KNOWLEDGE OF HEALTH EDUCATION AND THE ASSOCIATED FACTORS AMONG HEMODIALYSIS PATIENTS AT MUHIMBILI NATIONAL HOSPITAL, DAR ES SALAAM, TANZANIA

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Department of Clinical Nursing

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By

Jane Mmari

"A Dissertation Submitted in Partial Fulfillment of the Requirements for the Master of Science in Nephrology Nursing of the 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 **"Knowledge of Health Education and the Associated Factors among Hemodialysis Patients at Muhimbili National Hospital, Dar es Salaam, Tanzania"** in partial fulfillment of the requirements for the degree of Master of Science in Nephrology Nursing.

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Main-Supervisor

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Date

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Mr. Baraka Moriss

Co-Supervisor

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Date

DECLARATION

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

Signature ……..Date …….

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DEDICATION

I dedicate this work to my lovely son Peter for his support in my daily activities; his prayers are the things that make my life successful.

I also dedicate this study to all patients undergoing hemodialysis at MNH; hopefully they will be able to access definitive care for transplant in the near future.

ABSTRACT

Background: Education for patients with chronic kidney disease leads to improvements in their health and adherence to treatment. Despite its importance, there is limited information on the effectiveness of patient education in hemodialysis care.

Objective: This study aimed to assess the level of knowledge acquired through health education and its associated factors among hemodialysis patients at Muhimbili National Hospital.

Materials and Methods: This was a cross-sectional analytical study among hemodialysis patients at Muhimbili National Hospital. The trained research assistants collected data using interviewer-administered questionnaires from May 3rd to May 26th, 2023. Analysis was performed using Stata version 15.0. 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 factors associated with level of knowledge.

Results: Among the 246 participants, the majority (152, 61.8%) were male, with a mean age of 50 years (SD 13.5). The overall level of knowledge on various aspects of health education in hemodialysis was low (105, 42.7%). Noteworthy individual factors linked to knowledge included the presence of other chronic diseases (AOR = 0.60, 95% CI = 0.24-1.48), frequent adherence to hemodialysis education (AOR = 5.29, 95% CI = 2.84-9.86), and incomplete coverage of health education modules (AOR = 2.04, 95% CI: 1.16-3.59, p = 0.013). Organizational factors influencing knowledge encompassed patient-centered care (AOR = 1.89, 95% CI: 1.05-3.40, p = 0.034), regular doctor communication about hemolysis management (AOR = 2.47, 95% CI: 1.37-4.46, p = 0.003), and patients facing high treatment costs (AOR = 1.89, 95% CI: 1.05-3.40, p = 0.034).

Conclusion: The majority of hemodialysis patients had low knowledge of various aspects of health education. High knowledge was associated with patients' adherence to hemodialysis education, the presence of other chronic diseases, regular doctor communication, and treatment costs. In order to improve knowledge acquisition and patient outcomes, these findings advocate for educational interventions that address both individual and organizational factors

Keywords: Knowledge, Health education, Hemodialysis, Associated factors.

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ABBREVIATIONS

AOR	Adjusted Odd Ratio
CKD	Chronic Kidney Disease
COR	Crude Odd Ratio
ESRD	End Stage Renal Disease
GFR	Glomerular Filtration rate
HCP	Health care provider
HD	Hemodialysis
MNH	Muhimbili National Hospital
MUHAS	Muhimbili University of Health and Allied Sciences
QOL	Quality of Life
WHO	World Health Organization

DEFINITION OF TERMS

Patients' health education: is an organized, interactive learning process that aids in managing a patient's health, enable managing a patient' 's health, enabling good health literary and improving patients' quality of life (1).

Patient's knowledge: refers to the understandings that patients have based on health education received (2).

Chronic Kidney Disease: can be identified by the presence of kidney damage or a reduction in kidney function that has persisted for three months or longer, regardless of the underlying cause. It is characterized by kidney damage or a glomerular filtration rate (GFR) that is lower than 60 mL/min/1.73 m2 for three months or longer, regardless of the underlying cause(3).

End Stage Renal Disease (ESRD): is an irreversible decline in kidney function, which is severe enough and can lead to fatal complications without dialysis or kidney transplantation(4). In this study, ESRD patients refer to those who have eGFR<15ml/min/1.73m2 and are receiving maintenance hemodialysis therapy(5).

Hemodialysis: is a mechanical method of removing waste and excess water from the blood by diffusion across a semipermeable membrane by an electrochemical concentration gradient(6). This is done to recreate the intracellular and extracellular fluid environment typical of healthy kidneys(6).

OPERATIONAL DEFINITIONS

Patients' health education refers to health teaching and counseling given to patients with chronic kidney disease undergoing hemodialysis management at the study site.

Patients' knowledge stands for level of knowledge based on various aspects of health education on hemodialysis among CKD patients.

CHAPTER ONE

1.0 INTRODUCTION

1.1 Background

The global prevalence of chronic kidney disease (CKD) has been on a steady rise, impacting a significant portion of the population (7–9). CKD affects approximately 10–15% of the world's population, with resource-constrained countries bearing a substantial burden (10,11). In fact, CKD incidence rates in these countries are about four times higher than those in high-income nations, highlighting the urgency of addressing this issue (10,12).

The African continent, in particular, has witnessed a high prevalence of CKD among adults aged 20 to 50, with onset occurring at a notably younger age compared to Western countries (12,13). The dire situation in CKD is often compounded by the need for interventions such as hemodialysis and kidney transplants to manage kidney failure (14). Hemodialysis, performed frequently and for extended durations, emerges as a crucial treatment option for CKD patients (15).

In Tanzania, hemodialysis (HD) stands as the predominant method of managing CKD, with nearly 90.6% of patients relying on it (16). Despite its intended transitional nature while awaiting transplantation, HD has become a permanent solution in the scarcity of renal transplantation services across many sub-Saharan African countries, including Tanzania (16,17). This reliance on HD has brought about challenges, with certain patients struggling to accept their condition, leading to feelings of frustration during treatment (18). Additionally, existing research underscores the subpar quality of life (QoL) experienced by CKD patients undergoing hemodialysis (19,20). Factors such as limited education, female gender, residing in refugee camps, the presence of multiple co-morbidities, extensive use of chronic medications, and advanced age have been linked to reduced QoL among CKD patients (21).

Within the Tanzanian context, previous studies have delved into the impact of the healthcare system, financial constraints, psychological factors, and patient-provider interactions on the QoL of individuals undergoing hemodialysis for CKD (16,22,23).

Ensuring adherence to long-term treatment plans among CKD patients hinges on equipping them with the necessary knowledge, primarily facilitated through health education and patient empowerment initiatives (24,25). Adequate knowledge empowers patients by providing them with multifaceted information essential for informed decision-making (26,27). Effective health education during hemodialysis has been shown to significantly impact patient well-being and treatment compliance. Despite ongoing efforts to enhance patients' sense of control, the evidence regarding their access to sufficient information remains limited. Moreover, the extent to which patients' acquired knowledge is influenced by the education provided during hemodialysis management remains largely unexplored.

1.2 Problem statement

Chronic kidney disease (CKD) continues to take a significant toll on lives, particularly within resource-constrained nations like Tanzania, where the burden of CKD-related deaths remains substantial despite the availability of established hemodialysis services (28,29). Patients undergoing hemodialysis confront considerable health-related hurdles that influence their quality of life and increase the risk of mortality due to CKD (30). Studies in Tanzania have shown that poor adherence to hemodialysis and malnutrition are very common among patients undergoing hemodialysis therapy (31,32).

Knowledge of diet and hemodialysis adherence remains a challenges to the majority of CKD patients (31,32). Muhimbili National Hospital (MNH) provides crucial hemodialysis management services, including comprehensive education and counseling prior to treatment initiation. Empirical observations suggest that a subset of patients might not fully adhere to the provided educational regimen, potentially impacting their overall quality of life. However, there is limited information on the level of knowledge acquired through health education and the associated factors. To address this gap, our study aims to determine the level of knowledge regarding health education possessed and the associated factors among hemodialysis patients at Muhimbili National Hospital (MNH).

1.3 Rationale

Understanding the level of knowledge possessed through health education among hemodialysis patients is crucial for effective health service delivery. This study offers insights into areas where patients require more information, aiding healthcare providers in tailoring education and enhancing patient comprehension of hemodialysis. It also identifies factors influencing knowledge levels, guiding the development of interventions to improve patient understanding and, consequently, health outcomes. Knowledge gaps can highlight healthcare delivery issues, informing policymakers on resource allocation and policy enhancements to support patient education. Hospitals can efficiently allocate resources, particularly for dietary and self-care education programs, based on identified deficiencies. Moreover, this research can help hospitals evaluate and enhance existing education programs, serving as a valuable baseline for future knowledge assessments and research collaborations to improve hemodialysis patient care.

1.4 Conceptual Framework

The conceptual framework provides the road map for the relationship between the dependent variable (outcome variable of interest) and independent variables. The outcome variable of interest in this study is the level of knowledge possessed on health education among hemodialysis patients as indicated on the right side (blue box) in figure 1. The knowledge level was assessed in various aspects or areas (medication, complications, self-care, and dietary practice) where the total score was measured to determine whether patient possessed sufficient or insufficient knowledge based on mean score as cut-point. The arrows preceding from left to right shows various factors (independent variables) that are linked with level of knowledge.

The independent variables for this study were categorized into two major components; these are individual and organizational factors as indicated in the boxes at the left side of the conceptual framework Figure 1. For individual factors; the age of the patient, sex of the patient, marital status, educational background, occupation, income level, health insurance, duration of illness, duration of hemodialysis, having co-morbidities, adherence to health

education, attitude, and satisfaction with health education. For the organizational factors; Health education and counseling received, education quality, patient-centered care, time spent from home to facility, HCPs' communication, treatment cost, education methods and education materials, and hemodialysis environment were assessed. These variables were perceived to have an influence on the patient's knowledge level. Education methods play a pivotal role in knowledge level. It is hypothetical that having individual health education and counselling might increase knowledge as compared to group education (Figure 1)

Therefore, organizational and individual factors can influence each other. For example, providing quality education to patients may influence their satisfaction with education provided; hence influence their adherence to health education and improve their understating on various aspects of education received.

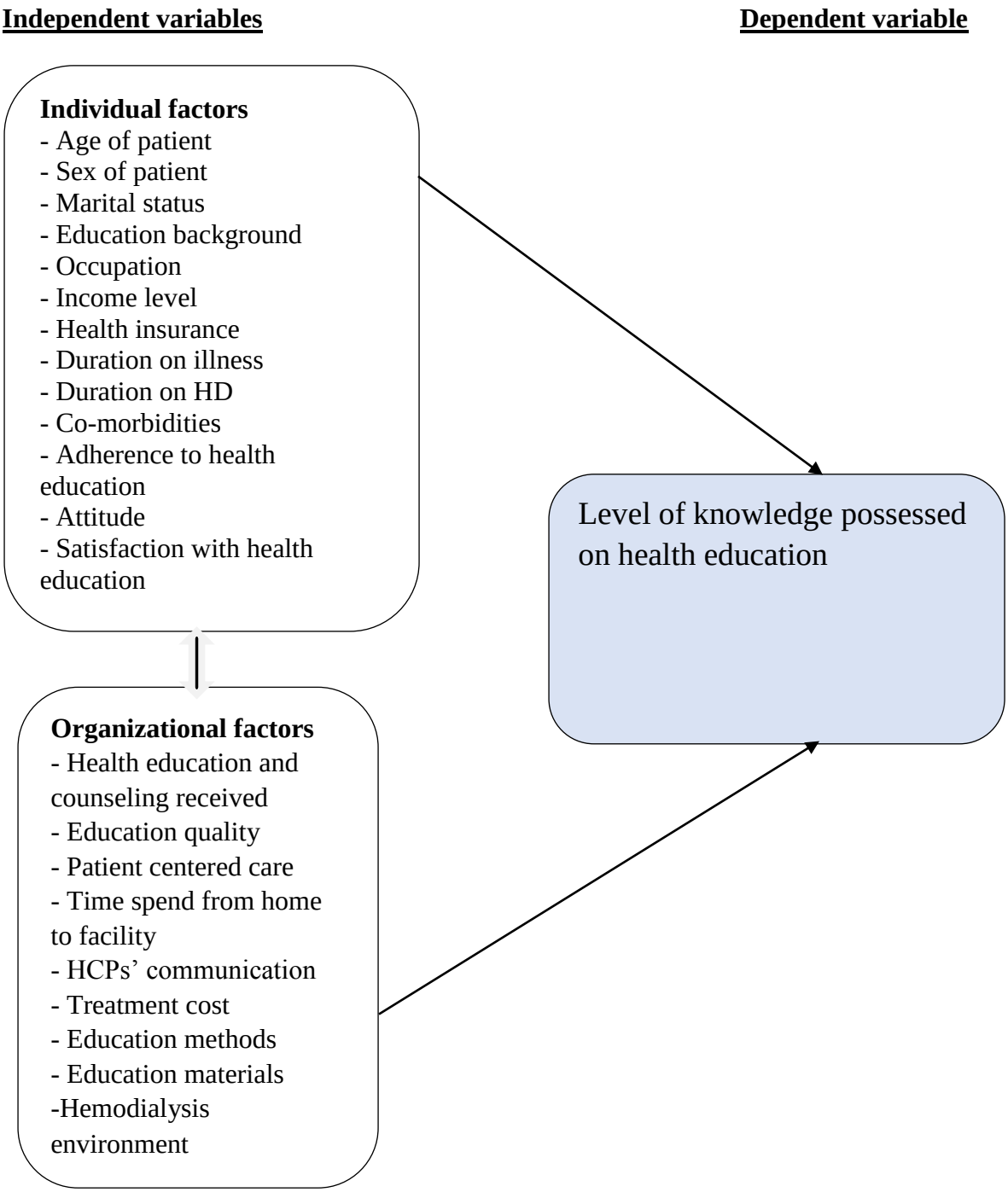


Figure 1: Conceptual Framework

Source: Author's constructed conceptual framework based on the findings from previous findings from the literature (26).

1.5 Research Questions

1.5.1 Main research questions

What is the level of knowledge on health education and the associated factors among hemodialysis patients at Muhimbili National Hospital?

1.5.2 Specific research questions

1. What is the level of knowledge on health education given to hemodialysis patients at Muhimbili National Hospital?
2. What are the individual factors associated with knowledge of health education given to hemodialysis patients at Muhimbili National Hospital?
3. What are the organizational factors associated with knowledge of health education given to hemodialysis patients at Muhimbili National Hospital?

1.6 Research Objectives

1.6.1 Main Objective

To analyze the level of knowledge of health education and the associated factors among hemodialysis patients at Muhimbili National Hospital

1.6.2 Specific Objectives

1. To determine the level of knowledge on health education given to hemodialysis patients at Muhimbili National Hospital
2. To determine the individual factors associated with the knowledge of health education given to hemodialysis patients at Muhimbili National Hospital
3. To determine the organizational factors associated with the knowledge of health education given to hemodialysis patients at Muhimbili National Hospital

CHAPTER TWO

2.0 LITERATURE REVIEW

2.1 Introduction

This section presents a discussion of research work pertinent to the study objectives. The most essential concepts concern the adequacy of health education for patients undergoing hemodialysis treatment. Patient education is an essential aspect of nurses' responsibilities. Patients are empowered to enhance their health through education. Patients involved in their care are more likely to participate in therapies that may improve their chances of improving their health outcomes. The chapter presents a comprehensive overview of existing literature pertaining to the assessment of health education awareness and its correlated determinants among CKD patients undergoing hemodialysis treatment. Through a systematic examination of relevant scholarly works, this research seeks to illuminate the current state of knowledge concerning health education levels in the context of hemodialysis, while also exploring the various factors that contribute to or hinder the acquisition of health-related knowledge among this group.

2.2 Patients' level of knowledge possessed on hemodialysis health education

According to a study carried out in the United States and Japan, it was found that 65% of patients in the United States and 81% of patients in Japan possessed sufficient knowledge regarding health education (35). The findings indicate variation in the knowledge in the two countries; Japan had higher knowledge on hemodialysis but lower knowledge on adherence to HD compared to the United States. However, this study failed to formally measure possible attributes for the existing variations in adherence knowledge across both countries.

The study conducted in Egypt revealed that eighty per cent of the 60 participants, 80% possessed adequate health education knowledge, with fifty-eight per cent ranking higher or good knowledge (2). Hemodialysis demands a lot on patient's life that 'can't be avoided. These include improving adherence to diet and fluids among hemodialysis patients is likely to

reduce the number of health problems caused by not sticking to diet and fluids, which can lower the CKD mortality rate.

A cross-sectional study of 162 patients undergoing hemodialysis in two university hospitals in Finland revealed that an average level of subjective knowledge was sufficient for the overall multidimensional contents of the health education provided (26). This study showed a general knowledge possessed and did not specify knowledge score per necessary recommended packages such as diet adherence, hemodialysis treatment, hemodialysis medication, and fluid restrictions.

According to the findings of another study conducted in Finland on ”patients” knowledge expectations from health education, more than half (54%) of the patients felt that their expectations of knowledge were moderate, 22% of the patients felt that their knowledge expectations were sufficient, and 24% felt that they had insufficient knowledge (36). Their findings suggested that patients had reasonable expectations regarding their level of knowledge. Knowledge’s bio physiological, functional, and ethical facets were of the utmost significance, and the social and experiential aspects of knowledge were the ones that were considered the least important.

A quasi-experimental study with pre- and posttest design conducted in Sudan revealed a significant increase in sufficient knowledge on hemodialysis from 48.6% (baseline) to 86.3% after intervention that involved health education provided to patients undergoing hemodialysis unit. It was noted that, knowledge increased at different aspects from the baseline to post-intervention about hemodialysis education. The aspects considered for knowledge assessment involved the concept of hemodialysis, fistula and vascular access catheter which all had significantly increased after intervention (34).

2.3 The individual factors associated with knowledge possessed about health education given to patients undergoing hemodialysis

The previous studies in high-income countries (the United States and Japan), found that the total knowledge score was negatively correlated with the patients" advancing ages (35).

A study conducted in Egypt revealed a statistically significant relationship between total knowledge scores and educational attainment ($p = 0.015$). None of the other demographic variables used in the study, such as patient age, were linked to higher levels of health education knowledge (2). Knowledge of self-management could be promoted when the standard educational approach is tailored to the' 'patient's unique beliefs, behaviors, emotional and physical states, cultural background, socioeconomic status, cognitive abilities, and understanding of the disease and its t treatment (2).

In India, socio-demographic variables such as age, gender, education, occupation, family structure, and income had no statistically significant effect on knowledge of hemodialysis care (37). It was also noted that caregiver knowledge about post-dialysis home care did not differ significantly by caregiver-to-patient relationship,' 'caregiver's age, gender, education, occupation, family structure, or income (37).

In sub-Sahara Africa, there is limited information on individual influence to knowledge possessed regarding health education among patients undergoing hemodialysis therapy. Tanzania is among low-middle income countries in SSA lacking information on individual factors associated with knowledge particularly on various aspects of hemodialysis.

2.4 The organizational factors associated with knowledge possessed about health education given to patients undergoing hemodialysis

A study carried out in Singapore brought to light the requirement for increased awareness of the various factors that influence the choice of dialysis modality as well as the significance of providing hemodialysis patients and their relatives with information that is repeated, comprehensive, and of high quality. It is essential to improve "patients" well-being and the

percentage of patients who use hemodialysis; the information and support provided to patients must be adapted to the specific needs of the patients and the relatives of those patients (38).

According to a randomized controlled trial conducted in Iran, it was observed that hemodialysis patients who participated in a patient education programme and were followed up on by nurses had a higher level of understanding and compliance with hemodialysis across four key areas: medication use, fluid restriction, and dietary recommendations (39). This indicates the need for a health education intervention programme integrated with hemodialysis care, as it significantly contributes to patients' knowledge and adherence to hemodialysis recommendations.

Studies in Sub-Saharan Africa (SSA) showed that health care providers provides education to patients which revealed to be effective in improving overall patients' knowledge of hemodialysis, self-care, HD related complications, fluids restrictions, the dietary practices, types of medications and activities that can help the patients to adapt with disease and hemodialysis (31,32,34). However, these findings do not provide clear information on the various organization aspects that are linked with the level of knowledge on health education possessed. This reveals the existing knowledge gap on organizational influence that have been one of the specific interests for this study.

CHAPTER THREE

3.0 MATERIALS AND METHODS

3.1 Study design

A cross-sectional analytical study was conducted among patients on hemodialysis treatment between May 2023 and June 2023. This design is relatively quick and less expensive (40), and allows the predictors and variables of interest to be assessed at one point. For the context of this study, this design was chosen as it was suitable for determining the level of knowledge on health education and to determine independent factors associated with knowledge possessed based on health education among HD patients.

3.2 Study Area

The study was done at Muhimbili National Hospital (MNH) in the hemodialysis unit (Upanga), Dar es Salaam, Tanzania. Other hospitals across the country send their patients there for treatment. This facility performs the roles of a general hospital and a university teaching hospital. The HD unit consists of forty-seven hemodialysis machines. From hospital raw data about 90 to 120 patients receive hemodialysis therapy per day. Moreover, the unity has 29 nurses.

3.3 Study population

Patients on hemodialysis treatment at Muhimbili National Hospital during the data collection.

3.4 Eligibility criteria

3.4.1 Inclusion criteria

The study included Hemodialysis patients (adults aged 18 years and above) who were available during the data collection period.

3.4.2 Exclusion criteria

Patients with speech, hearing, 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 sample size was determined based on the precision approach using the single proportion given below(41)..

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

Whereby: n = the desired sample size;

Whereby Z = Standard deviation at 95% confidence level = 1.96; Margin of error = 0.65; P = proportion of patients with sufficient knowledge possessed on health education (P = 58%) from the previous study in Egypt (2). The calculated sample size was 221 patients. An addition of 10% was adjusted for the non-response rate, giving a total of 246 hemodialysis patients to be enrolled in this study.

3.6 Sampling Method

The sampling method used in this study is systematic sampling, and it was conducted in the following four steps:

Step 1: Define the Sampling Frame; the first step in systematic sampling is to define the sampling frame. In this study, the sampling frame consisted of all the registered patients undergoing hemodialysis in the unit.

Step 2: Determine the Sampling Interval (kth term); to determine the sampling interval (kth term), the total number of patients undergoing hemodialysis (365 patients) was divided by the estimated sample size (246). This calculation resulted in a sampling interval of 2. In other words, every 2nd patient in the list would be selected for the study.

Step 3: Assign Unique Numbers; a list of patients who attended the unit during data collection was created, and each patient was assigned a unique number. These unique numbers ranged from 1 to 90 up to 120, depending on the number of patients who attended the unit each day. This step ensures that each patient has a specific identifier within the list.

Step 4: Select Participants; the actual selection of participants was carried out systematically. The first participant was selected randomly from the list, ensuring that the selection process is not biased. After the initial random selection, every 2nd patient in the list was chosen to participate in the study. This process continued until the desired sample size of 246 patients was reached.

3.7 Study Variables

3.7.1 Dependent variables

The dependent variable for this study was the level of knowledge about health education (sufficiency or insufficiency). The mean score was used as a cut-point for sufficient knowledge if an individual score is above the average; otherwise, it was considered insufficient knowledge.

3.7.2 Independent variables

The independent variables were classified as individual factors and organizational factors as follows: -

Individual factors comprised of age of patient, sex of patient, marital status, education level, occupation, income level, having health insurance or not, duration on illness, duration on HD, co-morbidities, adherence to health education, attitude, satisfaction with health education.

Organizational factors were health education and counseling received, education quality, patient centered care, time spend from home to facility, HCPs' communication, Treatment cost, education methods, and education materials.

3.8 Data collection method

An interviewer-administered questionnaire was employed to collect the data from the study participants. Data were collected by the researcher with the help of well-trained research assistants (2 nurses). The researcher and research assistants asked specific research questions to the study participants while writing the responses. Each question was asked at a time, and the responses were recorded for all questions.

3.9 Data Collection Tools

The interviewer-administered questionnaire consisted of structured questions. The questionnaire was developed in English and translated into Swahili. It was checked for consistency before use. This tool was comprised of three (4) main sections. Section A comprised background characteristics of the participants; Section B comprised questions regarding clinical history, Section C comprised of questions regarding knowledge on health education on hemodialysis, and Section D comprised questions of organizational characteristics.

3.10 Validity and Reliability

Research tools quality was assessed with the help of Reliability and validity concepts.

3.10.1 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 among 25 patients (10% of the desired sample) to determine the strengths and weaknesses of the study concerning questions format, wording and order. Pre-testing also tested questions variation, meaning, task difficulty, and study participants interest and attention. Pre-testing was done at Hindu Mandal hospital. The findings from pre-test were used to improve validity and reliability of the study variables and the findings were not included in the final report.

3.11 Data Analysis

The collected data were entered, coded, cleaned, and analyzed by using Stata Version 15. Data cleaning and error range checks to enhance validity and consistency was adhered to before data analysis. Each correct response under each knowledge question was graded as 1 point and incorrect was graded as 0.

Objective 1: Univariate analysis was used to describe the knowledge possessed about health education using frequency and proportion. The knowledge items were summed up to obtain total scores. The mean score was used as a cut-point for knowledge level, if an individual score was above the mean was considered as sufficient otherwise it was considered insufficient knowledge.

Objective 2, 3: To determine factors associated with the level of knowledge possessed on health education on hemodialysis, logistic regression analysis was used to estimate the associations; whereas a bivariate logistic model gives the estimates for the crude odds ratios (COR) at 95%, the multivariate logistic regression analysis estimates the adjusted odds ratio (AOR) to control for the possible confounding variables. That was helpful to determine the independent factors associated with the knowledge of health education at a 95% confidence level. All variables with a 95% confidence interval that did not cross the null value were considered statistically significant. The findings were presented using tables as per specific study objectives.

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) with reference number DA.282/298/01.C/. 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 Participation rate

A total of 249 patients receiving hemodialysis treatment at MNH during the data collection were approached and invited to participate in the study. Out of these, three participants declined to provide consent. Consequently, a total of 246 participants were included in the final analysis, resulting in a participation rate of approximately 98.8%.

4.2 Socio-demographic characteristics of the participants

The age of the participants ranged from 18 to 80 years, with a mean age of 50 years and a standard deviation of 13.5 years. The majority (152, 61.8%) were male. The majority (186, 75.6%) were married and educated up to secondary education (102, 41.5%). In terms of occupation, the majority (184, 74.8%) were informally employed. A significant proportion of participants (164, 66.7%) reported experiencing financial hardship. Additionally, the majority (185, 75.2%) of participants had health insurance. The majority of participants (202, 82.1%) had been living with chronic kidney disease for more than 12 months, and almost a similar proportion (185, 75.2%) had been on hemodialysis for more than 12 months. Furthermore, a large number (206, 83.7%) of participants reported having at least one other chronic disease.

Table 1: Socio-demographic characteristics of the participants (N=246)

Variables	Frequency	Percent
Age (years)		
[Mean; SD]	[50; 13.5]	
Below 40	51	20.7
40 to 60	133	54.1
More than 60	62	25.2
Sex		
Male	152	61.8
Female	94	38.2
Marital status		
Married	186	75.6
Single	60	24.4
Education level		
Primary/below	53	21.5
Secondary	102	41.5
Above secondary	91	37.0
Occupation		
Formal employed	62	25.2
Informal employed	184	74.8
Financial hardship		
Yes	164	66.7
No	82	33.3
Have health insurance		
Yes	185	75.2
No	61	24.8
Duration living with CKD		
< 6 months	23	9.3
6-12 months	21	8.5
>12 months	202	82.1
Duration on hemodialysis		
< 6 months	30	12.2
6-12 months	31	12.6
>12 months	185	75.2
Any other chronic disease		
Yes	206	83.7
No	40	16.3

4.3 The patients' knowledge of hemodialysis health education received

The patients' knowledge of health education on hemodialysis was measured, focusing on different knowledge components. An overall knowledge of health education on hemodialysis

was insufficient to the majority (141, 57.3%). For the signs and complications of chronic kidney disease (CKD), then half (129, 52.4%) had insufficient knowledge. The majority (169, 68.7%) had insufficient knowledge of hemodialysis management. For self-care knowledge, insufficient level of knowledge was also considerably high to majority (149, 60.6%), (Figure 2).

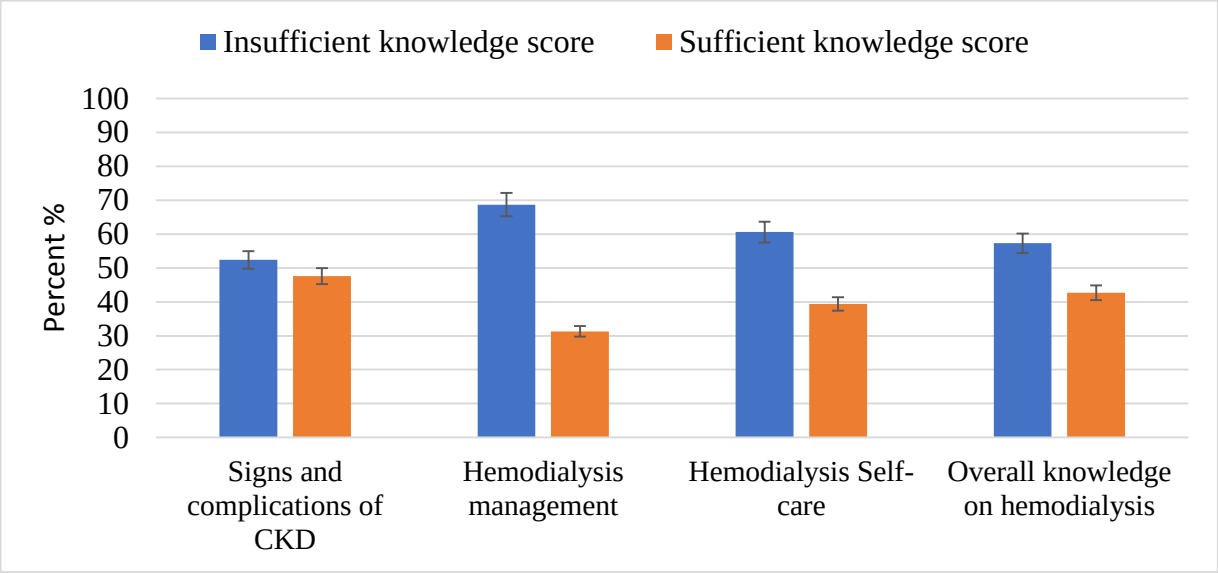


Figure *1*: The patients' knowledge of hemodialysis health education received (N=246)

4.4 Individual factors associated with patients' knowledge of health education

The key findings from the bivariate logistic regression analysis of individual factors associated with patients' knowledge of health education given on hemodialysis are as follows: Patients aged 40 to 60 had a lower likelihood of sufficient knowledge compared to those below 40 (OR = 0.19, 95% CI: 0.09–0.38), and patients above 60 also had a lower likelihood (OR = 0.24, 95% CI: 0.11-0.53). Sex, marital status, and occupation did not show significant associations with knowledge. However, education level had a significant impact, with patients with above-secondary education being more likely to have sufficient knowledge (OR = 2.08, 95% CI: 1.03–4.19). Financial hardship, health insurance, duration of living with chronic kidney disease (CKD), duration on hemodialysis, having other chronic diseases, frequent adherence to hemodialysis health education, personal attitude towards hemodialysis health education, and

satisfaction with hemodialysis health education did not show significant associations with knowledge, except for frequent adherence to health education, which was strongly associated with higher knowledge (OR = 6.17, 95% CI: 3.53–10.81). Overall, age, education level, and frequent adherence to health education were important factors related to patients' knowledge of health education in the context of hemodialysis (Table 2).

In multivariate analysis, variables that remained significant included the following: patients aged 40 to 60 had a lower likelihood of being knowledgeable compared to those below 40 (adjusted odds ratio [AOR] = 0.21, 95% confidence interval [CI] = 0.08–0.54). Similarly, patients above 60 had a lower likelihood of being knowledgeable compared to those below 40 (AOR = 0.32, 95% CI = 0.11-0.91). Having other chronic diseases was strongly associated with lower knowledge (AOR = 0.60, 95% CI = 0.24-1.48). Frequent adherence to hemodialysis health education was significantly associated with higher knowledge (AOR = 5.29, 95% CI = 2.84–9.86).

Table *2*: Individual factors associated with patients' knowledge of health education given to hemodialysis

Variables	N	Knowledgeable n(%)	Bivariate analysis		Multivariate analysis	
			Crude OR (95%CI)	P-value	Adjusted OR (95%CI)	P-value
Age (years)						
Below 40	51	37(72.5)	ref			
40 to 60	133	44(33.1)	0.19(0.09-0.38)	<0.001	0.21(0.08-0.54)	0.001
More than 60	62	24(38.7)	0.24(0.11-0.53)	<0.001	0.32(0.11-0.91)	0.032
Sex						
Male	152	67(44.1)	1.16(0.69-1.96)	0.574		
Female	94	38(40.4)	ref			
Marital status						
Married	186	72(38.7)	0.52(0.29-0.93)	0.028	1.07(0.46-2.47)	0.881
Single	60	33(55.0)	ref			
Education level						
Primary/below	53	18(34.0)	ref			
Secondary	102	40(39.2)	1.25(0.63-2.51)	0.522	1.15(0.51-2.60)	0.734
> Secondary	91	47(51.6)	2.08(1.03-4.19)	0.041	1.53(0.67-3.53)	0.314
Occupation						
Formal employed	62	23(37.1)	0.73(0.41-1.33)	0.305		
Informal employed	184	82(44.6)	ref			
Financial hardship						
Yes	164	67(40.9)	ref			
No	82	38(46.3)	1.25(0.73-2.13)	0.412		
Have health insurance						
Yes	185	82(44.3)	1.32(0.73-2.38)	0.365		
No	61	23(37.7)	ref			
Duration living with CKD						
< 6 months	23	9(39.1)	ref			
6-12 months	21	5(23.8)	0.49(0.13-1.80)	0.280		
>12 months	202	91(45.0)	1.28(0.53-3.08)	0.589		
Duration on hemodialysis						
< 6 months	30	10(33.3)	ref			
6-12 months	31	7(22.6)	0.58(0.19-1.81)	0.351	0.53(0.13-2.09)	0.361
>12 months	185	88(47.6)	1.81(0.81-4.09)	0.150	1.63(0.63-4.23)	0.315

Having other chronic disease						
Yes	206	80(38.8)	0.38(0.19-0.77)	0.007	0.60(0.24-1.48)	<0.271
No	40	25(62.5)	ref			
Frequent adherence to hemodialysis health education adherence						
No	128	29(22.7)	ref			
Yes	118	76(64.4)	6.17(3.53-10.81)	<0.001	5.29(2.84-9.86)	<0.001
Personal attitude on hemodialysis health education						
Negative	78	27(34.6)	ref			
Positive	168	78(46.4)	1.64(0.94-2.85)	0.082	1.19(0.61-2.31)	0.606
Satisfaction with hemodialysis health education adherence						
Very satisfied	124	68(54.8)	2.91(0.97-8.77)	0.057	1.26(0.35-4.51)	0.727
Satisfied	105	32(30.5)	1.05(0.34-3.23)	0.929	0.73(0.20-2.62)	0.629
Not satisfied	17	5(29.4)	ref			

4.5 The organizational factors associated with patients' knowledge of health education given to hemodialysis

From the bivariate analysis, patients who received health education had a significantly higher level of knowledge compared to those who did not receive coverage (COR = 2.30, p = 0.002). A conducive hemodialysis environment was also associated with greater knowledge, with patients in such environments having higher levels of knowledge compared to those in less conducive environments (COR = 2.32, p = 0.001). Additionally, patients who spent less than 1 hour travelling from home to the treatment facility had significantly higher knowledge levels compared to those who spent over 3 hours (COR = 3.08, p = 0.004). Patients who were frequently informed by doctors about hemodialysis management also had higher knowledge levels (COR = 2.99, p < 0.001). However, other factors such as education quality, frequency of individual health education and counseling, availability and accessibility of training materials,

given reading materials, hard appointments, health care behavior, patient-centered care, and high treatment costs did not show significant associations with patients' knowledge of health education during hemodialysis (Table 3).

The multivariate analysis examined several organizational factors associated with patients' knowledge of health education given to hemodialysis. The results showed that patients who weren't receiving health education had less knowledge than those who were (AOR = 2.04, 95% CI: 1.16-3.59, p = 0.013). The quality of education did not show a significant association with patients' knowledge. In terms of the frequency of individual health education and counseling, no significant difference was observed between patients who received it often and those who did not. However, a more conducive hemodialysis environment was associated with higher patient knowledge (AOR = 1.63, 95% CI: 0.91-2.91, p = 0.100). The availability and accessibility of training materials did not significantly affect patients' knowledge. Patients who were given reading materials, had hard appointments, and had good health care behavior did not exhibit significant differences in knowledge compared to those who did not. Patient-centered care was associated with higher knowledge (AOR = 1.89, 95% CI: 1.05–340, p = 0.034). Patients who spent less than 1 hour or 1-2 hours from home to the treatment facility had higher knowledge compared to those who spent more than 3 hours. Being frequently informed by doctors about hemodialysis management was associated with higher knowledge (AOR = 2.47, 95% CI: 1.37–4.46, p = 0.003). Lastly, patients who experienced high treatment costs had higher knowledge compared to those who did not (AOR = 1.89, 95% CI: 1.05–340, p = 0.034) (Table 3).

Table 3: The organizational factors associated with patients' knowledge of health education given to hemodialysis

Variables	N	Knowledgeable n(%)	Bivariate analysis		Multivariate analysis	
			Crude OR (95%CI)	P-value	Adjusted OR (95%CI)	P-value
Health education received						
Not covered	154	54(35.1)	2.30(1.36-3.90)	0.002	2.04(1.16-3.59)	0.013
Covered	92	51(55.4)	ref			
Education quality						
Poor	122	50(41.0)	ref			
Good	124	55(44.4)	1.15(0.69-1.90))	0.593		
Frequency of individual health education and counselling						
Not often	112	47(42.0)	ref			
Often	134	58(43.3)	1.06(0.64-1.75)	0.835		
Hemodialysis environment						
Less conducive	130	43(33.1)	ref			
Conducive	116	62(53.4)	2.32(1.38-3.89)	0.001	1.63(0.91-2.91)	0.100
Availability and accessibility of training materials						
No	93	35(37.6)	ref			
Yes	153	70(45.8)	1.40(0.83-2.36)	0.213		
Given reading materials						
No	167	73(43.7)	ref			
Yes	79	32(40.5)	0.88(0.51-1.51)	0.635		
Hard appointment						
No	184	80(43.5)	1.14(0.63-2.04)	0.664		
Yes	62	25(40.3)	ref			
Health care behavior						
Bad	29	10(34.5)	ref			
Good	217	95(43.8)	1.48(0.66-3.33)	0.344		
Patient centered care						
No	145	57(39.3)	ref			
Yes	101	48(47.5)	1.40(0.84-2.34)	0.201		
Time spend from home to treatment facility						

< 1 hr	85	46(54.1)	3.08(1.43-6.65)	0.004	2.02(0.88-4.64)	0.099
1-2 hrs	114	46(40.4)	1.77(0.84-3.71)	0.131	1.30(0.59-2.89)	0.514
> 3 hrs	47	13(27.7)	ref			
Frequent informed by doctors about hemolysis management						
Yes	129	71(55.0)	2.99(1.76-5.07)	<0.001	2.47(1.37-4.46)	0.003
No	117	34(29.1)	ref			
High treatment cost						
Yes	160	75(46.9)	ref			
No	86	30(34.9)	1.65(0.96-2.83)	0.071	1.89(1.05-340)	0.034

CHAPTER FIVE

5.0 DISCUSSION

5.1 Discussion of the key findings

This study found that the majority of the participants had insufficient knowledge of hemodialysis health education whereby less than half had sufficient knowledge. Age, having other chronic diseases, and frequent adherence to HD health education were individual factors significantly associated with the knowledge possessed on health education. The organizational factors that were significantly associated with knowledge of hemodialysis included received health education and counseling, hemodialysis environment, regular information from doctors about hemodialysis management, and treatment costs. Additionally, participants with shorter travel time to treatment facilities exhibited sufficient knowledge as compared to those who came far from the facility.

Knowledge of hemodialysis was remarkably insufficient among hemodialysis patients in the current study. This suggests that multiple factors can influence the understanding of health education given to hemodialysis patients. Similarly, the study in Sudan, reported that knowledge of HD was low accounting for forty-nine percent of the studied participants (34). This was supported by the findings from the study in India, which is listed among low-and middle- income countries (37). These findings imply that, HD patients from low- middle-income countries like Tanzania have insufficient information on various aspects of hemodialysis that calls for well-informed intervention strategies to embark on the patients' understanding of hemodialysis.

Studies in developed nations present high knowledge regarding HD among CKD patients as compared to current findings. For example, in the United States and Japan (35), in Finland (26), and in Egypt (2), remarkably sufficient knowledge was reported that account between sixty-five and more than eighty percent of CKD patients having sufficient knowledge on CKD (2,26,35). The variation in knowledge between developed nations as compared to less developed nations can be explained due to nature of the population involved in the study

which can be attributed to cultural, social, and health education policies and hemodialysis set-up. In addition to that, variation in knowledge cut-point can explain the existing differences.

Regarding individual factors associated with patients' knowledge in the current study, age, education level, and adherence to health education were found to be significant factors. The fact that less than half had insufficient knowledge implies that individual factors need to be monitored to enhance the acquisition of more knowledge. These findings align with previous studies (2,37) that found a negative correlation between advancing age and knowledge score in high-income countries. In Egypt, educational attainment was significantly related to total knowledge scores, while other demographic variables did not show a significant association (2). In India, socio-demographic variables such as age, gender, education, occupation, family structure, and income did not have a statistically significant effect on knowledge of hemodialysis care (37). These findings emphasize the importance of considering individual characteristics when designing educational interventions.

Regarding organizational factors, the current study found that patients who received health education and were in a conducive hemodialysis environment had higher knowledge levels. This implies that a hemodialysis environment can facilitate understanding of health education given amongst patients. Patients with shorter travel time to the treatment facility and regular information from doctors about hemodialysis management also had higher knowledge levels. A study conducted in Singapore highlighted the importance of providing repeated, comprehensive, and high-quality information to hemodialysis patients and their relatives, considering the factors that influence the choice of dialysis modality (38). This study suggested that such information provision would contribute to improving patients' well-being and increasing the percentage of patients who use hemodialysis. Furthermore, a randomized controlled trial in Iran demonstrated that a patient education program followed up by nurses resulted in a higher level of understanding and compliance with hemodialysis recommendations (39). These findings underscore the significance of integrating health education interventions with hemodialysis care to improve patients' knowledge and adherence.

Generally, the current study and previous findings highlight the insufficient knowledge among hemodialysis patients in various aspects of health education. Addressing these knowledge gaps and tailoring health education interventions to individual and organizational factors can contribute to improving patients' understanding and adherence to hemodialysis care. Future research should continue to explore the effectiveness of educational interventions and consider the cultural, social, and economic contexts in which patients receive health education.

5.2 Strengths and weakness of the findings

5.2.1 Strengths of the study:

The study assesses the knowledge of health education among patients undergoing hemodialysis by examining different knowledge components related to signs and complications of chronic kidney disease (CKD), hemodialysis care, self-care, and overall knowledge of hemodialysis. This comprehensive assessment provides a detailed understanding of patients' knowledge levels in various areas.

The study utilizes multivariate analysis to identify the factors associated with patients' knowledge of health education in the context of hemodialysis. Controlling for multiple variables helps determine the independent effects of individual and organizational factors on patients' knowledge.

The presentation of results in terms of odds ratios (OR) provides a measure of the strength and direction of associations between different factors and patients' knowledge. ORs allow for easy interpretation of the relationships between variables.

5.2.2 Weaknesses of the study

The study was conducted at a single hospital, Muhimbili National Hospital, which may limit the generalizability of the findings to other healthcare settings or regions. The characteristics and experiences of patients in this particular hospital may differ from those in other contexts, potentially affecting the external validity of the study.

The study relies on self-reported data from patients, which may be subject to recall bias or social desirability bias. Patients may overestimate or underestimate their knowledge levels, potentially influencing the accuracy of the findings.

Cross-sectional design limitations: The cross-sectional design only provides a snapshot of patients' knowledge at a specific point in time. It does not allow for the assessment of changes in knowledge over time or the establishment of causal relationships between variables.

Although the study includes several individual and organizational factors, there may be additional unmeasured confounding variables that could influence patients' knowledge of health education. Factors such as socioeconomic status, cultural beliefs, or access to information may impact patients' knowledge but were not included in the analysis.

CHAPTER SIX

6.0 CONCLUSION AND RECOMMENDATIONS

6.1 Conclusion

The findings revealed that a significant proportion of patients had insufficient knowledge of hemodialysis health education. Age, education level, and frequent adherence to health education were identified as important individual factors related to patients' knowledge. Furthermore, organizational factors such as health education received, a conducive hemodialysis environment, and shorter travel time to the treatment facility, patient-centered care, and frequent information provided by doctors were associated with higher patient knowledge. These findings emphasize the need for targeted health education interventions to improve knowledge among hemodialysis patients, with particular attention to individual and organizational factors influencing knowledge levels.

6.2 Recommendations

For Practice:

Healthcare providers should develop and implement tailored health education programs for hemodialysis patients that consider individual characteristics such as age and education level. These programs should cover various aspects of hemodialysis care, including signs and complications of CKD, self-care, and hemodialysis management.

Healthcare providers should encourage patients to consistently engage in health education sessions. Healthcare facilities should provide comprehensive health education and create a supportive environment that fosters active participation.

Health facilities should ensure that patients have easy access to educational materials and resources related to hemodialysis care. This may include pamphlets, online resources, and educational sessions. Information should be clear, understandable, and culturally sensitive.

Hemodialysis clinics should promote regular and effective communication between doctors and patients regarding hemodialysis management. Physicians should provide information in an accessible manner and address patient questions and concerns.

For Policy:

The Ministry of Health should develop national or regional guidelines for standardized health education programs for hemodialysis patients. These guidelines should outline the key components of health education, frequency of sessions, and methods of delivery.

The health facility management should implement quality assurance mechanisms to ensure that health education materials and sessions meet established standards. Regular audits and assessments can help maintain the quality of educational programs.

The health facility management should explore options for financial support or subsidies to help patients cover the costs associated with hemodialysis care, which may include treatment costs and transportation expenses. Reducing the financial burden can improve patient access to care and education.

Future Research:

The researchers should conduct longitudinal studies to track changes in patients' knowledge over time and assess the impact of health education interventions. Long-term data can provide valuable insights into the effectiveness of educational programs.

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APENDICES

8.0 APENDICES

8.1 APPENDIX I: QUESTIONNAIRE (ENGLISH VERSION)

ID: **Date of Interview:**

Hospital Number:

A: SOCIO-DEMOGRAPHIC CHARACTERISTICS

1.1	Is the participant a male or female	1. Male 2. Female
1.2	How old are you now? **(IF 95 OR MORE, RECORD ''95')**	____ **(Age in completed years)**
1.3	What is your is current marital status?	1 = Married or Living together 2 = Divorced/ Separated 3 = Widowed 4 = never-married and never lived Together
1.4	Have you ever attended formal school?	1. Yes 2. No (Skip next question)
1.5	What is the highest level of school (education) has attended?	0 = Pre-primary 1 = Primary 2 = Post Primary Training 3 = Secondary 'O' Level 4 = Post-Secondary 'O' Level 5 = Secondary ''A' Level 6= Post-secondary ''A' Level 7 = University 98 = Don't Know
1.6	Do you have partner?	1. Yes 2. No (Skip next question)
1.7	What is your partner's highest education level?	0 = Pre-primary 1 = Primary

		2 = Post Primary Training 3 = Secondary 'O' Level 4 = Post-Secondary 'O' Level 5 = Secondary ''A' Level 6= Post-secondary ''A' Level 7 = University 98 = Don't Know
1.8	What is your occupation? That is, what kind of work do you mainly do?	
1.9	What is your (partner's) occupation? That is, what kind of work does he mainly do?	
1.10	Please provide an estimation of the monthly family income	_____ (In Tanzanian shillings)
1.11	Now I would like to ask you about the food your household eats. How many meals does your home usually have per day?	MEALS _____
1.12	Do you have health insurance?	1 = YES 2 = NO
1.13	Type of Insurance	1 = NHIF 2 = Private 3= Other: _____
	Does your health insurance cover hemodialysis treatment costs?	1 = YES 2 = NO

B: CLINICAL HISTORY

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

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

2.3 Duration undergoing HD: _____ (years) _____ (months) _____ (weeks)

2.4 How often do you visit hemodialysis for weekly treatment (Hemodialysis sessions per week)?

1) Two
2) Three
3) Four
4) Other: _____

2.5 Duration of dialysis sessions _____ hours

2.6 Have you ever experienced severe complications due to hemodialysis?

1. Yes
2. No

If Yes, what was the possible adverse effect of the drugs:

_____

_____

2.6 Do you have any other chronic problem than CKD?

1. Yes
2. No

2.7 If YES in Q5.7, what other chronic disease do you have?

1. Diabetes mellitus
2. Cancer
3. HIV/AIDS
4. Cardiac disease
5. Others, mention: _____

C: KNOWLEDGE OF HEALTH EDUCATION

Knowledge area	**NO**	**YES**
Medication		
Signs (symptoms) of not getting enough dialysis are:		
▪ Weakness and tiredness		
▪ Poor appetite		
▪ Feeling sick		
▪ Trouble getting a good sleep		
▪ Itchy skin		
▪ Metallic taste mouth		
▪ Difficulty in concentrating		
▪ Reduced interest in sex		
▪ Difficulty breathing, mainly when exercising or spelling down flat.		
▪ Swelling in your hands and feet		
▪ Poor blood pressure control		
Complications of Hemodialysis		
▪ Hypotension		
▪ Hypervolemia		
▪ Chest pain		
▪ Back pain		

▪ Diaphoresis		
▪ Tachycardia		
▪ Dizziness		
▪ Painful muscle cramps		
▪ Dysthymias		
▪ Air embolism		
▪ Loss of blood		
▪ Hepatitis		
▪ Sepsis		
Knowledge on self-care		
Partnership		
▪ Checking the parameters of the dialysis machine during dialysis		
▪ Talking with the healthcare provider about the bodily fluid I want to remove		
▪ Discussing the parameters of the dialysis machine that I would like with the healthcare provider		
▪ Discussing the puncture site		
Problem-solving		
▪ Correcting the potential causes of out-of-range blood tests		
▪ Asking questions about kidney disease		
▪ Trying to figure out the underlying reasons for out-of-range blood tests		
▪ Trying to figure out what leads to uncomfortable symptoms		
▪ Adding phosphorus-lowering medications when eating food with high phosphorus		
Self-care		
▪ Taking care of arterio-venous fistula		
▪ Choosing appropriate food, even when eating out		
▪ Cleansing the puncture site before dialysis		
▪ Choosing vegetables and fruit with low levels of potassium		
▪ Trying to control fluid intake		
▪ Scalding greens before cooking		
▪ Controlling fluid intake to limit daily weight gain		
Emotional management		
▪ Relieving emotional distress through exercise		
▪ Seeking information when having questions about kidney disease		
▪ Discussing my emotional distress comfortably		
▪ Turning to others for help during emotional distress		
▪ Regulation of diet patterns is an essential aspect in the case of patients undergoing hemodialysis		

D: ORGANIZATIONAL CHARACTERISTICS

6.1 What is the average fare in TZS. from your residence to the facility for hemodialysis treatment?: _____

6.2 What is the average cost of your CKD medication per month? TZS: _____

6.3 Do you experience delays starting care in hemodialysis?

1. Yes 2. No

6.4 Have your doctor ever told you about the effects of failure to adhere to hemodialysis treatment?

1. Yes 2. No

6.5 How do you consider your relationship with health care providers?

1. Very good 2. Good 3. Fair 4. Poor

6.3 Do you receive regular health education on hemodialysis during your visits for HD care?

1. Yes 2. No

6.4 Means of education or mode used?

1. Visual 2. Talk 3. Both

6.5 Kindly provide your response on health education you have been receiving from health care providers while undergoing hemodialysis treatment (Put a tick on the appropriate answer)

Items	**Yes**	**No**
CKD treatment options		
Living with CKD		
• Diet		
• Working while dialysis		
• Hobbies and free time		
• Sexuality and outer appearance Practicalities		
Practicalities in dialysis care		
• Use of dialysis machine		
• Fluid restrictions		
• Use and care of catheter and fistula		

• How to solve problems in dialysis treatment		
• Hygiene and infection control		
Medication and vaccinations		
Self-monitoring symptoms		
When and how to contact hospital Kidney transplantation		

6.6 How do you consider health education provided by health care providers regarding hemodialysis at this facility sufficiently?

1. Very good 2. Good 3. Fair 4. Poor

6.7 Do you receive learning material on hemodialysis and self-care management while away from hemodialysis care?

1. Yes 2. No

6.8 Satisfactions with services/Medical Care

How strongly do you **AGREE** or **DISAGREE** with the following (Circle One Number in each line).

SN	Items	Strongly agree	Agree	Uncertain	Disagree	Strongly disagree
1	Nurses are good at explaining the importance and effects of hemodialysis treatment	1	2	3	4	5
2	The hemodialysis unit has everything I need during my treatment	1	2	3	4	5
3	Do you have to pay more money for better care?	1	2	3	4	5
4	Has it been easier for you to access the information regarding hemodialysis and self-care at this facility?	1	2	3	4	5
5	Nurses treat you in amicable and courteous manner	1	2	3	4	5
6	Healthcare providers	1	2	3	4	5

	act to business-like and impersonal towards patients					
7	It is hard to get an appointment for hemodialysis, and this confuses your plan for hemodialysis care	1	2	3	4	5

8.2 APPENDIX II: QUESTIONNAIRE (KISWAHILI VERSION)

ID: **Tarehe ya mahojisno:**

Namba ya Hospitali:

A: SOCIO-DEMOGRAPHIC CHARACTERISTICS

1.1	Je mgonjwa ni mke au mme?	1. Mme 2. Mke
1.2	Una umri gani kwa sasa? **(kama ni '95' au zaidi, andika '95')**	____ **(Umri kwa miaka timilifu)**
1.3	Je umeoa au kuolewa?	1 = Ndani ya ndoa au kuishi pamoja 2 = Mtalakiwa/ Mtalaka/Kutengana 3 = Mjane 4 = Sina ndoa au sijawahi kuishi na mwemza
1.4	Umewwahi kuhudhuria au kupata elimu/kisomo darasani?	1 Ndio 2 Hapana (Endelea na swali linalofuata)
1.5	Ni ngazi ipi ya elimu ya juu kabisa umefikia ?	0 = Chekechea 1 = Msingi 2 = Mafunzo ya awali ya msingi 3 = Shule ya msingi 4 = Post-Secondary 'O' Level 5 = Secondary 'A' Level 6= Post-secondary 'A' Level 7 =Chuo kikuu 98 = Sifahamu
1.6	Una mwenza?	1. Ndio 2. Hapana(Endelea na swali linalofuata)
1.7	Ngazi ya juu zaidi ya elimu ya mwenza wako ni ipi?	0 = Chekechea 1 = Msingi 2 = Mafunzo ya awali ya msingi 3 = Secondary 'O' Level 4 = Post-Secondary 'O' Level 5 = Secondary ''A' Level

		6= Post-secondary ’‘A' Level 7 = Chuo kikuu 98 = Sifahamu
1.8	Unafanya kazi gani/ Unajishughulisha na nini?	
1.9	Mwenza wako anafanya kazi gani/ Anajishughulisha na nini?	
1.10	Kipato cha familia yako kwa mwezi ni makadirio ya kiasi gani?	_____ (Taslim)
1.11	Sasa ningependa kukuuliza kuhusiana na chakula mnachokula nyumbani.Kwa siku huwa mnakula milo mingapi?	MILO _____
1.12	Una bima ya afya?	1 = NDIO 2 = HAPANA
1.13	Aina gani ya bima?	1 = NHIF 2 = Binafsi 3= Nyinginezo: _____
	Bima yako ya afya inakidhi gharama za matibabu ya haemodialysis?	1 = NDIO 2 = HAPANA

B: HISTOTIA YA KLINIKI

2.1 Siku uliyotambulika kuwa na ugonjwa sugu wa figo _____ (DD/MM/YYYY)

2.2 Kipindi ca kuugua (CKD) _____ (miaka) _____ (miezi) _____ (wiki)

2.3 Kipindi ulichopitia HD: _____ (miaka) _____ (miezi) _____ (wiki)

2.4 Ni mara ngapi unaenda kwa ajili ya matibabu ya hemodialysis kwa wiki (Vipindi vya Hemodialysis)?

1) Mbili
2) Tatu
3) Nne
4) Nyingine: _____

2.5 Kipindi cha dialysis _____ saa

2. Umewahi kupitia maumivu makali kutokana na hemodialysis?

1. Ndio
2. Hapana

Kama ndio, yalikuwa mauvivu makali kiasi gani yaliyotokana na hizo dawa?:

_____

_____

2.6 Una tatizo lingine sugu ukiachilia CKD?

1. Ndio
2. Hapana

2.7 Kama ni ndio kwenye swali 5.7, magonjwa gani sugu mengine ambayo unayo?

1. Kisukari
2. Kansa
3. HIV/AIDS
4. Ugonjwa wa moyo
5. Mengine, mengine: _____

C: UELEWA KUHUSU ELIMU YA AFYA

Eneo la uelewa	**HAPANA**	**NDIO**
Matibabu/Dawa		
Viashiria (Dalili) vya kutopata dialysis ya kutosha ni:		
▪ Udhaifu na uchovu		
▪ Kutokuwa na hamu ya kula		
▪ Kuhisi kuumwa		
▪ Shida kwenye kupata usingizi mzuri		
▪ Ngozi kuwasha		
▪ Mdomo kuwa mchungu		
▪ Shida katika kuweka umakini katika jambo		
▪ Kutokuwa na hamu ya tendo la ndoa		
▪ Shida ya upumuaji, hasa unapofanya mazoezi .		
▪ Kuvimba mikono na miguu		
▪ Udhibiti duni wa shinikizo la damu		
Matatizo ya Hemodialysis		
▪ Shinikizo la damu		
▪ Hypervolemia		
▪ Maumivu ya kifua		
▪ Maumivvu ya mgongo		
▪ Diaphoresis		
▪ Tachycardia		
▪ Kizunguzungu		
▪ Maumivu ya mkazo wa misuli		
▪ Dysthymias		
▪ Embolism ya hewa		

▪ Upungufu wa damu		
▪ Homa ya ini		
▪ Sepsis		
Uelewa wa kujilinda mwenyewe		
Ushirikiano		
▪ Kuangalia vigezo vya mashine kipindi cha dialysis		
▪ Kuongea na mtoa huduma ya afya kuhusu vitu ninavyohitaji kuviondoa mwilini.		
▪ Kujadili vigezo vya dialysis mashine ambavyo ningependelea na mtoa huduma wa afya		
▪ Kujadiliana kuhusu sehemu zenye tatizo		
Utatuzi wa tatizo		
▪ Kurekebisha sababu kuu za kutopata majibu ya damu kwa wakati		
▪ Kuuliza kuhusu magonjwa ya figo		
▪ Kurekebisa visababishi vya kuchelewewsha vipimo vya damu		
▪ Kurekebisha sababu zinazopelekea dalili zinazokutoa kwenye hali nzuri.		
▪ Kuongeza kiasi cha madini ya fosforasi kwenye chakula wakati madini yapo kwa kiwango cha juu		
kujijari		
▪ Kuweka uangalizi wa fistula		
▪ Kuchagua chakula sahihi hata kupindi cha kupata chakula nje		
▪ Kusafisha sehemu majeraha kabla ya dialysis		
▪ Kuchagua mbogamboga na matunda yenye kiwango kidogo cha potasiam		
▪ Kudhibiti kiwango cha unywaji		
▪ Kusafisha mboga kabla ya kuzipika		
▪ Kudhibiti unywaji ili kujikinga na ongezeko la uzito		
Muongozo wa hisia za ndani		
▪ Kuondoa msongo wa mawazo kupitia mazoezi		
▪ Kutafuta taarifa pale unapokuwa na maswali kuhusu ugonjwa wa figo		
▪ Kujadili kuhusu msongo wa mawazo katika hali ya utulivu		
▪ Kutafuta msaada kwa wengine kipindi cha kuanguka kihisia		
▪ Mabadiliko ya mzunguko wa lishe ni jambo la muhimu pale wagonjwa wanapopitia hemodialysis		

D: SIFA ZA SHIRIKA

6.1 Nauli ya kawaida ni shiling ngapi, kutoka unapoishi mpaka sehemu ya huduma ya matibabu ya hemodialysis?: _____

6.2 Makadirio ya gharama za matibabu yako ya CKD kwa mwezi ni kiasi gani? TZS: _____

6.3 Huwa unachelewa kupata uangalizi kwenye hemodialysis?

1. Ndio 2. Hapana

6.4 Umeshawahi kuambiwa na daktari wako kuhusu athari za kushindwa kuzingatia matibabu ya hemodialysis?

1. Ndio 2. Hapana

6.5Unachukulia vipi uhusiano wako na watoa huduma wao wa afya ?

1. Nzuri sana 2. Nzuri 3. Kawaida 4. Mbaya

6.3Huwa unapata elimu ya afya ya kila mara kuhusu hemodialysis unapoenda kuangaliamaendelea ya afya ya HD ?

1. Ndio 2. Hapana

6.4 Njia au aina ya elimu unayopewa?

1. Kwa kuona 2. Kuambiwa 3. Vyote

6.5Onyesha mwitiko wako kuhusiana na elimu ya afya uliyoipata kwa watoa huduma ya afyaulipokuwa unaendlea na matibababu ya hemodialysis (weka tiki kwenye jibu lenye usahihi)

Items	**Ndio**	**Hapana**
CKD machaguo ya matibabu		
Kuishi na CKD		
• Lishe		
• Kushughulika kipindi cha dialysis		
• Vipaumbele na muda wa zida		
• Jinsia na vitendo dhahiri		
Vitendo katika uangalizi wa dialysis		
2 Matumizi ya mashine ya dialysis		
3 Uzuiaji wa vimiminika		
4 Matumizi na uangalizi wa catheter na fistula		
5 Jinsi ya kutatua matatizo kwenye matibabu ya dialysis		
6 Usafi na kudhibiti maambukizi		
Matibabu na Chanjo		
Self-monitoring symptoms		
Wakati na jinsi ya kuwasiliana na hospitali ya upandikizaji wa figo		

6.6 Unazingatia vipi elimu ya afya inayotolewa na watoa huduma wa afya kuhusiana na hemodialysis katika usaidizi huu kikamilifu?

1. Nzuri sana 2. Nzuri 3. Kawaida 4. Mbaya

6.7Unapokea mafunzo kuhusiana na hemodialysis na muongozo wa kujiangalia unapokuwa mbali na waangalizi wa hemodialysis ?

1. Ndio 2. Hapana

6.8 Kuridhika na huduma/Uangalizi wa kitabibu

Ni kwa kiasi gani **unakubali** au **kukataa** kulingana na yafuatayo. (Zungushia kila namaba kwenye kila mstari).

SN	**Yaliyomo**	**Nakubali kabisa**	**Nakubali**	**Sina uhakika**	**Nakataa**	**Nakataa kabisa**
1	Wauguzi wako vizuri kwenye kufafanua umuhimu na matokeo ya matibabu ya hemodialysis	1	2	3	4	5
2	The hemodialysis unit has everything I need during my treatment	1	2	3	4	5
3	Je unahitajika kulipa pesa zaidi kwa huduma bora?	1	2	3	4	5
4	Je kumekuwa na uwezekano wa kupata taarifa kuhusu hemodialysis,uangalizi binafsi katika usaidizi huu ?	1	2	3	4	5
5	Wauguzi wana kuonyesha ukarimu na adabu njema.	1	2	3	4	5
6	Watoa huduma wa afya huwa kibiashara na kukosa utu kwa wagonjwa	1	2	3	4	5
7	Ni ngumu kupata mihadi kwa ajili yaIt is	1	2	3	4	5

	hard to get an appointment for hemodialysis nah ii inapelekea kuwa na hali duni ya uangalizi wa hemodialysis					

8.3 APPENDIX III: 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 **Jane Mmari**I am studying for a Master of Science in Nephrology Nursing at the Muhimbili University of Health and Allied Sciences (MUHAS). I am researching **"*The knowledge on health education and the associated factors among patients undergoing hemodialysis factors at Muhimbili National Hospital*"**.

The aim of the study

This observational study aims to assess the knowledge of health education and the associated factors among patients undergoing hemodialysis at Muhimbili National Hospital.

Procedure

I would like you to participate in this study. You are selected because you are one of the participants who directly meet the criteria for the subject matter of this study. Administered questionnaire guides will be used, and privacy will be maintained as much as possible. I hope that you will be willing to share your information with the researcher. If you have questions about this research, please do not hesitate to ask or contact the researcher anytime.

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 the 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. Also, 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 have no direct benefits from being in the study. However, your participation in this study will provide information for improving compliance to antihypertensive medicationfor patients with hypertension and improve health services to our patients. Your information will help reduce anxiety, tension, and uncertainty to patients, hence preparingreduce anxiety, tension, and uncertainty to patientspatients reduce anxiety, tension, and uncertainty, preparing them psychologicallyfor compliance to antihypertensive medication.

Risks

There will be no harm to you due to participation in this study, although some questions will be personal, which might trigger your emotions, feelings, worries, and despair.

Whom to Contact

In case of any inquiry, please get in touch with 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 the contents of this form and understood. My questions have been answered. I agree to participate in this study.

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

8.4 APPENDIX IV: 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

Salaam! Jina langu **Jane Mmari**mwanafunzi wa mbobezi katika science ya uuguzi wa figo katika chuo kikuu cha afya na sayansi shirikishi muhimbili. Utafiti wangu unahusu**"uelewa juu ya elimu ya afya na sababu zinazohusiana kwa wagonjwa wa figo wanaosafisha damu(dialysisi) katika Hospitali ya Taifa ya Muhimbili"**

Lengo la utafiti

Madhumuni ya utafiti huu wa uchungui ni kutathimini juu ya elimu ya afya na sababu yanayohusiana kwa wagonjwa wanaosafisha damu dialysis katika Hospitali ya Taifa Muhimbili.

Utaratibu wa kushiriki

Ningependa ushiriki katika utafiti huu, umechaguliwa kwa sababu wewe ni mmoja wa washiriki ambaye ametimiza moja kwa moja vigezo vya mada ya utafiti. Miongoozo ya dodoso inayosimamiwa itatumika na faragha itadumishwa iwezekanavyo . natumai kuwa utakuwa tayari kushiriki habari zako na mtafiti . 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 , hakuna watu ambao hawajaidhinishwa watapata taarifa zako , punde tu taratibu hii zitakapokamilika nyenzo ziliotumika zitatupwa kwa njia salama ili kuboresha usiri wa utafiti. Zaidi zaidi ili kulinda usiri 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

Utafiti huu utasaidia kutambua sababu zinazohusiana nauelewa juu ya elimu ya afya na sababu zinazohusiana kwa wagonjwa wa figo wanaosafisha damu(dialysi**s)** Hii itasaidia kuwajengea uwezo wa kuwa na elimu juu ya afya ya figo pia kuimarisha na kuboresha sera ya matibabu ya figo kwa kusafisha damu.

Madhara ya utafiti

Hakutakuwa na madhara kwako katika ushiriki wako katika mahojiano yetu. Ijapokuwa itakuhitaji muda wako kujibu maswali yetu.

Mawasiliano

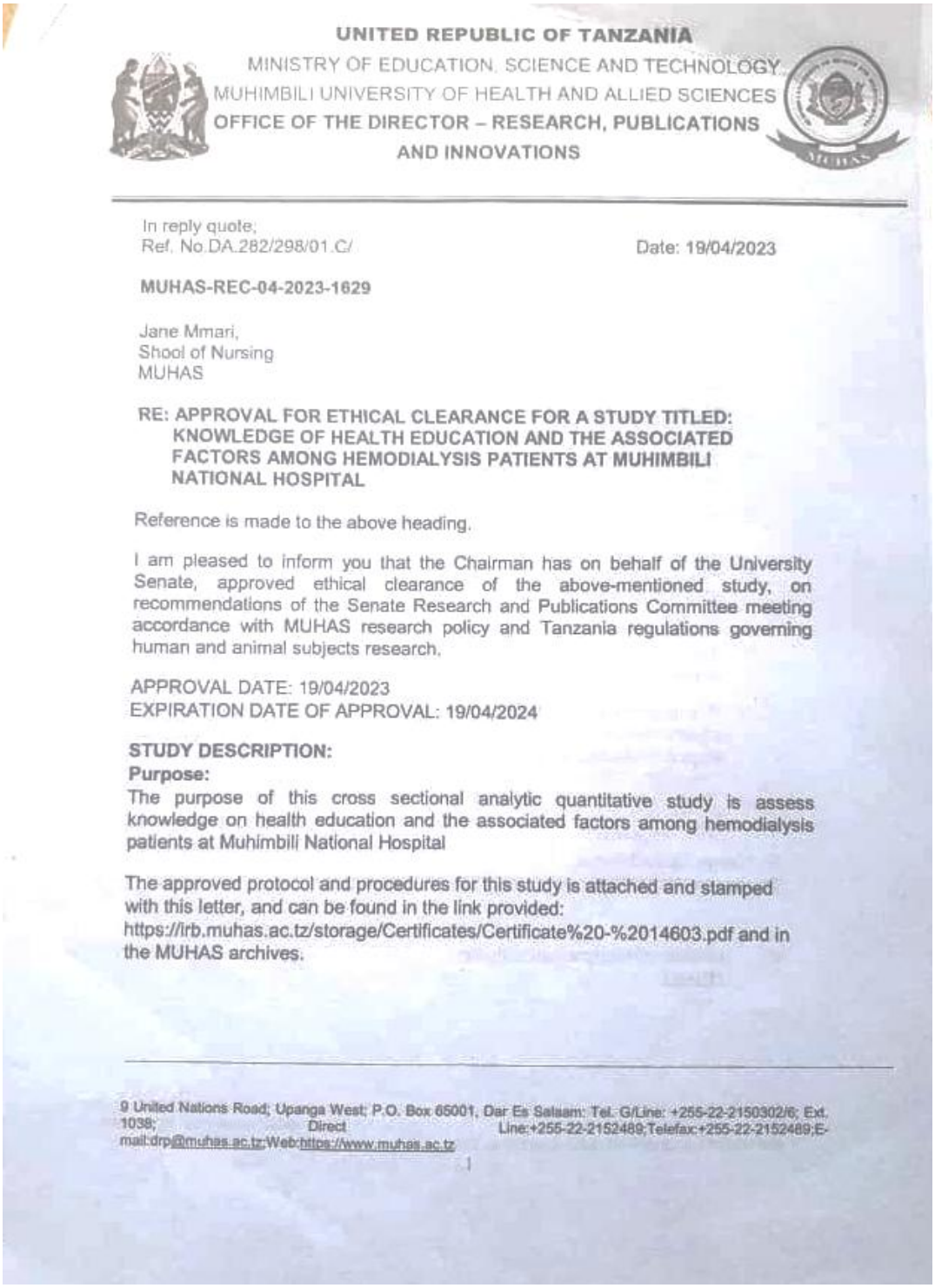
Endapo una maswali au jambo lolote kuhusiana na matokeo ya utafiti huu, tafadhali wasiliana na ofisi ya kurugenzi na uchapishaji chou kikuu cha afya na sayansi vishirikishi Muhimbili (Sanduku la posta 65001, Dar es Salaam-Tanzania; Simu: **255 0222151596)**.

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: _____.

8.5 APPENDIX V: ETHIAL CLEARENCE APPROVAL



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

In reply quote;
Ref. No.DA.282/298/01.C/ Date: 19/04/2023

MUHAS-REC-04-2023-1629

Jane Mmari,
Shool of Nursing
MUHAS

RE: APPROVAL FOR ETHICAL CLEARANCE FOR A STUDY TITLED: KNOWLEDGE OF HEALTH EDUCATION AND THE ASSOCIATED FACTORS AMONG HEMODIALYSIS PATIENTS AT MUHIMBILI NATIONAL HOSPITAL

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: 19/04/2023
EXPIRATION DATE OF APPROVAL: 19/04/2024

STUDY DESCRIPTION:
Purpose:
The purpose of this cross sectional analytic quantitative study is assess knowledge on health education and the associated factors among hemodialysis patients 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-%2014603.pdf and in the MUHAS archives.

9 United Nations Road; Upanga West; P.O. Box 65001, Dar Es Salaam: Tel. G/Line: +255-22-2150302/6; Ext. 1038; Direct Line:+255-22-2152489;Telefax:+255-22-2152489;E-mail:drp@muhas.ac.tz;Web:https://www.muhas.ac.tz

The PI is required to:

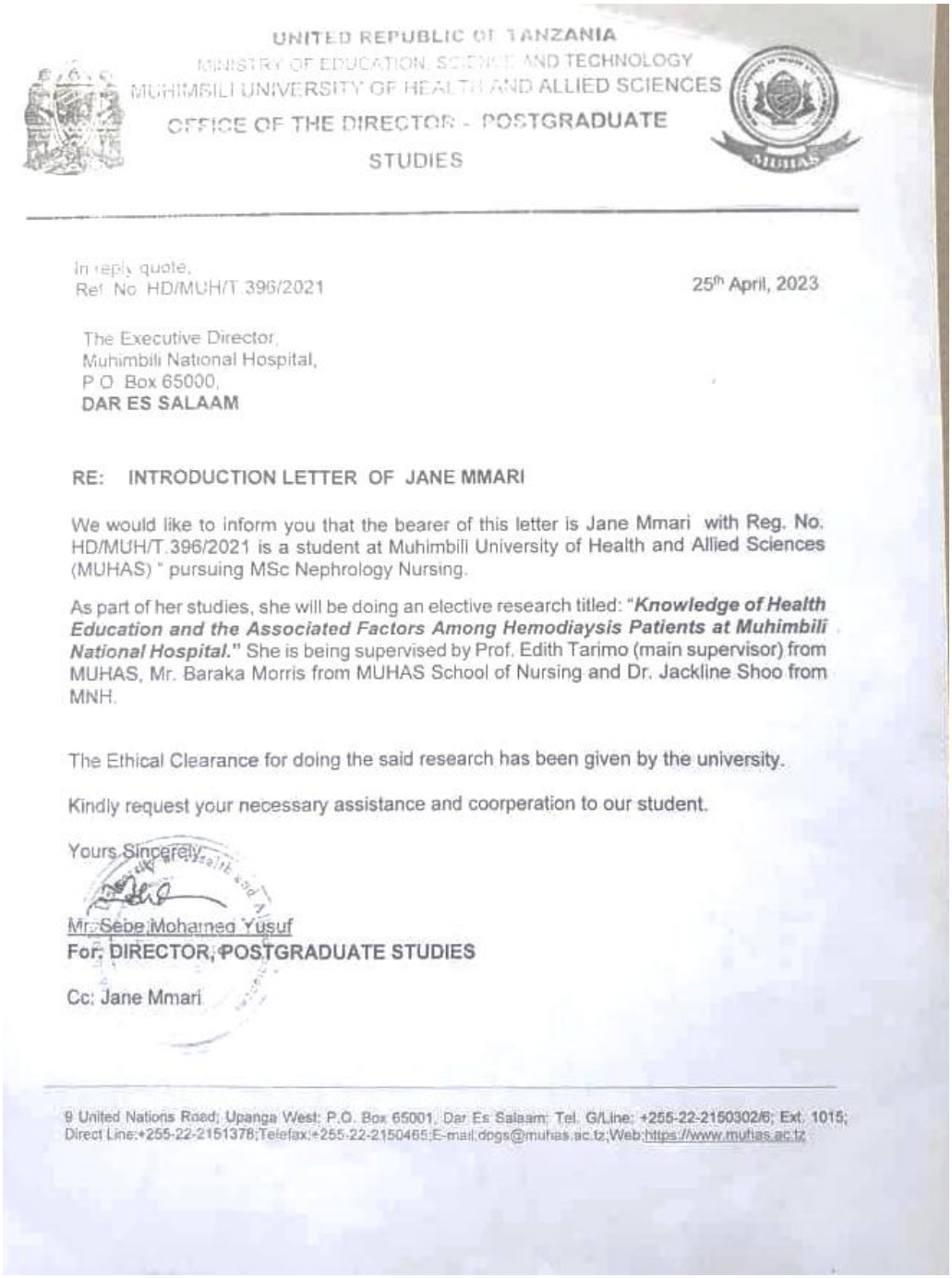
1. Submit bi-annual progress reports and final report upon completion of the study.
2. Report to the IRB any unanticipated problem involving risks to subjects or others including adverse events where applicable.
3. Apply for renewal of approval of ethical clearance one (1) month prior its expiration 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. 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)
9. The PI is required to ensure that the findings of the study are disseminated to relevant stake holders.
10. 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/.

Prof. Bruno Sunguya
Chairman, MUHAS Research and Ethics Committee
Cc: Director of Postgraduate Studies



9 United Nations Road; Upanga West; P.O. Box 65001, Dar Es Salaam; Tel. Gr/Line: +255-22-2150302/6; Ext. 1038; Direct Line:+255-22-2152489;Telefax:+255-22-2152489;E-mail:drp@muhas.ac.tz;Web:https://www.muhas.ac.tz

8.6 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.396/2021

25th April, 2023

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

RE: INTRODUCTION LETTER OF JANE MMARI

We would like to inform you that the bearer of this letter is Jane Mmari with Reg. No. HD/MUH/T.396/2021 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: "***Knowledge of Health Education and the Associated Factors Among Hemodiaysis Patients at Muhimbili National Hospital.***" She is being supervised by Prof. Edith Tarimo (main supervisor) from MUHAS, Mr. Baraka Morris from MUHAS School of Nursing and Dr. Jackline Shoo from MNH.

The Ethical Clearance for doing the said research has been given by the university.

Kindly request your necessary assistance and coorperation to our student.

Yours Sincerely,

Mr. Sebe Mohamed Yusuf
For: DIRECTOR, POSTGRADUATE STUDIES

Cc: Jane Mmari

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

8.7 APPENDIX VII: PERMISION LETTER

THE UNITED REPUBLIC OF TANZANI

MINISTRY OF HEALTH

MUHIMBILI NATIONAL HOSPITAL

In reply please quote.

Ref. No.: MNH/CRTCU/Perm/2023/264 Date: 25th April, 2023

Block Manager
NPC – I
Muhimbili National Hospital

RE: PERMISSION TO COLLECT DATA AT MNH.

Name of Student	**Jane Mmari**
Title	**"Knowledge of Health Education and the Associated Factors Among Hemodialysis Patients at Muhimbili National Hospital".**
Institution	Muhimbili University of Health and Allied Sciences
Supervisors	Prof. Edith Tarimo (MUHAS) Mr. Baraka Morris
Co – supervisor	Dr. Jackline Shoo (MNH)
Period	25h April, 2023 to 30th June, 2023

Approval has been granted to the above principal investigators to collect data at MNH. Dissemination of study findings at MNH shall be overseen by Sir. **Jackline Shoo** (MNH) Co - supervisor.

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

Sincerely,

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

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

c.c DNS
c.c Jane Mmari

Upanga West, Kalenga Street, Plot No. 10480/3, P.O. BOX 65000, Dar es Salaam, Tanzania.
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