

**PREDICTORS OF ADHERENCE TO TREATMENT REGIMEN AMONG
HEMODIALYSIS PATIENTS AT KENYATTA NATIONAL HOSPITAL**

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DECLARATION

This thesis is my original work and has not been submitted for any academic award or published in any other university or any other institution of higher learning for the award of a degree.

Signature:
Date: 1/12/2020

SUPERVISOR APPROVAL

This thesis has been submitted for examination with our approval as University Supervisors.
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DEDICATION

I Would like to dedicate this achievement to my family for their continued support throughout this journey. They have been amazing for all the time I have been away working on this thesis to ensure successful completion.

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LIST OF ABBREVIATIONS

CKD: Chronic Kidney Disease

ERC: Ethics and Review Committee

ESRD: End Stage Renal Disease

DALYS: Disability-Adjusted Life Years

HD: Hemodialysis

IWG: Interdialytic Weight Gain.

KNH: Kenyatta National Hospital

SPSS: Statistical Package for Social Sciences

UON: University of Nairobi

WHO: World Health Organization

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OPERATIONAL DEFINITIONS

Adherence: The ability of a patient undergoing hemodialysis to fully follow the identified guidelines involving attending hemodialysis sessions, adhering to medication prescribed, dietary and fluid restrictions where adherence was determined by a score of more than 80 in the ESRD-AQ questionnaire.

Chronic Kidney Disease: Refers to the irreversible and progressive loss of kidney function that requires replacement therapy to sustain life and increase longevity. It occurs in five stages i.e. from stage 1 which refers to mild stage and stage 5 which refers to end stage renal disease.

End Stage Renal Disease (ESRD): It is a health condition where an individual's kidneys cease functioning on a permanent basis leading to the need for a regular course of long-term dialysis or a kidney transplant to maintain life.

Disability Adjusted Life Years (DALYs): This is a measure of overall disease burden, expressed as the number of years lost due to ill-health, disability, or early death.

Hemodialysis Is a treatment to filter wastes and water from the blood, as your kidneys did when they were healthy.

Non-adherence – The inability of the patient to fully follow the identified treatment, session, diet, and fluid restriction limits as identified with a score less than 80% in the ESRD Questionnaire.

Perception: Refers to interpretation of a situation by an individual in a particular way.

Predictors: Refers to independent factors that are being investigated to have an influence on adherence

Treatment regimen: This refers to four components guideline used to assess adherence among hemodialysis patients. It looks at attended hemodialysis sessions adhering to medication prescribed, dietary and fluid restrictions.

ABSTRACT

Background: Adherence in hemodialysis has been a significant factor that helps in modifying the quality of life among patients undergoing hemodialysis. Adherence to hemodialysis treatment regimen encompasses four-components, which include hemodialysis treatment, medication adherence, fluid, and dietary restriction. There are clear guidelines that patients undergoing hemodialysis are expected to abide by to increase adherence. The increasing non-adherence provides a difficult context, and it is therefore essential to understand the underlying predictors of hemodialysis adherence.

The purpose of the study: To determine the predictors of adherence to the treatment regimen among hemodialysis patients attending Kenyatta National Hospital.

Methodology: A cross-sectional study was conducted among 97 patients with End-Stage Renal Disease, selected purposefully. A standardized ESRD Adherence questionnaire consisting of five sections: General information, dialysis, medication, dietary, and fluid restriction was used to collect quantitative data. Descriptive and binary logistic regression were conducted to meet the research objectives. The level of significance was assessed at 0.05.

Results: The prevalence of adherence to hemodialysis treatment regimen was 39.2%. The prevalence of each of the component of hemodialysis treatment was assessed, which revealed that 55.7% of the respondents adhered to medication, 39.2% adhered to fluid intake, 35.1% adhered to dietary restriction while 47.4% adherence to hemodialysis treatment. Education was the only patient related significant predictor of hemodialysis adherence ($p = 0.048$, $OR = 0.433$, 95% $CI [0.189,0.991]$). Distance from facility ($p < 0.001$, $OR = 1.39$, 95% $CI [0.649,2.977]$) and communication between healthcare provider and hemodialysis patients ($p = 0.017$, $OR = 1.659$, 95% $CI [1.096,2.496]$) were significant health system related predictors of adherence to hemodialysis. Hypotension was the only therapy related significant predictor of adherence to hemodialysis ($p < 0.001$, $OR = 7.216$, 95% $CI [2.456,21.167]$).

Conclusion: Adherence to hemodialysis treatment is still low prompting the need to integrate better strategies for improved healthcare for hemodialysis patients. Low level of education, longer distance to health facility, lack of communication between patients and healthcare providers and hypotension were associated with non- adherence to hemodialysis treatment regimen. Therefore, there is need to focus on controlling these factors which have a greater influence on adherence to hemodialysis treatment regimen.

CHAPTER ONE: INTRODUCTION

1.1. Background of the study

Hemodialysis is a major healthcare intervention for patients with renal failure and end-stage renal disease. An efficient hemodialysis treatment requires at least three sessions per week, with each session running for three to four hours and effective adherence to the diet, fluid, and following medical instructions. Adherence to the treatment regimen has proven to be difficult in patients undergoing Hemodialysis worldwide (1). In regards to this, Kim et al. stressed that adherence to hemodialysis therefore, remains a significant challenge in the management of the End-Stage Renal Disease (ESRD) population (2).

It is a recommendation that patients follow the prescribed treatment regimen for better outcomes. In contrast, non-adherent to the prescribed treatment is quite common among hemodialysis (HD) patients and has been adversely associated with morbidity (3). Non-adherent to one or two components of the treatment regimen, has been approximated to be at least 50% globally (4). Furthermore, studies have indicated fluid restriction prevalence was about 30% in some regions while adherence to dietary regimen prevalence has been approximately 66% (5)(4)(6). Medication being a component of treatment regimen remains a major concern in HD patients. Recent studies have shown that more than half miss their medication some of the time leading to non-adherence (6) (7) (8).

In a study conducted in Vietnam on challenges of hemodialysis, it was observed that half of the End-stage renal disease patients missed their dialysis sessions at some point (9). This occurrence could be a result of many sessions and long duration, which patients are expected to make in increasing their quality of life. Similarly, Chironda and Bhengu highlighted that adherence to the hemodialysis treatment was associated with positive patient outcomes such as improved quality of life (7). Nonadherence to HD was associated with the strict treatment regimen, high pain score, and financial constraints (10).

Notable determinants of non-adherence among hemodialysis patients identified in previous studies include level of education, marital status, and employment status (11). The reason for this could be, those patients of low socio-economic status may not afford the drugs and required food. In contrast, another study did not show any connection on the level education and employment status as predictors of adherence in hemodialysis patients. A study in Malaysia only found that the location of the healthcare facility and the duration of dialysis were predictors of patient adherence (21). Improved quality of life and functional independence have been the hallmark of adherence. However non-adherence remains a great challenge.

1.2.Problem statement

In developing countries, there is a rising burden of non-communicable diseases such as chronic kidney disease, which appear to overwhelm weak health care systems (12). In the Kidney Disease Improving Global Outcomes report of 2019, Chronic Kidney Disease in sub-Saharan Africa constitutes 15% of adult mortality and 25% of total DALY's (10). Survival is poor, when compared to persons living in high resource countries. Reasons for poor outcomes are mainly due to inadequate adherence to treatment regimens (13). Four components of hemodialysis care comprises of: strict adherence to medication, optimal dialysis sessions, fluid restriction and dietary perspectives (14).The impact of non-adherence includes higher health care costs, use of emergency dialysis, increased morbidity and mortality.

Non-adherence by patients with ESRD could be due to inadequate health messages, poor patient navigation, concurrent disease, adverse effects of therapeutic regimens and socioeconomic factors (14)(15) However, the contribution of these factors to overall DALY's in ESRD patients are unknown. A recent study conducted in Kenya at Kenyatta National Hospital (6) found that 33% of ESRD patients do not adhere to dietary advise, resulting in adverse clinical outcomes. Limited studies have examined additional factors that predict adherence to the treatment regimens. According to anecdotal evidence from renal expert at

Kenyatta National Hospital, 20-30% of patients admitted for emergency dialysis are due to non-adherence hemodialysis care. Studies that identify factors for adherence are essential for interventions that will contribute to improving the quality of renal care, minimizing the use of emergency dialysis sessions and averting unnecessary complications (15).

1.3.Justification

Renal Failure and End-stage renal disease are becoming common health care concerns in Kenya. Hemodialysis is a lifesaving procedure that requires a strict level of adherence. There is limited information available on complete adherence to hemodialysis among patients as well as associated predictors. Adherence to hemodialysis present a better approach in improving the quality of life among hemodialysis. Thus, knowledge of the current adherence levels informed healthcare stakeholders on the efforts that need to be considered to promote positive health among these individuals.

This study, therefore, aimed to give an opportunity for patients to share their challenges regarding adherence to HD. This valuable information helped integrate these concerns with the existing therapy practice for shared problem-solving. The findings also aimed at informing the Renal Department on developing standard operating procedures in fostering adherence as well as informing stakeholders on ways to improve management of hemodialysis adherence.

1.4.Research Question

What are the predictors of adherence to treatment regimen among Hemodialysis Patients at Kenyatta National Hospital?

1.5.Objectives

1.5.1. Broad Objective

To determine the predictors of adherence to the treatment regimen among Hemodialysis patients at Kenyatta National Hospital.

1.5.2. Specific objectives

- i. To assess the prevalence of adherence to treatment regimen among Hemodialysis patients at Kenyatta National Hospital
- ii. To investigate patient-related factors as predictors of adherence to treatment regimen among Hemodialysis patients at Kenyatta National Hospital
- iii. To determine health care system-related factors as predictors of adherence to treatment regimen among Hemodialysis patients at Kenyatta National Hospital
- iv. To identify therapy-related factors as predictors of adherence to treatment regimen among Hemodialysis patients at Kenyatta National Hospital

CHAPTER TWO: LITERATURE REVIEW

2.1.Introduction

This section sought to provide a review of past studies that have focused on understanding the predictors of adherence to treatment regimen among hemodialysis patients. The research utilized peer-reviewed research articles that have been published in different medical research databases. The databases that were considered include PubMed, EMBASE, Cochrane Library, PubMed Central, Ebsco Host, and Elsevier. Mendeley Desktop was used to cite and organize the research obtained. The keywords that were used in the literature search included Hemodialysis, adherence to Hemodialysis, Predictors of hemodialysis non-adherence, Hemodialysis treatment, Hemodialysis dietary, Hemodialysis patient fluid restriction. Key findings in each article were identified and formed part of the literature review.

2.2.Adherence to hemodialysis

Adherence to hemodialysis incorporates focus on the four components that define an effective commitment to the overall treatment regimen. Adherence is defined as following the medication prescription, hemodialysis sessions, fluid intake as well as dietary restrictions wholly without fail. Non-adherence is defined as missing a session of hemodialysis or more per month, shortening by ten or more minutes HD sessions in a month, and interdialytic weight gain (IWG) of more than 5.7% of dry weight, or a serum phosphate (PO₄) of greater than 7.5 mg/dL (16).

Adherence will be assessed based on the integration of different components in hemodialysis treatment. Adherence will be evaluated on four levels, which will include following medication prescription, attending hemodialysis sessions, and dietary and fluid restrictions. The use of hemodialysis to treat End-stage renal failure is more common compared transplant and peritoneal dialysis. This is because it is relatively cheap and the National Hospital Insurance Fund covers most of its cost implications. It is used to maintain kidney function while patients

await Kidney transplant or as alternative care on its own. It is a treatment that aims at removing nitrogenous wastes and extra fluid from the blood. Hemodialysis can be done at home as well as at the dialysis center (17). However, due to increased care and management by healthcare providers, the management of hemodialysis at dialysis centers is considered the most appropriate option. During the hemodialysis process, blood is pumped into the dialyzer. Patients with ESKD are expected to undergo hemodialysis 3-4 times a week, with each session taking approximately four hours (18). As the blood is filtered, it is returned into the body. The dialyzer machine ensures that only a small amount of blood is out of the body at any given time (17).

2.3.Prevalence of adherence to hemodialysis

Adherence to hemodialysis has been a significant challenge considering the complexity of the whole treatment regimen. There have been different levels of adherence across different regions. The level of adherence in low-income countries with hemodialysis treatment regimen has been significantly low. According to a study conducted in Rwanda, approximately 51% of the ESRD patients who participated in the study adhered fully to hemodialysis, 42% adhered to hemodialysis moderately while 7% of the respondents had a lower level of adherence. Adherence to hemodialysis is a public concern that has influenced healthcare policies in the country (1).

Similarly, in another study conducted in Palestine, dietary adherence was the lowest with only 24%, fluid restriction adherence was 31%, HD sessions adherence was 52% while medication adherence was 81%. Assessment of the level of adherence highlighted that 55.5% of the respondents had high adherence, 40.5% had moderate, while about 4.1% had poor adherence with male patients reporting a higher level of adherence (19). Counseling of patients and providing them with crucial information regarding adherence is essential in improving the levels.

Apart from attending the sessions of hemodialysis as stipulated, there are other essential aspects in defining the adherence level of hemodialysis. This includes following a medication prescription strictly, dietary and fluid components restrictions which need to be managed effectively in improving individual quality of life (20). Slowing the progression of CKD requires strict adherence to the dialysis plan, which includes medication, fluid, dietary restriction, and attendance. According to Yusop et al. significant number of CKD patients deviated from the recommended prescribed treatment regimen (21). Therefore, causing the current challenges in healthcare.

2.4. Contributing factors

Understanding the existing prevalence of adherence requires a critical emphasis on different factors that are associated with adherence based on past research. Identifying specific factors that help shape the overall commitment to the actual issues presents a highly engaged emphasis on particular measures that define an improved focus on positive change development.

2.4.1. Patient-related factors

2.4.1.1. Age

Patients related factors focus on specific characteristics that define their wellbeing from a general perspective. Patient-related factors appear to affect adherence to hemodialysis among chronic kidney patients. Various studies have identified that age is a significant determinant of adherence. Studies have also shown that older patients diagnosed with CKD or ESRD are more likely to adhere to hemodialysis treatment regimen compared to younger patients (7)(22)(4). Similarly, a study reported by Saha and Allon, young age was associated with increased nonadherence (23). In addition, Kamau et al. identified that, younger generation among hemodialysis patients is associated with non-adherence (22). This can be explained by failure to understand the extent of the problem or severity of the problem.

Adherence with hemodialysis requires a positive attitude and commitment to ensuring that there are better changes that promote a successful level of focus on patient needs. Ibrahim et al. highlighted that younger male were more likely to be noncompliant compared to older patients (4). Reason being attributed to self-denial and inability to understand the current situation and adverse medical outcomes involved. Similarly, Frih et al. found that older people who have had many hemodialysis sessions were less likely to become non-adherent because of past experiences (24). However, full adherence to hemodialysis is difficult to achieve because it has a detrimental influence on individual personal life, which includes professional and social life (25). It is difficult for an adult male to walk around with a jug to measure urine output to ensure fluid adherence is maintained.

According to Naalweh et al., in assessing medical adherence among hemodialysis patients, knowledge, awareness, attitude, facilitation, and action control are significant factors influencing the level of adherence. The study also found more than half of the patients' nonadherence to medication (19). The study further identified that patient-related factors had a major influence on non-adherence with medicine among hemodialysis patients. Younger hemodialysis patients are less likely to follow the outlined medicine prescription compared to the older population. The study further identifies that high pill burden, frequent hospitalization and poly-pharmacy are essential factors that contribute to adherence to hemodialysis (26). Similarly, age was a significant independent factor in defining the level of adherence to hemodialysis (10).

2.4.1.2. Health literacy

Health literacy entails the level of understanding of healthcare aspects in relation to the existing conditions. Therefore adherence has been associated with the ability of a patient to understand hemodialysis and other factors that influence their knowledge levels (10). The level of education has also been associated with adherence behavior among patients (27). Decreased

adherence has been associated with low education level (27). Health information is essential in dietary intake adherence because patients are aware of the non-adherence outcomes (27).

The literacy level has been an essential independent predictor of adherence to hemodialysis among patients. Browne and Merighi found out that patients who had difficulties in following hemodialysis guides had low levels of health literacy (69). Similar findings were obtained by Deif et al., who identified that low literacy level among hemodialysis patients is associated with increased hospitalization due to failure to adhere with the underlying hemodialysis prescription (27). A lower level of adherence results in worse health status as well as increased mortality (7). This is because patients are unaware of the need to adhere to hemodialysis prescription, which reduces their inability to follow the prescribed guidelines.

2.4.1.3. Knowledge and attitude

According to Matteson and Russell, patient understanding and beliefs about medicines have been essential patients related factors in determining the level of adherence among patients undergoing hemodialysis. Limited patients education on medication regimen largely contributes to non-adherence (28). Misinformation about drugs being washed intradiallytically has also contributed to non-adherence. Such necessity has led to doubts among hemodialysis patients regarding the need for taking these drugs regularly. The safety concerns of medicines were also considered as a major factor in contributing to non-adherence. Patients who had substantial knowledge about their disease were more likely to adhere to hemodialysis treatment.

Patient attitude and awareness towards hemodialysis regimen have been essential factors that define the level of adherence. According to a study in Malaysia, awareness on effects of non-adherence resulting in deterioration of the medical condition of the patients undergoing hemodialysis is vital. Fear of death was also found to be a motivator for adherent among patients (29). Motivated patients who have the desire to live longer as well as expressing a

positive attitude towards taking medicines were more adherent to the hemodialysis treatment regimen (30).

Self-efficacy defines a strong change approach, which helps maintain a positive level of emphasis on the management of the patient's condition. The ability of the patient to manage dietary, medication and attendance of hemodialysis presents a highly successful emphasis on better changes (31). Disruption of daily routine and presence of a high number of medications offer a more specific focus on a high level of adherence. The support of family members and relatives is invaluable and present a strong motivation for adherent among hemodialysis patients (32).

2.4.1.4.Socio-economic factors

Hemodialysis sessions are expensive and time-consuming, which requires a greater understanding of the better representation of the findings. Studies have indicated, a greater proportion of patients with CKD belongs to low socio-economic status (7). Riang et al., highlighted that the majority of the CKD patients were unemployed or low-income earners (33). This could be explained by the fact that these individuals cannot afford other healthcare interventions in controlling the adverse effects of CKD or ESRD. High-income earners can afford kidney transplant hence do not require hemodialysis unless if there if graft failure (34). A study in Italy found that hemodialysis is an expensive intervention considering that it is carried out three times a week in a hospital setting (35). Developing countries are faced with poor health systems that present a difficult context in managing chronic conditions such as ESRD (36). Patients have to pay from their own pockets. It is difficult when the majority of the population are low-income earners making it impossible to attend each of the dialysis sessions (37). High cost has been implicated in non-adherence in several studies of dialysis patients on hemodialysis (37)(35)(35). Access to healthcare insurance in developing countries has been a major challenge considering that there is no effective plan that can help ensure a

sustainable healthcare delivery. Most of hemodialysis patients are unable to effectively adhere to treatment regimen due to poor healthcare cost management (38).

Mukakarangwa et al., also stressed that healthcare professionals have an essential task of maintaining close relations with their patients, which offer social and psychological support (1). The family members of patients who emotionally or genetically can have a significant influence on the patient's engagement in their care (39). Explanation could be due to the improved quality of life among hemodialysis patients who have strong social support from relatives and family members. Excellence in hemodialysis care requires adherence to a given treatment regimen (40). Hemodialysis requires at least three sessions on weekly basis, which restricts individual movement as well as work hence making it difficult to achieve an improved quality of life (41). This is because patients have increased hope and commitment to hemodialysis to improve their survival chances. Social support is essential in enhancing individual social and psychological wellbeing, probably due to the feeling of being loved and appreciated.

2.4.1.5. Psychological Factors

It is difficult to rule out adverse psychological effects when dealing with a chronic condition (42). However, CKD patients have an extremely high prevalence of psychiatric disorders than any population coping with chronic illnesses (43). This could be based on excessive pressure among patients, which is caused by many sessions and subsequent financial strain. Depression is the most common disorder considering that it entails focusing on individual daily activities (44). Teles et al., stated that physiological changes, neurological disturbances and cognitive dysfunction are additional stressors that contributes to depression in CKD patients (45).

A study in Saudi Arabia examined psychological distress and quality of life among patients living with CKD. The results showed that CKD patients on hemodialysis have a lower quality of life and a high level of psychological distress (4). This was associated with the number of

sessions of hemodialysis and increased economic implications. Individuals who are depressed are less likely to remain committed to the hemodialysis treatment regimen put in place. This is associated with worth reduced hope and commitment among patients (44). According to Kipturgo, in a prospective study that was conducted at Kenyatta National Hospital, it was determined that respondents with ESRD undergoing dialysis tend to experience increased levels of depression and anxiety which increase non-adherence levels on dietary prescriptions as indicated by chemical biomarkers and history from the respondents (46).

According to Chironda and Bhengu, the initial diagnosis of CKD has been associated with significant negative individual outcomes based on the understanding on chronic disease. Life becomes difficult considering the need to balance different aspects of life (7). Opiyo et al., also stressed that psychological factors inhibit fluid restriction as a result of a lack of motivation among patients (6). When hemodialysis patients are under distress, they are unable to have any positive understanding of specific factors that help improve the underlying outcomes.

2.4.2. Health Care System-related Factors

The level of communication and interaction among hemodialysis patients and healthcare service providers creates a reliable system where it is possible to implement successful management of patient wellbeing. The availability of dialysis machines, as well as distance covered to receive hemodialysis, presents a highly integrated system that helps in managing improved outcomes (47).

Presence of hemodialysis centers present a more specific approach which help promote a successful change in maintaining a proper management of HD. Management of healthcare presents a more practical understanding of specific factors that are present, a more structured emphasis on the need to create a highly diversified healthcare quality management. CKD patients in the United States, do access hemodialysis through Medicare (48). Developing countries in the contrast, have difficulties in managing successful healthcare outcomes as a

result of limited dialysis machines and personnel (35). South African rely on the rationing of dialysis services to their high CKD patient population. In South Africa, public hospitals cut down hemodialysis cost in order boost budget for other pressing health priorities in the country (49). In a study done in Nigeria, it was found that many patients live far away from dialysis centers, which makes them fail to attend some hemodialysis sessions (50).

Dialysis centers play a major role in influencing patient's adherent to the hemodialysis treatment regimen. Institutions help in creating a better environment for their patients, which is essential in improving adherent levels (51). The interaction of patient and healthcare team present a strong platform that helps promote the level of the adherent. Lack of engagement during consultation visits, inadequate time for counseling, and one-sided communication were cited as independent factors that contribute to patient non-adherent to hemodialysis (51).

Lack of trust in the healthcare team was also a significant factor in predicting non-adherent. Many patients preferred hiding their concerns because they thought that they would not be heard and taken seriously by the healthcare team (52). Poor interaction between physicians and healthcare providers present a difficult environment considering the psychological stress that patients go through when attending hemodialysis. This is in contrast to patients who report a strong, trustworthy relationship with their healthcare teams (51).

2.4.3. Therapy-related Factors

Adherence to hemodialysis is affected by the side effects like muscle cramps, hypotension and chest pain experienced by the patient during dialysis. Muscle cramps is also a negative factor associated with hemodialysis. Some of the patients are discouraged because of the extent of the pain as a result of undergoing hemodialysis session which present increased nonadherence to attendance (53).

Muscle cramps that are associated with hemodialysis are devastating and often influence individual adherence to hemodialysis. Studies have shown that approximately 17% of patients signed off hemodialysis as a result of muscle cramps (54)(55). These cramps are mostly experienced at the end of the dialysis sessions and usually associated with higher removal of fluid during hemodialysis. Morena et al. stated that increased cramps, therefore, lead to non-adherence because patients fear the outcomes of each hemodialysis, especially considering the need for many sessions regularly (56).

Physical characteristics of medicines, packaging, and side effects were also identified as significant independent factors in defining medicine adherence. The severity of the condition, as well as affordability of drugs was found to be significant factors based on the findings from a Palestine study.(19). According to Mohmadi et al., physical characteristics of medicines were found to be independent predictors of medication adherence among hemodialysis patients (54). Pharmaceutical make-up such as the size of the pills, especially the larger ones, which include phosphate binders, was associated with lower adherent levels. The palatability of medicines was also considered a nuisance to patients considering that they had to take them in the morning based on the prescriptions given (57).

2.5. Adherence to dietary and fluid restrictions

Nutrition require an emphasis on diverse aspects that help identify specific levels of adherence. Protein requirement of patients undergoing hemodialysis is essential, considering the need to

ensure that hemodialysis sessions are successful (5). Inadequate intake of proteins increases adverse outcomes as a result of protein malnutrition. The protein levels should be increased due to dialysate losses and catabolism in hemodialysis patients (5). Protein synthesis and degradation are both increased by hemodialysis; hence the patient should ensure that their dietary intake has a higher level of proteins (42). The increase in the production of cytokines plays a major role in protein degradation, which means that patients need to maintain improved nutritional levels to improve their health (58). The correct diet for hemodialysis patients should include 1.1 -1.2g/kg/day proteins, which should be 50% high in biological value (58). This is mainly due to increased nutrient levels contained in biological food products as compared to inorganic products.

In a mixed-methods study conducted in Kenya focusing on adherence with dietary prescriptions, which included 333 participants, it was identified that only 36.3% of the patients undergoing hemodialysis adhered to dietary order (58). These results asserted that adherence to less restrictive dietary intake and those that require less effort were more likely as opposed to the restrictive ones among CKD patients on hemodialysis. Patients that follow fluid intake restrictions are more likely to follow the dietary prescriptions (59). This is mainly due to the strong interlink between these components of hemodialysis components and increased knowledge (60). Prescribed diets vary significantly based on the condition of the patient and the ability to understand key changes that help identify improved understanding of the underlying challenges in adherence (40).

According to a study in Hong Kong approximately 86.2% of the respondents found fluid prescription as the most challenging and difficult component of the hemodialysis treatment regimen (61). Most of the respondents found that fluid restrictions were more difficult to follow and required dedication and commitment reason could be attributed to the challenges a patient on hemodialysis has to go through, such as measuring urine out-put every time one has to visit

the washroom. In addition, forgetfulness was identified as a major reason for the low adherence level. Chironda & Bhengu (2016) also found that more than 60% of the hemodialysis patients had difficulty in adhering to dietary prescriptions (7). It was determined that limited information pertaining to fluid management was a key factor that described a high rate of non-adherence. In another study by Lam et al., patients were more likely to adhere to medication and dialysis compared to diet and fluid prescriptions (61). Patients who perceived themselves as having a higher adherence to medication were (83%) and dialysis session attendance (93%), adherence to fluid prescription was 64% while dietary restrictions at 38%. Information given during sessions was essential in determining these outcomes. Patients who had more knowledge were more likely to have a high level of adherence. According to a study in South Africa, younger males who had received dialysis for 1 to 3 years considered themselves as being nonadherent to the hemodialysis treatment regimen (12). Helping CKD patients require an emphasis on the underlying relationship and commitment to improved quality of care.

2.6. Adherence to medication and attendance of hemodialysis sessions

Medication is a key factor that presents a critical focus on regulating wastes in the body. Various researchers have found approximately 49% non-adherence (1). The high rate of non-adherence was associated with forgetfulness. According to Hong Kong study, around 70.6% of the respondents experienced difficulties in adhering to phosphate binders citing side effects such as constipation as a reason (61). Chironda et al., found that many patients who did not adhere with treatment cited many drugs and limited information regarding the need to adhere with medications as prescribed (39). Georgianos and Agarwal, in a study with 200 participants sought to determine the effects of lisinopril and atenolol on aortic stiffness among patients undergoing hemodialysis, found that the difference between drugs in percentage change of aortic pulse wave velocity from baseline to 6 months was analyzed (62). The findings were in contradiction to the assumption made, which specified that atenolol-based treatment induced

more significant reduction in aortic pulse wave velocity relative to lisinopril. Thus the results highlight that atenolol is more effective in improving arterial stiffness, although the differences that exist between these drugs in improving aortic stiffness can be explained by blood pressure lowering effects of medicines (63).

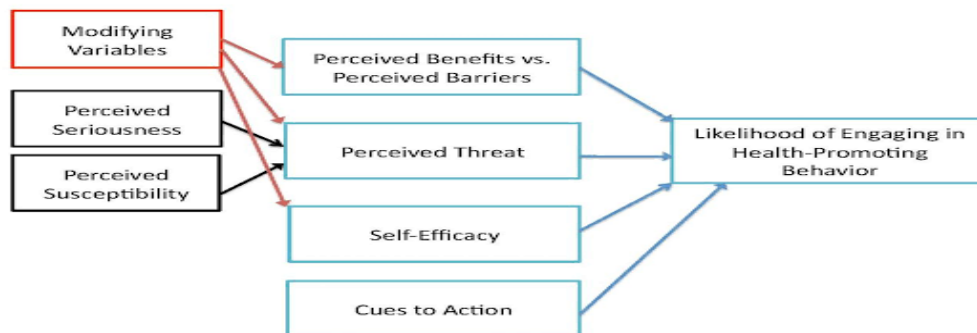
According to a cross-sectional study conducted in Rwanda, nonadherence was associated with low- and middle-income individuals hence present a more specific approach in dealing with these challenges which define a successful commitment to adherence (1). These results are similar to a study conducted in Spain that indicated hemodialysis is expensive, making it difficult for patients for low-income families to adhere with all treatment components as prescribed due to their inability to afford (64). Low and middle-income countries have challenges in providing quality hemodialysis care to patients because of factors beyond their control such as the financial position of patients (25).

2.7. Theoretical framework

The theoretical framework presents an understanding of the link that exists between developed theory and application into practice. The Healthcare model that is effective and helps understand the delivery of quality healthcare and adherence among hemodialysis patients is the Health belief model. This model explains the underlying changes implemented in healthcare to improve patient wellbeing. The Health Belief model was developed in the 1950s with a key purpose of determining the determinants of quality healthcare as well as the underlying challenges (65). The health belief model also helps to comprehend the underlying relationship between an individual and health behavior, which are explained by socio-demographic and personal beliefs. Adherence to hemodialysis requires a strict commitment which presents a strong focus on key elements that define patient health. Adherence to hemodialysis sessions, medication orders, fluid intake, and dietary restriction is essential in improving the quality of healthcare (66). Every patient undergoing hemodialysis understands the need to remain

committed and adhere to the current treatment regimen to have an improved focus on their health development (67). Perceived susceptibility entails the vulnerability of an individual to adhere to the existing conditions. Many factors influence susceptibility in adherence to hemodialysis, which includes level of education, income, and the interaction with health providers (68).

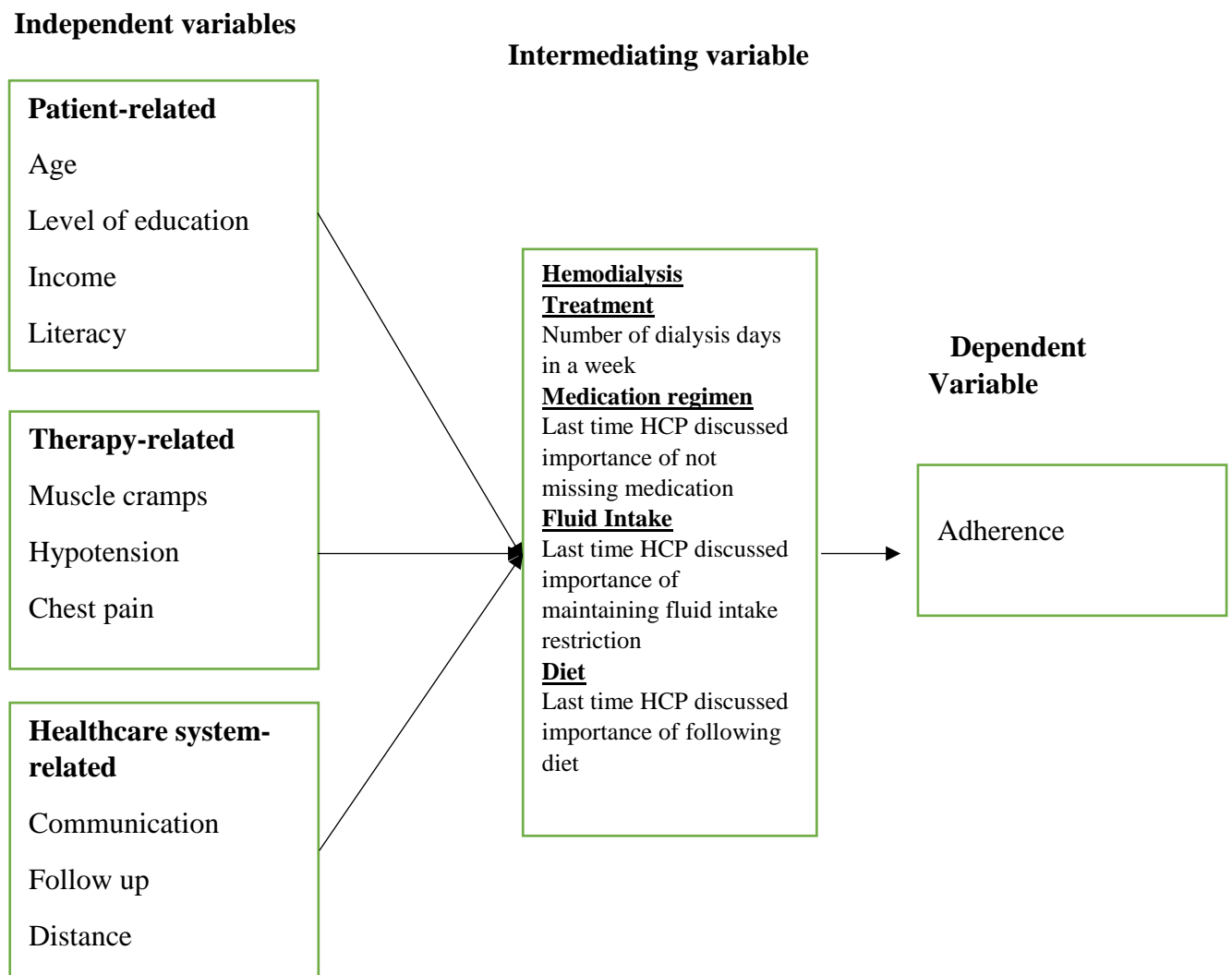
The Health Belief Model



Jones et al. (67).

2.8. Conceptual framework

The independent variables that were included in the study are, patient-related, therapy-related, and healthcare system-related factors. These are categorical variables that are measured on nominal scale. The treatment regimen components form the intervening variable measured on a nominal scale while the dependent variable is adherence and measured on a nominal scale while the outcome variable is overall adherence to components of hemodialysis treatment regimen.



Source author (2020).

Figure 1: Conceptual Framework

2.9. Summary of literature and gaps

Author title	Setting/year	Research design	Findings	gaps
Mukakarangwa et al. Adherence to Hemodialysis and Associated Factors among End Stage Renal Disease Patients at Selected Nephrology Units in Rwanda	India, 2018	A Descriptive Cross-Sectional Study, 150 patients undergoing HD,	The study found that the overall adherence was 30%. Associated factors with non-adherence included lack of knowledge on side effects, poor communication HCPs and Unhappy clinical visits	The study was conducted in a different setting which might provide different outcome
Opiyo et al. Factors associated with adherence to dietary prescription among adult patients with chronic kidney disease on hemodialysis in national referral hospitals in Kenya.	Kenya, 2019	A mixed methods study	Adherence to HD dietary intake was 36.3%. Factors associated with non-adherence were flexibility in the diets and difficulty in following recommendations.	The study followed only a single facet of HD
Kraus et al. Intensive Hemodialysis and Health-Related Quality of Life.	United States, 2016	Case controlled trial, HD or conventional HD in the Daily Trial (n =245), Nocturnal HD in the Nocturnal Trial (n 5 87)	Absence of dialysis machines and longer distance travelled influenced adherence to intensive HD	The study focused on specific group of patients attending hemodialysis (Nocturnal HD)
Bucharles et al. Hypertension in patients on dialysis: diagnosis, mechanisms, and management.	Brazil, 2019	Systematic review	Patients on hemodialysis are influenced by chest pains, hypotension and muscle cramps which limit daily attendance of HD sessions.	The study utilized a systematic review

CHAPTER THREE: METHODOLOGY

3.1.Introduction

This chapter provided a critical review of essential research processes that define a successful emphasis on accurate research development. The major concepts that were explained included research design, study area, target population, sample size, sampling procedure, data collection, research instruments, data analysis, and data analysis methods.

3.2.Research design

This was a descriptive cross-sectional survey. This approach was essential in ensuring that data was collected without manipulation of the research variables. Inferences were made based on a specific understanding of independent and dependent variables. The researcher focused on engaging the respondents at a single point in time. This design helped understand different aspects that influence adherence with treatment regimen among patients undergoing hemodialysis at Kenyatta National Hospital.

3.3.Study area

This study was conducted at Kenyatta National Hospital renal Unit because it is the largest teaching and referral hospital in East and Central Africa, dealing with different conditions. It is located at the Upper Hill area, approximately 3.5KM West from the Central Business District and off Ngong road. The hospital has a bed capacity of more than 1,800 inpatients. KNH has 50 inpatient wards and various outpatient and specialized units and clinics. Renal unit is one of the busiest in the hospital with many out-patients undergoing hemodialysis. It has 22 hemodialysis machines with more than 150 patients on regular hemodialysis. The facility provides services to approximately 40 hemodialysis patients daily.

The study population was the specific group within the study area that is relevant to the present study. The target population was ESRD patients undergoing hemodialysis at Kenyatta National Hospital renal unit.

3.4. Inclusion criteria

Respondents who had ESRD and were on maintenance hemodialysis for at least six months were included in the study.

3.5. Exclusion criteria

Respondents on HD who presented with active mental illness and those who were critically ill on HD were excluded from the study. Individuals with mental illness were excluded because they were unable to consent and their responses were considered not to be honest and representative of true events regarding their HD care because of lack of better judgement. Critically ill were excluded because they were unable to consent and respond to questions.

3.6. Sample size calculation and sampling technique

3.6.1. Sample size calculation

The sample size was calculated based on Fischer's sample size estimation formulae. An assumption was made that, adherence prevalence is equal to a 50% chance. This means that the assumed prevalence of adherence was 50%.

$$n = \frac{Z^2 Pq}{e^2}$$

In this case:

n = Sample size [for population >10,000]

Z = level of confidence according to the standard normal distribution. It was 95%, **Z**-Value at 95% is 1.96.

P = Proportion of the population estimated to have a characteristic of interest (adherence to HD) = 50%

q = Proportion of the population without characteristic of interest (Non-adherence to HD) = 50%

e² = Tolerable margin of error; 5 %

Therefore.

$$n = \frac{1.96^2 0.50 * 0.50}{0.05^2}$$

$$n = \frac{3.8416 * 0.25}{0.0025}$$

$$n = \frac{0.9604}{0.0025}$$

$$n = 384$$

Sample size =384

When the sample size is less than 10,000, as in the case of patients with ESRD.

The formula of Yamane is used as a substitute

N_0 =Desired sample size

N = is the estimated number of ESRD patients on hemodialysis

n =calculated sample size

$$n_0 = n/[1+(n/N)]$$

$$n_0 = 130/[1+(130/384)]$$

$$n_0 = 130/(1+0.3385)$$

$$n_0 = 130/1.3385$$

$$n_0 = 97 \text{ Respondents}$$

The sample size was 97

3.6.2. The sampling technique

Sampling strategy includes the plan that the researcher used to obtain the respondents in the study. Purposive sampling was used in selecting respondents for the study. This strategy focuses on specific characteristics of the population based on the set criteria to attain better outcomes. Also known as judgmental or selective, this sampling method relies on the judgment of the researcher when it comes to selecting cases that are to be studied. The researcher used the inclusion criteria in ensuring that the sample population meets the underlying guidelines. The researcher therefore sampled ESRD patients on hemodialysis from the renal unit.

3.7.Data collection

3.7.1. Data collection tools

The researcher used a standardized questionnaire to help in identifying better outcomes based on the research question. The questionnaire was administered by the researcher and research assistants. The questionnaire comprised of five sections. Section 1 included patient socio-demographic. Section 2 had End Stage Renal Disease Questionnaire (ESRD) to determine the level of adherence among respondents. The ESRD Questionnaire was designed to investigate the four level of adherence to hemodialysis which include attendance to HD, medication, dietary intake and fluid restriction (44). The ESRD-Adherence Questionnaire has 46 questions which are divided in five major sections. The first section contained 5 items including patient medical history, the second section had 14 items that inquired about hemodialysis treatment, the third section included 9 items on medication adherence, the fourth section had 10 items on fluid restrictions while the fifth section had 8 items on dietary intake adherence. The questions included were measured on a Likert scale as well as Yes/No format(2) . In scoring the tool, the findings of each of the respondents where adherence was scored above 80%, while non-adherence was scored below 80% (1).

3.8.Reliability and validity

ESRD questionnaire have been used previously and validated. According to a study conducted in Brazil to validate ESRD questionnaire among patients undergoing hemodialysis. The results found interclass correlation of 0.98 for adherence for the questions and 0.91 for the perception of the questions. The study determined that the study had a Cronbach value of 0.57. The questionnaire was also assessed by experts where it was verified for face and content validity indicating a 0.96 content validity index (19).

3.9.Data Collection procedure

The research team (researcher and 2 trained research assistants) administered the questionnaires. Data collection started at 4.30.am with the first group of patients scheduled for hemodialysis. The research assistants targeted approximately 5 respondents daily for a period of 2 weeks to attain the required sample size of 97 respondents. The researcher with the help of research assistants used approximately 15 minutes to complete the questionnaire. The research assistant introduced themselves to the respondents to create a favorable environment where they could provide accurate results based on their knowledge. The researcher explained the study objectives and expected outcome to the respondents. Every respondent was given a chance to consent willingly without coercion. The data was then collected from those who had consented. The researcher oversaw the whole process and ensured that the research assistants were providing respondents with accurate information through constant review of the completed questionnaires. The data collection process took 2 weeks from April to May 2020.

3.10. Data management

3.10.1. Data Cleaning and Entry

Data was coded, cleaned and entered into SPSS version 25 for analysis.

3.10.2. Data Storage

The consent forms and questionnaires were serialized. The respondents were not required to include their names on the forms. Once they were filled, they were locked up in a safe cupboard and only accessible by researcher. The analyzed data was stored in a password protected laptop. The consent forms and questionnaires will be safely stored for five years after which they will be destroyed.

3.10.3. Data analysis and presentation

Data entry was done using Epidata application and analyzed using SPSS version 25. The findings were considered significant at $p < 0.05$. Data was presented in tables, charts and graphs. All statistical tests were conducted at 5% level of significance ($p < 0.05$).

3.10.3.1. Data analysis plan

Frequencies and percentages were used to analyze categorical data while mean (SD) and median (IQR) were used to analyze continuous data. Among the variables used for this included but were not limited to, Gender, age, level of education, and marital status. To present the outcome of this analysis, tables and graphs were used in report writing.

The prevalence of the treatment regimen was assessed based on Adherence and Non-adherence. The prevalence of adherence to treatment regimen among Hemodialysis patients at Kenyatta National Hospital was determined using the formulae below.

$$\text{Prevalence} = \frac{\text{Number of patients who adhered to Hemodialysis}}{\text{Total sample size (n)}} * 100\%$$

A binomial logistic regression analysis was conducted to identify patient related factors, healthcare system related factors and therapy related factors to predict adherence to hemodialysis treatment regimen among Hemodialysis patients at Kenyatta National Hospital.

3.11. Ethical Consideration

Ethical clearance of the study was obtained by the researcher from the Kenyatta National Hospital/University of Nairobi- Ethics and Research Committee (KNH/ UoN- ERC), Reference number P89/02/2020. Clearance to conduct the study was obtained from KNH department of research. Both verbal and written permission was sought from KNH administration as well as from the renal department in charge. Participation into the study was on voluntary. Respondents were required to give both written and verbal consent. There was no coercion nor negative consequences to the respondents who declined to participate. It was

a non-invasive study. Respondents' confidentiality and privacy was observed by ensuring non-disclosure of personal information.

3.12. Study findings/ dissemination plan

The study findings will be presented to Kenyatta National Hospital administration and renal unit to understand various ways that can be considered in order to increase quality of healthcare among hemodialysis patients. The results will also be presented to University of Nairobi nursing faculty as well as in healthcare conferences since ESRD has become a major healthcare concern across the world. The study report will further be published in a peer reviewed journal for future reference. Thereafter, a hard and soft copy of the results will be available at the University of Nairobi Library and at Kenyatta National Hospital/University of Nairobi- Ethics and Research Committee

CHAPTER FOUR: RESULTS

4.0.Introduction

The researcher sought to determine the prevalence and predictors of adherence to treatment regimen among hemodialysis patients. The objectives that were being investigated included the prevalence of hemodialysis treatment regimen, patient related predictors to adherence, healthcare system related predictors and therapy related predictors of adherence to hemodialysis treatment regimen. Approximately ten respondents were recruited daily. Out of the 107 questionnaires issued, 97 were filled representing a 91% response rate.

4.1.Sociodemographic characteristics of the respondents

Over half (50.5%) of the respondents interviewed were male with 38.1 % (37) aged above 50 years. Education level was also assessed where 42(43.3%) had secondary level education. More than half of the respondents, 36 (57%) had monthly income of more than Ksh.15,000. The sociodemographic characteristics of the respondents are summarized in table 1.

Table 1:Sociodemographic of respondents

		Frequency (n = 97)	Percent (%)
Gender	Male	48	49.5
	Female	49	50.5
Age	20 -29 Years	13	13.4
	30 - 39 Years	24	24.7
	40 - 49 Years	23	23.7
	50 years and above	37	38.1
Education level	Primary level	26	26.8
	Secondary level	42	43.3
	Tertiary level	29	29.9
Occupation	Employed	19	19.6
	Unemployed	49	50.5
	Business	26	26.8
	Farming	3	3.1
	Less than Ksh. 5000	10	15.9
Monthly Income	Ksh 5001 - 15,000	17	27
	Above Ksh. 15,000	36	57.1
Duration on HD since Diagnosis	Less than 12 months	48	49.5
	13 to 24 months	26	26.8
	More than 24 months	23	23.7

HD – Hemodialysis

4.2. Prevalence of hemodialysis adherence

The prevalence of hemodialysis adherence was 39.2%. An analysis of different components of adherence to hemodialysis treatment, medication, fluid intake and dietary restrictions were done, and the results are shown in table 2.

Table 2:Prevalence of hemodialysis adherence

Hemodialysis component	Adherence n (%)	Non-adherence n (%)
Medication	54(55.7%)	43(44.3%)
Fluid intake	38(39.2%)	59(60.8%)
Dietary restriction	34(35.1%)	63 (64.9%)
Treatment	46(47.4%)	51(52.6%)

4.2.1. Adherence to hemodialysis treatment

Adherence to hemodialysis treatment was 47.4% as represented in Table 2. Treatment component of hemodialysis was assessed by asking questions related to the hemodialysis session. The results showed that 97.9% (95) of the respondents received hemodialysis twice weekly, with 92.8% (90) undergoing a 4 hour-dialysis session. In addition, 74.2% (72) asserted that the hemodialysis treatment was not convenient to them. In assessing whether respondents had missed hemodialysis session, 15.5% (15) reported to have missed only 1 session, and 20.6% (20) of the respondents had their hemodialysis shortened by more than 30 minutes. The results are presented in table 3.

Table 3: Adherence measures to hemodialysis Treatment components

		Frequency	Percent
Number of times on dialysis per week	2 days	95	97.9
	3 days	2	2.1
Number of hours per HD treatment per session	Less than 3 hours	2	2.1
	3 hours 30 mins	3	3.1
	4 hours	90	92.8
	More than 4 hours	2	2.1
Convenience of dialysis sessions	Yes	25	25.8
	No	72	74.2
Last time HCP discussed importance of not missing HD treatment	This week	9	9.3
	Last week	17	17.5
	More than a month ago	26	26.8
	When I began HD	38	39.2
	Never	7	7.2
Dialysis importance	Highly important	90	92.8
	Moderately important	6	6.2
	A little important	1	1.0
Difficulty in staying for the entire dialysis treatment	No difficulty	21	21.6
	A little difficulty	24	24.7
	Moderate difficulty	36	37.1
	A lot of difficulty	16	16.5
Treatment sessions missed in the last month	None	78	80.4
	Missed 1 treatment schedule	15	15.5
	Missed 2 or 3 treatment schedule	4	4.1
Average number of minutes dialysis was shortened	Not applicable	45	46.4
	<=10 Mins	5	5.2
	11 - 20 Mins	8	8.2
	21 - 30 Mins	19	19.6
	More than 30 minutes	20	20.6

HD – Hemodialysis, HCP – Health Care Provider

4.2.2. Adherence to Hemodialysis medication

Adherence to hemodialysis medication was found to be 55.7% as shown in Table 2. Hemodialysis medication components were also assessed to find out the last time the respondent spoke to healthcare provider, difficulty in taking medicines and details on missing medication was obtained. The results show that 39.2% (38) talked about their medication with healthcare providers more than one month prior to this visit, 70.1% (68) had difficulty in taking

medications while 40.6% (39) of the respondents asserted that the reason for missing medication is because they forgot as shown in table 4.

Table 4: Adherence measures to hemodialysis medication components

		Frequency (n =97)	Percent (%)
Last time HCP discussed HD medicine	This week	11	11.3
	Last week	17	17.5
	More than a month ago	38	39.2
	When I began HD	26	26.8
	Never	5	5.2
Presence of difficulties in taking medicine	Yes	68	70.1
	No	29	29.9
Often missing medication	None of the time	33	34.0
	Very Seldom	31	32.0
	About half of the time	26	26.8
	Most of the time	6	6.2
	All of the time	1	1.0
Reason for missing Medication	Not applicable	28	28.9
	Forgot to take medicines	39	40.6
	Forgot to order medicines	7	7.3
	Medicine cost	16	16.7
	I was hospitalized	2	2.1
	Side effects	4	4.2

HD – Hemodialysis, HCP – Health Care Provider

4.2.3. Adherence to Hemodialysis fluid restriction

The findings from the study found that adherence to hemodialysis fluid restriction was 39.2% as highlighted in table 2. The components of adherence to fluid restriction among hemodialysis were assessed, and the results are as shown in table 5.

Table 5: Adherence measures to hemodialysis fluid restrictions

		Frequency	Percent
Last HCP discussed fluid restriction	This week	11	11.3
	Last week	16	16.5
	More than a month ago	31	32.0
	When I began HD	34	35.1
	Never	5	5.2
Frequency in following fluid restriction	All of the time	19	19.6
	Most of the time	43	44.3
	About half of the time	30	30.9
	Very seldom	4	4.1
	None of the time	1	1.0
Rating importance of limiting fluid intake	Highly important	78	80.4
	Moderately important	16	16.5
	A little important	2	2.1
	Not important	1	1.0
Difficulty in limiting fluid intake	Yes	79	81.4
	No	18	18.6
Weighed self in the past week	Yes	15	15.5
	No	82	84.5
Importance of self-weighing daily H	Highly important	47	48.5
	Moderately important	12	12.4
	A little important	21	21.6
	Not important	17	17.5

HD – Hemodialysis, HCP – Health Care Provider

4.2.4. Adherence to Dietary restriction

Adherence to dietary restriction was assessed using frequencies and percentages as shown in table 6. The results as shown found that 43.3% (42) of the respondents last talked to their healthcare providers about dietary restrictions when they began hemodialysis, 88.7% (87) indicated that it was highly important to monitor diet, 72.2% (70) stated that it was difficult to follow dietary restrictions as represented in table 6.

Table 6: Adherence to dietary restriction measures

		Frequency (n)	Percent (%)
Last time HCP discussed diet	This week	8	8.2
	Last week	13	13.4
	More than a month ago	33	34.0
	When I began HD	42	43.3
	Never	1	1.0
Importance of watching diet intake	Highly important	86	88.7
	Moderately important	8	8.2
	A little important	2	2.1
	Not important	1	1.0
Difficult to follow dietary recommendation	Yes	70	72.2
	No	27	27.8
Times in following diet recommendation	All of the time	26	26.8
	Most of the time	40	41.2
	About half of the time	29	29.9
	Very Seldom	2	2.1

HD – Hemodialysis, HCP – Health Care Provider

4.3. Patient related predictors of adherence to hemodialysis

In the study, the researcher sought to determine predictors of adherence to hemodialysis treatment regimen among patients undergoing hemodialysis as presented in table 7. To determine patient related predictors of adherence to hemodialysis, gender, age, education, occupation, and income were investigated. A binary logistic regression was conducted. The model was significant ($\chi^2(5) = 5.076, p = 0.004$), yielding a small effect size ($r = 0.077$). Education was the only patient related significant predictor of hemodialysis adherence ($p = 0.048, OR = 0.433, 95\% CI [0.189, 0.991]$). The findings show that respondents who had primary

level as their highest education attainment were 0.4 times less likely to adhere to hemodialysis treatment regimen.

Table 7: Patient related factors model

Omnibus Tests of Model Coefficients		Chi-square	Df	Sig.	Step	-2 Log likelihood	Cox & Snell R Square	Nagelkerke R Square	Hosmer and Lemeshow Test		
Step	Step								Chi-square	df	Sig.
1	Block Model	5.076	5	0.004	1	75.125 ^a	0.077	0.108	7.07	8	0.059
		B	S.E.	Wald	df	Sig.	Odds Ratio	95% C.I.			
								Lower	Upper		
Step 1 ^a	Gender	.102	.657	.024	1	.877	1.107	.305	4.016		
	Age	-.167	.360	.216	1	.642	.846	.418	1.713		
	Education	-.837	.422	3.927	1	.048	.433	.189	.991		
	Occupation	-.226	.347	.425	1	.514	.798	.404	1.574		
	Income	.250	.413	.366	1	.545	1.284	.571	2.884		
	Constant	2.934	2.546	1.328	1	.249	18.798				

a. Variable(s) entered on step 1: Gender, Age, Education, Occupation, Income.

4.4. Health system related predictors of adherence to hemodialysis

The researcher sought to determine health system related predictors of adherence to hemodialysis treatment regimen among patients undergoing hemodialysis as presented in table 8. Distance from dialysis facility, number of sessions a week, number of hemodialysis hours per session and communication between healthcare provider and patients were assessed. A binary logistic regression was conducted. The model was significant ($\chi^2(4) = 11.869, p = 0.018$) yielding a small effect size ($r = 0.115$). Distance from facility ($p < 0.001, OR = 1.39, 95\% CI [0.649, 2.977]$) and communication between healthcare provider and hemodialysis patients ($p = 0.017, OR = 1.659, 95\% CI [1.096, 2.496]$) were significant health system related predictors of adherence to hemodialysis. Hemodialysis patients who lived less than 5km from the facility

were 1.39 times more likely to adhere to hemodialysis compared to those who live in a distance of more than 5km from the facility. Patients who had talked to their health providers about the need to improve their adherence levels in the last visit were 1.659 times more likely to adhere to hemodialysis.

Table 8: Health system related factors model

Omnibus Tests of Model Coefficients				Model Summary			Hosmer and Lemeshow Test			
		Chi-square	Df	Sig.	-2 Log likelihood	Cox & Snell R Square	Nagelkerke R Square	Chi-square	df	Sig.
Step 1	Step	11.869	4	0.018						
	Block	11.869	4	0.018	118.019 ^a	0.115	0.156	1.7	6	0.945
	Model	11.869	4	0.018						
95% C.I.										
		B	S.E.	Wald	df	Sig.	Odds ration	Lower	Upper	
Step 1 ^a	Distance from hospital	.329	.389	.719	1	.000	1.390	.649	2.977	
	Days receive HD treatment in a week	-20.975	28067.468	.000	1	.999	.000	.895	3.688	
	Hours treated in each session	-.580	.731	.630	1	.427	.560	.134	2.344	
	Communication with health provider	.503	.210	5.739	1	.017	1.654	1.096	2.496	
	Constant	41.878	56134.936	.000	1	.999	1540101			

a. Variable(s) entered on step 1: Residence from hospital, Days receive HD treatment, Hours treated in each session, Communication with HCP

4.5. Therapy related predictors of adherence to hemodialysis

The researcher sought to determine therapy related predictors of adherence to hemodialysis treatment regimen among patients undergoing hemodialysis as shown in Table 9. Muscle cramps, chest pain, hypotension and dizziness were investigated. A binary logistic regression statistical test was conducted. The model was significant ($\chi^2(4) = 17.741, p = 0.001$) yielding a small effect size ($r = 0.167$) as shown in Table 11. Hypotension was the only therapy related significant predictor of adherence to hemodialysis ($p < 0.001, OR = 7.216, 95\% CI$

[2.456,21.167] as illustrated in table 12. Hemodialysis patients who did not have hypotension were 7.216 times more likely to adhere to hemodialysis treatment regimen.

Table 9: Therapy related factors model

Omnibus tests of model coefficients				Model summary			Hosmer and Lemeshow Test			
		Chi-square	Df	Sig.	-2 Log likelihood	Cox & Snell R Square	Nagelkerke R Square	Chi-square	df	Sig.
Step 1	Step	17.741	4	0.001	112.147 ^a	0.167	0.227	1.25	7	0.99
	Block	17.741	4	0.001						
	Model	17.741	4	0.001						
							95% C. I			
		B	S.E.	Wald	df	Sig.	Odds ratio	Lower	Upper	
Step 1 ^a	Muscle cramps	.151	.471	.103	1	.748	1.163	.462	2.927	
	Chest pain	-.640	.510	1.578	1	.209	.527	.194	1.431	
	Hypotension	1.975	.549	12.925	1	.000	7.210	2.456	21.167	
	Dizziness	.183	.547	.112	1	.737	1.201	.411	3.510	
	Constant	-2.114	1.070	3.908	1	.048	.121			

a. Variable(s) entered on step 1: Did you have muscle cramps, did you have chest pain cramps, did you have stomach pain, did you have dizziness.

CHAPTER FIVE: DISCUSSION, CONCLUSION AND RECOMMENDATION

5.1. Discussion

The study sought to investigate determinants of adherence to hemodialysis treatment among patients attending renal clinic at Kenyatta National Hospital. The findings revealed that majority of the respondents were unemployed. This could be attributed to the strict schedules associated with in-hospital hemodialysis, which required the respondents to visit the hospital several days in the week, and this could affect any work schedule. These findings compare to those of Mukakarangwa et al. who also reported that majority of the respondents of the respondents were unemployed. Similarly, Opiyo et al. also reported that a high percentage of the respondents were unemployed (6). However, Chan et al. in Malaysia, found that employment and education were not major problems in their study. This could be because sample were drawn from older population of whom majority have insurance covers and therefore, attend dialysis more frequently with ease.

The results from this study found that less than half of the respondents were reported to be adherent, with varying analysis of the individual components which included medication prescription, hemodialysis sessions, fluid intake as well as dietary restrictions. Many of the respondents adhered to dietary restriction and fluid intake. However, adherence to medication had the lowest percentage even though respondents affirmed striving to adhere to hemodialysis to promote their wellbeing. Nonadherence to hemodialysis as observed from this study was mainly associated with the patients' inability to maintain the same commitment across the four-hemodialysis components. These findings compare to those of Chironda and Bhengu (7) who found that more than half of respondents undergoing hemodialysis adhered to hemodialysis medication. Opiyo et al., who assessed dietary adherence, found that less than half of the respondents adhered to dietary prescriptions. Difficulty in following dietary prescriptions was associated with patient income and inability to afford the prescribed diet (6). However, in

conducted in Palestine by Naalweh et al. (19) found that medication adherence was highest among other components (19) In another study Ibrahim et al. found that adherence to hemodialysis prescription was highest (4). This could be attributed to these participants receiving free medications while on treatment for CKD and improved health systems in these countries compared to Kenya.

In assessing patient factors that influence hemodialysis adherence, the analysis of the findings showed that only the level of formal education was a significant predictor of hemodialysis adherence. Patients with a lower level of formal education were 0.4 times less likely to adhere to hemodialysis treatment. Highly educated patients understand the complications associated with non-adherence; hence they are more likely to comply. These findings are comparable to a study conducted by Purnell et al., in a systematic review to determine predictors of non-adherence to hemodialysis treatment, where lower education level was associated with increased non-adherence which was explained by lack of knowledge on the complications associated with non-adherence (11). Similarly, in a systematic review conducted by Vaitkeviciute et al. found out that decreased adherence to hemodialysis was associated with low education level (27). This was because of lack of commitment to all components of hemodialysis. This was comparable to the findings in this study which found that highly educated patients had increased knowledge and awareness of the disease and its implications. Browne and Merighi stressed that patients who had difficulties following hemodialysis guidelines had a low level of education and literacy and did not understand the impact of non-adherence on their health and quality of life (69). This could be explained by inadequate understanding among respondents with lower level of education who are unable to comprehend the process of CKD development and implications on non-adherence.

Health system-related factors were assessed to determine how they predict adherence to hemodialysis. Distance from the hospital and communication strategy employed within the

healthcare institution were crucial predictors of hemodialysis adherence from the findings in this study. Respondents living less than 5 kilometers from the hospital were 1.39 times more likely to adhere to hemodialysis treatment. This compares with a study done in Malaysia by Yusop et al. found that short distance to hemodialysis center was associated with increased patient adherence to hemodialysis. Similarly, Kraus et al. in a study done in United States found that distance covered to receive hemodialysis and the presence of dialysis machines were associated with improved adherence to hemodialysis (47).

Hemodialysis patients who talked with healthcare professionals regarding their hemodialysis treatment were 1.65 times more likely to adhere to hemodialysis treatment. Patients who regularly interact with their healthcare providers are likely to understand their current health situation and know the need to adhere to hemodialysis treatment. These results are comparable to the findings from Matteson and Russell, who found that patients who were less informed about the purpose of their medications see little sense or importance of taking them regularly therefore resulting in non-adherence. Furthermore, Matteson and Russell indicated that, patients who had substantial knowledge about their disease were more likely to adhere to hemodialysis treatment (28). Fram et al. also emphasized that the communication and interaction between patients and the healthcare team presents a platform that promotes hemodialysis adherence. Inadequate engagement during consultation visits, less time for counseling and one-sided communication negatively influence adherence to hemodialysis (51). Therapy-related factors that were investigated included muscle cramps, chest pain, dizziness, and hypotension. The results of this study found that only hypotension was a significant predictor of hemodialysis adherence. Hemodialysis patients who did not have hypotension were 7.2 times more likely to adhere to hemodialysis treatment regimen. Dialysis induced hypotension is a considerable therapy problem that has adverse outcomes for patients on maintenance hemodialysis. It results in lower patient's quality of life as well as increased

mortality. Bucharles et al. found that muscle cramps, chest pains, and hypotension were primary therapy-related predictors of hemodialysis (70). Increased number of patients who develop hypotension is associated with health challenges, limiting patients' commitment to hemodialysis adherence.

5.2.Conclusion

This study shows that adherence to the hemodialysis treatment regimen was generally low, at 39%. All the components of adherence had percentages of less than half apart from Adherence to medication which was the highest at 55.7%. Lower education level, distance from the dialysis facility, communication between patients and healthcare providers, and hypotension were identified as major predictors of adherence. Continuous education and prompt communication are key predictors which provides adequate knowledge of complications associated with adherence. Hemodialysis patients who understand the effects of non-adherence strived to adhere to the four components for better outcome. There is need to focus on implementing favorable policies which will tremendously improve the level of adherence with a specific emphasis on identified predictors.

5.3.Recommendations

To promote education and training sessions for hemodialysis patients on the implications of non-adherence to hemodialysis.

To create awareness for the government on the need to install more dialysis centers to reduce long distances travelled by patients. Similarly, there is need to improve communication between patients and healthcare providers through regular nurse training

To emphasize more on adherence to dietary and fluid intake through following the laid down specific restrictions.

To ensure that there is effective management of intradialytic hypotension through regular assessment of patient blood pressure during dialysis session.

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APPENDICES

Appendix I: Consent form

Title of the study: Predictors and Outcomes of Adherence among Hemodialysis Patients at Kenyatta National Hospital

Researcher: Choge Chemutai Priscah

Introduction to the study: You are asked to participate in the study which is voluntary and will be conducted in the renal department at Kenyatta National Hospital.

The Purpose of the study: To determine the predictors and outcomes of adherence with hemodialysis among Hemodialysis patients at Kenyatta National Hospital.

Time: The questionnaire has simplified multiple choice questions expected to guide the researcher. Completing the questionnaire will take approximately 15 minutes.

Benefit of the study: If the findings indicate cognitive impairment, you will be given priority to get expert management intervention from healthcare service providers within the clinic.

Risks, stress and discomfort: There are no direct foreseen risks in you participating in this study. However, the study will require you to spare at most 10 minutes of your time and fill the questionnaire. If there are any questions you do not want to answer, you are obliged to skip. In addition, you have the right to decline giving information.

Cost and risk of loss of Confidentiality: There will be no direct cost incurred by you neither will you receive any money for participating in this study. Data including questionnaires and file from the study will be kept locked in a cabinet during the study period. Your data will be labelled with your unique identity and your name concealed to maintain confidentiality when taking part in the study. Furthermore, your name will not appear in any report or publication of the research and all your personal information will be handled with a high level of confidentiality.

Voluntary Participation and withdrawal: Remember, your participation is entirely voluntarily. Should you consider changing your mind midway, you have the right to do so and you shall not suffer any consequence whatsoever.

Sharing of results: The results of this study may be presented during scientific and academic forums and may be published in scientific medical journals and academic papers.

Participants consent

I confirm that the researcher has explained fully the nature of the study and the extent of activities which I will be asked to undertake. I confirm that I have had adequate opportunity to evaluate and ask questions about this study. I understand that my participation is voluntary and that I may withdraw at any time during the study, without having to give a reason. I agree to take part in this study by filling in the questionnaire.

Signed by participant..... Date.....

In case of any issues or challenges related to this study, please contact me on **0737294774** or **0796489967** or **Dr. Dorcas Maina on 0724440843** or the Kenyatta University Ethical Review Committee Secretariat on chairman.kuerc@ku.ac.ke, KNH/UON ERC Secretariat on Tel.2726300 ext 44102, uonknherc@uonbi.ac.ke.

Thank you for sparing your precious time dedicated to participating in this study exercise.

Researcher's statement

Interviewer: I certify that the purpose, potential benefits and possible risks associated with participating in this research have been explained to the above participant and the individual has consented to participate.

Signature _____ Date _____

Appendix II: Questionnaire

SECTION A: Patient socio demographics

1. Gender

Male [] Female []

2. Age

Less than 20 years []

21 – 29 years []

30 – 39 years []

40 – 49 years []

Above 50 years []

3. Level of education

Primary []

Secondary []

College []

University []

4. Occupation

Employed []

Not employed []

Business []

Farming []

5. Monthly Income

Ksh.1 – 1000 []

Ksh. 1001 – 5000 []

Ksh 5001 – 10,000 []

Ksh. 10001 – 20,000 []

Ksh 20001 – 30,000 []

Ksh 30001 – 40,000 []

Above 40,000 []

6. How far do you live from the hospital?

Less than 5kms []

Between 10-25kms []

More than 25kms []

SECTION B: End-Stage Renal Disease Adherence Questionnaire (ESRD-AQ)

This survey asks for your opinion about how well you follow your dialysis treatment schedule and about medical recommendations related to medication, diet, and fluid intake. This information will help us to understand if you have difficulty following your dialysis treatment, medication regimen, fluid restriction, and recommended diet. Please answer every question by marking the appropriate box.

I. General Information

1. When did you begin or restart your hemodialysis treatment?

- Beginning Date: MonthYear.....
- (Restarting date if you restarted hemodialysis):
Month Year.....

2. Have you ever had chronic peritoneal dialysis treatment?

- No
- Yes (Please answer below)
I had peritoneal dialysis from Month/year.....to month/year.....

3. Have you had a kidney transplant?

- No
- Yes (Please answer below)
 - I had a kidney transplant once from Month/year.....to month/year.....
 - I had a kidney transplant twice from Month/year.....to month/year.....
and from month/year.....to month/year.....

If you have had transplants more than twice, please write the dates in the spaces above for the last two transplants

4. What type of transportation do you use to go to the dialysis center?

- Personal transportation
- Taxi
- Other (Specify)
- Bus
- Medical transportation van

5. Who accompanies you to the dialysis center?

- Myself
- Spouse (Husband or wife)
- Other (Specify the person)
- parents
- child

Hemodialysis Treatment

6. How many days a week do you receive hemodialysis treatment?

- None or 1 day 2 days
 3 days More than 4 day

7. How many hours are you treated for each hemodialysis session?

- Less than 3 hours 3 hours 30 mins
 4 hours More than 4 hours

8. Is your dialysis schedule convenient for you? (Please choose one best answer that applies to you.)

- Yes
 No, because I am needed to come to the dialysis center too early
 No, because of my work schedule
 No, because I need to come to the dialysis center too late
 No, because it is my mealtime and I get hungry during dialysis treatment
 No, because of (Other)

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

- This week Last week
 More than a month ago When I first began dialysis treatment
 Never Other (Specify): _____

10. How often does a medical professional (your doctor, nurse, dietician, or other medical staff) talk to you about the importance of staying for the entire dialysis time during your dialysis treatment?

- Every dialysis treatment Every week
 When I have abnormal blood or other test results Once a month
 Rarely Never

11. How important do you think it is to follow your dialysis schedule?

- Highly important Moderately important
 A little important Not important

12. Why do you think it is important to follow your dialysis schedule? (Please choose one best answer that applies to you.)

- Because I fully understand that my kidney condition requires dialysis as scheduled
- Because following the dialysis schedule is important to keep my body healthy
- Because medical professional (my doctor, nurse, or dietitian) told me to do so
- Because I had an experience that I was sick and hospitalized after I missed dialysis
- I don't think following the dialysis schedule is very important to me
- Other (Specify

13. How much difficulty have you had staying for your entire dialysis treatment as ordered by your doctor?

- No difficulty
- A little difficulty
- Moderate difficulty
- A lot of difficulty

14. During the **last month**, how many dialysis treatments did you miss completely?

- None (I did not miss any treatment)
- Missed one dialysis treatment
- Missed two or three dialysis treatments
- Missed four or more dialysis treatments

15. What was the main reason you missed your dialysis treatment **last month**?

- Not applicable: I did not miss any treatment
- Transportation problems
- Hemodialysis access (graft, fistula, or catheter) clotted
- I was hospitalized
- I had other things to do (Please explain
- I Forgot

“Didn't want to go” or “Couldn't go” (*Go to the next question: Question #16*)

- Other (Please specify)

16. (Answer this question when you marked the above question as “*Didn't want to go Couldn't go.*”)

Why didn't you want to go to the dialysis center? (Please choose one best answer that applies to you)

- Because dialysis treatment makes me anxious
- Because I had vomiting/diarrhea/cramping
- Because I was sick due to other conditions (Specify the conditions)
- Because I often get hungry during dialysis treatment
- Because I was emotionally depressed

17. During the *last month*, **how many times** have you **shortened** your dialysis time?

- Not applicable: I have not shortened my dialysis time less than twice
- Three to five times Other (Specify frequency)

18. During the *last month*, when your dialysis treatment was shortened, what was the **average number of minutes**?

- Not applicable: I have not shortened my dialysis time Less than 10 mins or 10 mins
- 11 to 20 minutes 21 to 30 minutes
- More than 31 minutes Other (Specify)

(If you need to indicate two or more different time because you shortened dialysis more than once, please use this space):.....

19. What was the main reason you have shortened your dialysis treatment?

- Not applicable: I have not shortened my dialysis time Cramping
- Work schedule/ transportation problems Personal business or emergency
- Low blood pressure Access (graft, fistula, or catheter) clotted

Staff decision (**Why? Please explain:** For example, poor blood flow, clotting dialyzer, machine malfunction, etc.): _____

- Did not feel like staying Other (Please specify)

III. Medication

20. When was the last time a medical professional (your doctor, nurse, dietician or other medical staff) spoke to you about your medicines?

- This week Last week
- More than a month ago When I first began dialysis treatment
- Never Other (Specify): _____

21. How often does a medical professional (your doctor, nurse, dietician or other medical staff) talk to you about the importance of taking medicines as ordered?

- Every dialysis treatment Every week
- When I have abnormal blood or other test results Once a month
- Rarely Never

22. How important do you think it is to take your medicines as scheduled?

- Highly important Moderately important
- A little important Not important

23. Why do you think it is important to take your medicines as scheduled? (Please choose one best answer that applies to you.)

- Because I fully understand that my kidney condition requires to take medicines as scheduled
- Because taking medicines is important to keep my body healthy
- Because medical professional (my doctor, nurse, or dietitian) told me to do so
- Because I had an experience that I was sick and hospitalized after I missed my medicines
- I don't think taking medicine is very important to me
- Other (Specify

24. Have you had any difficulty with taking your medicines?

- Yes
- No

25. How much difficulty have you had with taking your prescribed medicines?

- No difficulty
- A little difficulty
- Moderate difficulty
- A lot of difficulty

26. During the *past week*, **how often** have you missed your prescribed medicines?

- None of the time: I did not miss my medicines
- Very seldom
- About half of the time
- Most of the time
- All of the time

27. What was the main reason for not taking your prescribed medicines this *past week*?

- Not applicable: I did not miss medicines
- Forgot to take medicines
- Forgot to order medicines
- Medicine cost
- I was hospitalized
- Side effects (*Go to question #28*)
- Other: _____

28. (Answer this question when you have marked the above question a "*Side effects.*")

What kind of side effect(s) to the medication(s) did you have? (Please choose one best answer that applies to you.)

- Loss of appetite
- Nausea/vomiting/diarrhea/constipation
- Stomach pain
- Dizziness/Headache
- Itching/skin problems
- Other (Specify symptoms

IV. Fluid

29. When was the last time a medical professional (your doctor, nurse or dietician or other medical staff) spoke to you about your fluid restrictions?

- This week
- More than a month ago
- Never
- Last week
- When I first began dialysis treatment
- Other (Specify): _____

30. How often does a medical professional (your doctor, nurse, dietician or other medical staff) talk to you about the importance of fluid restriction?

- Every dialysis treatment
- When I have abnormal blood or other test results
- Rarely
- Every week
- Once a month
- Never

31. During the *past week*, how often have you followed the **fluid restriction** recommendations?

- All of the time
- About half of the time
- None of the time
- Most of the time
- Very seldom

32. How important do you think it is to limit your fluid intake?

- Highly important
- A little important
- Moderately important
- Not important

33. Why do you think it is important for you to limit your fluid intake? (Please choose one best answer that applies to you.)

- Because I fully understand that my kidney condition requires limiting fluid intake
- Because limiting fluid intake is important to keep my body healthy
- Because medical professional (my doctor, nurse, or dietitian) told me to do so
- Because I got sick and hospitalized after I drank lots of water
- I don't think limiting fluid intake is very important
- Other (Specify)

34. Have you had any difficulty with limiting your fluid intake?

- Yes
- No

35. How much difficulty have you had following your fluid restriction recommendations?

- No difficulty
- Moderate difficulty
- I was unable to follow any recommendations at all
- A little difficulty
- A lot of difficulty

36. If you had difficulty following your fluid restriction recommendations, *what type of difficulty* have you had?

- No difficulty
- I was unable to control fluid intake
- I don't understand how to follow the fluid restriction
- Not interested
- Other: _____

37. During the past week, how many times have you weighed yourself *at home* (outside dialysis center)?

- Once
- twice
- 3 times
- more than 3 times
- None of the times above
- Other

38. How important do you think it is to weigh yourself daily?

- Highly important
- Moderately important
- A little important
- Not important

V. Diet

39. When was last time a medical professional (your doctor, nurse, dietician, or other medical staff) talked to you about your diet?

- This week
- Last week
- More than a month ago
- When I first began dialysis treatment
- Never
- Other (Specify): _____

40. How often does a medical professional (your doctor, nurse, dietician or other medical staff) talk to you about the importance of following a proper diet?

- Every dialysis treatment
- Every week
- When I have abnormal blood or other test results
- Once a month
- Rarely
- Never

41. How important do you think it is to watch the types of food you eat each day?

- Highly important
- Moderately important
- A little important
- Not important

42. Why do you think it is important for you to watch your diet daily? (Please choose one best answer that applies to you.)

- Because I fully understand that my kidney condition requires me to watch my diet
- Because watching diet is important to keep my body healthy
- Because medical professional (my doctor, nurse, or dietitian) told me to do so
- Because I got sick and hospitalized after eating certain food, I was not supposed to
- I don't think watching my diet is very important
- Other (Specify _____)

43. Have you had any difficulty following your dietary recommendations?

- Yes
- No

44. How much difficulty have you had following your dietary recommendations?

- All of the time
- Most of the time
- About half of the time
- Very seldom
- None of the time

45. What type of difficulty have you had keeping your dietary recommendations?

- No difficulty
- I was not willing to control what I want to eat
- I was unable to avoid certain unrecommended foods
- I don't understand what types of diet to follow
- Other (specify) _____

46. During the *past week*, how many times have you followed the diet recommendations?

- All of the time
- Most of the time
- About half of the time
- Very seldom
- None of the time

Appendix III: Work schedule

ACTIVITY	October 2019 – Feb,2020	Feb,2020	March 2020 – April, 2020	May 2020	Jun – 2020	July - 2020	Aug 2020	Sep 2020	Oct 2020	Nov 2020
Proposal development										
Proposal submission										
ERC Approval										
Data collection										
Data analysis										
Report writing and submission										
Dissemination of findings and publishing										

Appendix VI: Budget

Item Description	Unit Cost (Kshs.)	Quantity	Total (Kshs.)
Proposal and questionnaire development			
Files	100.00	6	600.00
Pens	15.00	6	90.00
Papers	500.00	5	2,500.00
Flash Disk	2000.00	3	6,000.00
Internet			15,000.00
Printing	10.00	1000	10,000.00
Photocopying	5.00	1000	5,000.00
Binding	100.00	10	1,000.00
Sub-total			42,190
Data Collection and Analysis			
Research assistant	10,000.00	2	20,000.00
Data entry and cleaning	15,000.00	1	15,000.00
Statistician	30,000.00	1	30,000.00
Sub-total			65,000
Thesis Development			
Printing	10.00	1000	10,000.00
Binding	100.00	30	3,000.00
Photocopying	5.00	1000	5,000.00
Sub-total			18,000
Other Expenses			
Travelling	300.00	30	9,000.00
Internet			15,000
Airtime	100.00	50	5,000.00
Sub-total			29,000
Sum-Total			154,190
Contingencies (15%)			23,129
Grand Total			177,319.00

Appendix V: Letter to Ethics Review Committee

PRISCAH CHEMUTAI CHOGE

P.O BOX 66177-00800

NAIROBI.

17/02/2020

THE RESEARCH AND ETHICS REVIEW
COMMITTEE, KNH/UON

PO BOX 20723- 00202

NAIROBI,

Dear sir/ madam,

RE: REQUEST FOR AUTHORITY TO CONDUCT RESEARCH IN KNH.

I am a postgraduate student at UoN pursuing a Master of Science in Renal Nursing

I am kindly requesting for your authorization to carry out research on the **predictors of Adherence to Treatment Regimen among Hemodialysis Patients at Kenyatta National Hospital** as part of my academic requirements.

Attached is a copy of my research proposal for your perusal, i wish to carry out my study between May and July 2020 at KNH Renal unit. Ethical standards will be observed throughout the study

Thank you ahead of time.


Yours Sincerely,


Choge Chemutai Priscah

073729474

Chemutai.choge@gmail.com

Appendix VI: Approval from KNH-UoN ERC


UNIVERSITY OF NAIROBI
COLLEGE OF HEALTH SCIENCES
P O BOX 19676 Code 00202
Telegrams: varsity
Tel: (254-020) 2726300 Ext 44355


KENYATTA NATIONAL HOSPITAL
P O BOX 20723 Code 00202
Tel: 726300-9
Fax: 725272
Telegrams: MEDSUP, Nairobi


KNH-UON ERC
Email: uonknh_erc@uonbi.ac.ke
Website: <http://www.erc.uonbi.ac.ke>
Facebook: <https://www.facebook.com/uonknh.erc>
Twitter: @UONKNH_ERC https://twitter.com/UONKNH_ERC

24th April 2020

Ref: KNH-ERC/A/131

Priscah Chemutai Choge
Reg. No.H56/ 12134/2018
School of Nursing Sciences
College of Health Sciences
University of Nairobi

Dear Priscah



RESEARCH PROPOSAL – PREDICTORS OF ADHERENCE TO TREATMENT REGIMEN AMONG HEMODIALYSIS PATIENTS AT KENYATTA NATIONAL HOSPITAL (P89/02/2020)

This is to inform you that the KNH- UoN Ethics & Research Committee (KNH- UoN ERC) has reviewed and **approved** your above research proposal. The approval period is 24th April 2020 – 23rd April 2021.

This approval is subject to compliance with the following requirements:

- Only approved documents (informed consents, study instruments, advertising materials etc) will be used.
- All changes (amendments, deviations, violations etc.) are submitted for review and approval by KNH-UoN ERC before implementation.
- Death and life threatening problems and serious adverse events (SAEs) or unexpected adverse events whether related or unrelated to the study must be reported to the KNH-UoN ERC within 72 hours of notification.
- Any changes, anticipated or otherwise that may increase the risks or affect safety or welfare of study participants and others or affect the integrity of the research must be reported to KNH- UoN ERC within 72 hours.
- Clearance for export of biological specimens must be obtained from KNH- UoN ERC for each batch of shipment.
- Submission of a request for renewal of approval at least 60 days prior to expiry of the approval period. (*Attach a comprehensive progress report to support the renewal*).
- Submission of an *executive summary* report within 90 days upon completion of the study. This information will form part of the data base that will be consulted in future when processing related research studies so as to minimize chances of study duplication and/ or plagiarism.

For more details consult the KNH- UoN ERC website <http://www.erc.uonbi.ac.ke>

Protect to discover

Yours sincerely,



PROF. M.L. CHINDIA
SECRETARY, KNH-UoN ERC

- c.c. The Principal, College of Health Sciences, UoN
 The Director, CS, KNH
 The Chairperson, KNH- UoN ERC
 The Assistant Director, Health Information, KNH
 The Director, School of Nursing Sciences, UoN
Supervisors: Dr. Dorcas Maina, School of Nursing Sciences, UoN
 Dr. Mary Kamau, School of Nursing Sciences ,UoN

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Appendix VII: Certification of Registration

KNH/R&P/FORM/01



KENYATTA NATIONAL HOSPITAL
P.O. Box 20723-00202 Nairobi

Tel.: 2726300/2726450/2726565
Research & Programs: Ext. 44705
Fax: 2725272
Email: knhresearch@gmail.com

Study Registration Certificate

1. Name of the Principal Investigator/Researcher
..... Choge Chemutai Priscah
2. Email address: chemutai.choge@gmail.com Tel No. 0731294774
3. Contact person (if different from PI)..... N/A
4. Email address: Tel No.
5. Study Title
..... PREDICTORS OF ADHERENCE TO TREATMENT REGIMEN
AMONG HEMODIALYSIS PATIENTS
6. Department where the study will be conducted RENAL UNIT
- (Please attach copy of Abstract)
7. Endorsed by Research Coordinator of the KNH Department where the study will be conducted.
Name: Nancy Wangide Signature [Signature] Date 12.05.2020
8. Endorsed by KNH Head of Department where study will be conducted.
Name: R. J. Muri Signature [Signature] Date 12.05.20
9. KNH UoN Ethics Research Committee approved study number PS9/02/2020
(Please attach copy of ERC approval)
10. I PRISCAH CHEMUTAI CHOGE commit to submit a report of my study findings to the Department where the study will be conducted and to the Department of Research and Programs.
Signature [Signature] Date 12th MAY 2020
11. Study Registration number (Dept/Number/Year) Renal 181 2020
(To be completed by Research and Programs Department)
12. Research and Program Stamp _____



All studies conducted at Kenyatta National Hospital **must** be registered with the Department of Research and Programs and investigators **must commit** to share results with the hospital.

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Appendix VIII: Plagiarism Report

Turnitin Originality Report

Processed on: 2020년 12월 03일 13:32 PST
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Similarity Index	Similarity by Source
10%	Internet Sources: 7% Publications: 4% Student Papers: 7%

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2% match (student papers from 13-Mar-2020)
Submitted to Kenyatta University on 2020-03-13

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<https://www.ncbi.nlm.nih.gov/pubmed/9669435>

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Submitted to Kenyatta University on 2020-11-11

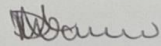
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<https://www.hindawi.com/journals/nrp/2018/4372716/>

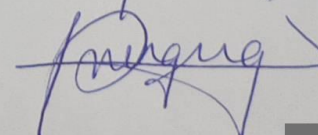
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Submitted to Buckinghamshire Chilterns University College on 2019-04-29

< 1% match (publications)
Michael A. Kraus, Richard J. Fluck, Eric D. Weinhandl, Sheru Kansal, Michael Copland, Paul Komenda, Fredric O. Finkelstein, "Intensive Hemodialysis and Health-Related Quality of Life". American Journal of Kidney Diseases, 2016

< 1% match (Internet from 22-Jul-2020)
http://erepository.uonbi.ac.ke/bitstream/handle/11295/100268/Checkok_Assessment%20of%20Aseptic%20Technique%20isAllowed=y&sequence=1

< 1% match ()
<http://studentsrepo.um.edu.my/7795/1/All.pdf>

Dr. Dorcas Malia

 7.12.2020

Prof Mungai Ngugi


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