya chuo kikuu cha afya na sayansi shirikishi muhimbili. Utafiti wangu unahusu **"Utaratibu wa malipo kwa wagonjwa wanaofanyiwa dialysis(haemodialysis) katika Hospitali ya Taifa ya Muhimbili na athari zake katika kupata mwendelezo unaotakiwa wa dialysis na vipimo vya maabara".**

Lengo la utafiti: Madhumuni ya utafiti huu ni kutathimini Utaratibu wa malipo kwa wagonjwa wanaofanyiwa dialysis(haemodialysis) katika Hospitali ya Taifa ya Muhimbili na athari zake katika kupata mwendelezo unaotakiwa wa dialysis na vipimo vya maabara .

Utaratibu wa kushiriki: Ningependa ushiriki katika utafiti huu, kwa kua ametimiza moja kwa moja vigezo vya mada ya utafiti. Miongozo ya dodoso inayosimamiwa itatumika na faragha itadumishwa iwezekanavyo .Natumai utakuwa tayari kushiriki katika utafiti huu, ikiwa una swali kuhusu utafiti huu tafadhali usisite kuwasilia na mtafiti wakati wowote.

Usiri wa utafiti. Taarifa zote na maswala yanayohusiana na ushiriki wako katika utafiti yatachukuliwa kuwa siri. punde tu taratibu hii zitakapokamilika nyenzo ziliotumika zitatupwa

kwa njia salama ili kuboresha usiri wa utafiti. Jina lako halitatumika katika nakala iliyoandikwa kwa majadiliano.

Haki ya kushiriki au kutoshiriki Ni chaguo lako kushiriki katika utafiti huu pia huna haja ya kuzungumza juu ya kitu chochote ambacho hutaki , na unaweza kumaliza mahojiano wakati wowote,hata hivyo, nakuhimiza kushiriki kwa sababu maoni yako ni muhimu sana katika utafiti huu.

Faida. Ushiriki wako utasaidia watoa maamuzi kwa wabunifu wa sera katika kufanya chaguo zenye ufahamu wakati wa bajeti ya afya, katika ngazi ya kitaifa na hospitali. Mchango wako unaweza kusababisha marekebisho katika mgawo wa rasilimali, kama vile kubadilisha idadi ya mahudhurio ya dialysis na vipimo vya maabara na kutekeleza mipango ya elimu kwa wagonjwa

Madhara ya utafiti Hakutakuwa na madhara kwako katika ushiriki wako katika mahojiano yetu.

Mawasiliano: Endapo una maswali au jambo lolote kuhusiana na matokeo ya utafiti huu, tafadhali wasiliana na ofisi ya kurugenzi na uchapishaji chou kikuu cha afya na sayansi vishirikishi Muhimbili (Sanduku la posta 65001, Dar es Salaam-Tanzania; Simu: **255 0222151596)**.

Tamko: Nimesoma yaliyomo kwenye fomu hii na kuelewa, maswali yangu yamejibiwa, ninakubali kushiriki katika utafiti huu.

Saini ya mshiriki_____ tarehe_____

Saini ya mtafiti/ msaidizi_____ Tarehe: _____.

Appendix 5: Ethical Clearances

UNITED REPUBLIC OF TANZANIA

MINISTRY OF EDUCATION, SCIENCE AND TECHNOLOGY

MUHIMBILI UNIVERSITY OF HEALTH AND ALLIED SCIENCES

OFFICE OF THE DIRECTOR – RESEARCH, PUBLICATIONS AND INNOVATION

Ref. No.DA.282/298/01.C/ 2188 Date: 03/06/2024

MUHAS-REC-04-2024-2188
BRUNO NJONJO
School of Public Health and Social Sciences,
MUHAS.

RE: APPROVAL FOR ETHICAL CLEARANCE FOR A STUDY TITLED: PAYMENT METHODS FOR PATIENTS ON HAEMODIALYSIS PROCEDURES AT MUHIMBILI NATIONAL HOSPITAL AND ITS IMPACT ON ADHERENCE TO DIALYSIS SESSIONS AND ROUTINE LABORATORY TESTING.

Reference is made to the above heading,

I am pleased to inform you that the Chairman 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: 22/04/2024
EXPIRATION DATE OF APPROVAL: 22/04/2025

STUDY DESCRIPTION:
Purpose:
The purpose of this study is to assess how payment methods influence the adherence of ESRD patients to dialysis sessions and routine laboratory testing at Muhimbili National Hospital.

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-%2014532.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 data transfer agreement (DTA) from NIMR if data will be transferred to a foreign country.
8. Apply for and obtain material transfer agreement (MTA) from NIMR, if research materials (samples) will be shipped to a foreign country,
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/.



Dr. Nahya Salim Masoud.
AG. Chairman, MUHAS Research and Ethics Committee

Appendix 6: Introduction 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 INNOVATION

In reply quote;
Ref. No: MU/282/298/01/C **12th July, 2024.**

Executive Director,
Muhimbili National Hospital,
P.O Box 65000,
Dar es salaam.

RE: INTRODUCTION OF BRUNO NJONJO

This is to inform you that Mr. Bruno Njonjo is a final-year student in MSc. Health Economics and Policy with Registration No. MUHAS-REC-04-2024-2188.

He will be doing research titled "**Payment Methods for Patients on Heamodialysis Procedures at Muhimbili National Hospital and its Impact on Adherence to Dialysis Sessions and Routine Laboratory Testing**" under the supervision of MNH staff Dr. Jonathan Mngumi, a Nephrologist. The ethical clearance for doing the said research has been attached.

Kindly request your assistance during Data collection.

Dr. Kasusu Nyamuryekung'e
FOR: DIRECTOR OF RESEARCH, PUBLICATIONS AND INNOVATION

cc: Bruno Njonjo

Appendix 7: Turnitin Receipts

turnitin

Digital Receipt

This receipt acknowledges that Turnitin received your paper. Below you will find the receipt information regarding your submission.

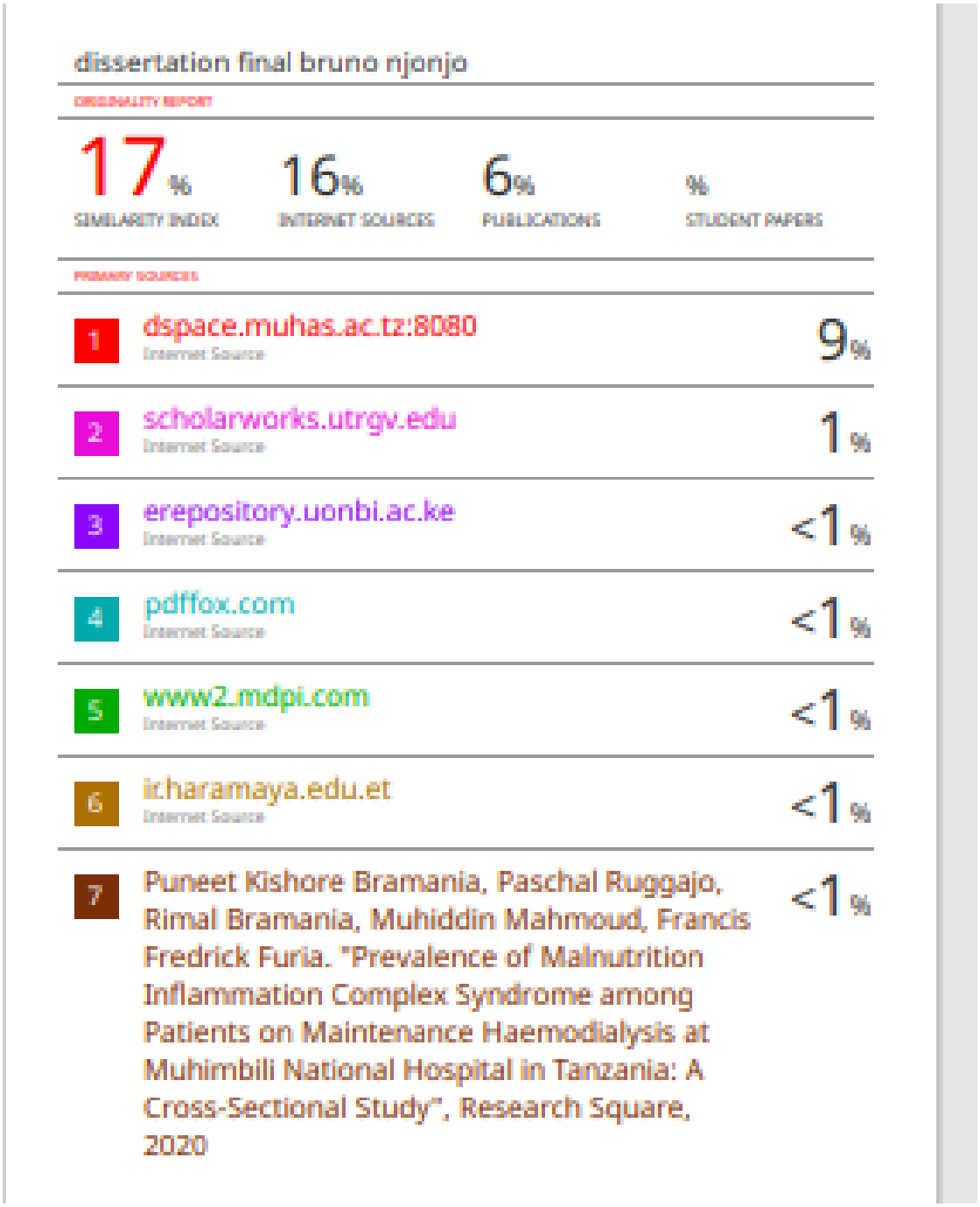
The first page of your submissions is displayed below.

Submission author:	BRUNO NJONJO
Assignment title:	Proposal check
Submission title:	dissertation final bruno njonjo
File name:	disertation_for_print_word.docx
File size:	322.11K
Page count:	64
Word count:	11,053
Character count:	64,178
Submission date:	12-Jul-2024 11:25AM (UTC+0300)
Submission ID:	2415625154


PAYMENT METHODS FOR PATIENTS ON HAEMODIALYSIS PROCEDURES AT MUHIMBILI NATIONAL HOSPITAL AND ITS IMPACT ON ADHERENCE TO DIALYSIS SESSIONS AND ROUTINE LABORATORY TESTING.

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Appendix 8: Plagiarism Report



dissertation final bruno njonjo

ORIGINALITY REPORT

17%	16%	6%	%
SIMILARITY INDEX	INTERNET SOURCES	PUBLICATIONS	STUDENT PAPERS

PRIMARY SOURCES

1	dspace.muhas.ac.tz:8080 Internet Source	9%
2	scholarworks.utrgv.edu Internet Source	1%
3	erepository.uonbi.ac.ke Internet Source	<1%
4	pdffox.com Internet Source	<1%
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7	Puneet Kishore Bramania, Paschal Ruggajo, Rimal Bramania, Muhiddin Mahmoud, Francis Fredrick Furia. "Prevalence of Malnutrition Inflammation Complex Syndrome among Patients on Maintenance Haemodialysis at Muhimbili National Hospital in Tanzania: A Cross-Sectional Study", Research Square, 2020	<1%

Appendix 9: permission to collect data at MNH



THE UNITED REPUBLIC OF TANZANIA

MINISTRY OF HEALTH

MUHIMBILI NATIONAL HOSPITAL

In reply please quote:

Ref. No.: MNH/TRCU/PERM/2024/336 Date: 16th July, 2024

Head of Department
Internal medicine
Muhimbili National Hospital

RE: PERMISSION TO COLLECT DATA AT MNH

Name of student	**Bruno Njonjo**
Title	**"Payment Methods for Patients on Haemodialysis Procedures at Muhimbili National Hospital and its Adherence to Dialysis Sessions and Routine Laboratory Testing".**
Institution	Muhimbili University of Health and Allied Sciences
Supervisor	Ms. Alphoncina Kagaigai (MUHAS)
Co – supervisor	Dr. Jonathan Mngumi (MNH)
Period	16th July, 2024 to 15th Septembert, 2024

Approval has been granted to the above principal investigators to collect data at MNH. Data dissemination at MNH will be overseen by **Dr. Jonathan Mngumi as** MNH Co – supervisor

Kindly ensure the named principal investigator abide to the ethical principles and other conditions of the research approval.

Sincerely,

Dr. Charles K. Pallangyo
For: Head of Clinical research, Training and Consultancy Unit

C.c DMS
C.c Dr. Jonathan Mngumi
C.c Bruno Njonjo

P. O. Box 65000 DAR-ES-SALAAM

Upanga West, Kalenga Street, Plot No. 10480/3, P.O. BOX 65000, Dar es Salaam, Tanzania.
Telephone: +255-22-2151367-9, Telephone: +255-22-2151351-2
Email: info@mnh.or.tz, Website: www.mnh.or.tz

CamScanner

1 of 1