

**FACTORS ASSOCIATED WITH NUTRITION THERAPY RELATED CHALLENGES  
AND SUPPORT NEEDS FOR PATIENTS WITH END STAGE KIDNEY DISEASE  
UNDERGOING HEMODIALYSIS AT KENYATTA NATIONAL HOSPITAL**

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THE CONFERMENT FOR THE DEGREE OF MASTER OF SCIENCE IN NURSING  
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## DECLARATION


I, Parkire Mark, declare that this thesis is my original work and it does not include any material previously published or presented in any institution of higher learning, or scientific conferences. The source literature used has been acknowledged and referenced accordingly.

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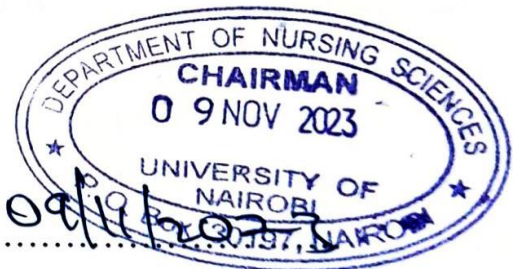
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## **DEDICATION**

I dedicate my dissertation work to our almighty God whose all providence belongs to Him, my family and many friends. My express gratitude to my loving wife, Monica, my daughters Naipei and Sinantey and a special mention to my son Miller and Aunt Susan for their unreserved push and words of encouragement. To my many friends, colleagues and classmates who supported me throughout the process. To my classmate Alice thank you for being my biggest critique and cheerleader and for pushing me whenever I slowed down.

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## **LIST OF ABBREVIATIONS AND ACRONYMS**

**BMI:** Body mass index

**CKD:** Chronic kidney disease

**CRP:** C-reactive protein

**DNT:** Dietetic-nutritional therapy

**ESKD:** End stage kidney disease

**ERC:** Ethics Review Committee

**HD:** Hemodialysis

**ISRNM:** International society of Renal Nutrition and Metabolism

**KNH:** Kenyatta national hospital

**MUAC:** Mid upper arm circumference

**PEW:** Protein Energy Wasting

**QOL:** Quality of life

**RRT:** Renal replacement therapy

**SGA:** Subjective global assessment

**TNF:** Tumor necrotic factor

**WHO:** World health organization

## **DEFINITION OF TERMS**

**Challenges:** Refers to the physiological, financial constraints and disease related difficulties or barriers faced by patients with ESKD on hemodialysis.

**Nutritional challenges:** refers to obstacles, difficulties or inadequacies faced or experienced by ESKD patients on HD that are related to nutrients absorption, co-morbidities and uremic inflammatory processes, financial constraints, food availability and diversity, and cultural factors.

**Patient:** client, individual, or the sick person above 18 years old with ESKD on HD receiving care at KNH.

**Socio-economic related challenges:** refers to routine practices and income related difficulties faced or experienced by patients with ESKD.

**Support needs:** refers to any assistance extended to an ESKD patient on HD to improve their quality of life as well as deter disease-related complications. These may be financial related, individualized healthcare, or dietary guidance.

**Therapy-related challenges:** Refers to any difficulties, or barriers experienced by ESKD on HD patients, which relate to compliance or non-compliance to their medications or treatment regimen.

## ABSTRACT

**Background:** Nutritional challenges in end-stage kidney disease (ESKD) is a common occurrence experienced by patients on hemodialysis. Protein-energy wasting is the depletion of protein/energy stores seen in an advanced stage of Chronic Kidney Disease (CKD), and it is linked to poor clinical results, high morbidity and mortality rates, and higher healthcare expenses. Nutritional guidance for those with CKD/ESKD can be complex, and successful dietary management involves careful planning, periodic nutritional assessments, and dietary compliance and monitoring. The majority of patients with ESKD on dialysis at KNH have been reported to be nutritionally challenged and subsequently referred for nutritional counselling and follow up. **Aim of the study:** To establish nutrition and therapy related challenges and support needs for patients with end-stage kidney disease undergoing hemodialysis at Kenyatta National Hospital.

**Materials and Methods:** This was a descriptive study. Simple random sampling was used to recruit patients into the study. The study was conducted in the Renal Unit of Kenyatta National Hospital where review of patients' medical files, anthropometric examination and interviewing was used to screen ESKD patients undergoing HD at KNH. The collected quantitative data was entered into Epidata and then exported into SPSS version 24 for analysis. The data was analysed both descriptively using frequencies, percentages and using logistic regression.

**Results:** The findings established that 59.1% of the patients were male. The average age was 45.39 (SD±16.03) years, 43.9% had secondary level of education. Patient's awareness on commonly recommended diet showed that majority of patients were taking carbohydrates and vegetables 86.4%, low fluid diet 77.3%, low potassium diet 66.7% and low salt intake diet 63.6%. The findings established that 51.5% of the patients were having difficulties in following the recommended diet. Common challenges limiting patients from following the recommended diet include financial challenges 51.5%, food unavailability 47%, personal food preferences 37.9% and feeding complications 27.3%. On investigating therapy related challenges, 31.8% of the patients affirmed to having missed their medication with 66.7% citing high cost of medication. Assessment of bio-clinical nutritional related factors established that 42.4% of the patients had malnutrition. The results also showed that 87.9% of the patients were anaemic. In investigating the body mass index, 83.3% of the patients had normal weight. The findings also established that being a male patient (OR =3.33, 95% CI: 1.15 – 9.68, p =0.042), having formal employment (OR =0.26, 95% CI: 0.07 – 0.97, p=0.045) and being single (OR =3.51, 95%CI: 1.56 – 5.88, p<0.001) were associated with malnutrition.

**Conclusion and recommendations:** Poor adherence to recommended diet and high cost of medication were major factors contributing to nutritional challenges. Therefore, there is need for healthcare providers to conduct regular nutrition counselling to patients and their caregivers and the government should also consider expanding NHIF coverage to incorporate medication as well as consultation.

## **CHAPTER ONE: INTRODUCTION**

### **1.0.Introduction**

This chapter presents background information, statement of the problem, justification of the study research questions, study objectives, research hypothesis, the conceptual framework, the theoretical model of the study (biological influences on health, psychological influences on health, socio-economic influences related to kidney disease).

### **1.2. Background**

Chronic kidney disease (CKD) has become a global epidemic, affecting between 5% and 15% of the population. End-stage kidney disease (ESKD) is causing an increase in the number of individuals who need hemodialysis. A variety of alterations have been related to nutritional deficiencies, including metabolic acidosis, changes in gut flora, and hormone dysregulation, all of which have been linked to the progression of renal disease and an increase in morbidity and mortality according to a cross-sectional study done (Zha and Qian, 2017).

According to Chan et al, 2021, Protein-energy wasting (PEW) affects 28%-54% of patients who need maintenance dialysis. Importantly, the prevalence of PEW rises with dialysis vintage, contributing significantly to increased morbidity and mortality, as well as a decrease in quality of life (Chan et al., 2021). Globally, 23–76% (WHO) of hemodialysis patients are reported to be malnourished. A multicenter cross-sectional study done in Iran on 233 HD patients, Malnutrition in varying degrees was detected in 29.7% of hemodialysis patients, according to this study (18.8% mild malnutrition and 10.9% severe malnutrition), further corroborating the earlier studies (Ghorbani et al., 2020).

Malnutrition is a deficiency in calories, protein, and micronutrients that causes growth and development problems. In hemodialysis patients, protein-energy wasting is a common cause of malnutrition and in CKD, it is estimated to affect 9.1% of the world's CKD population and is linked to an increased risk of cardiovascular as well as mortality, and acute renal damage, and disease progression, among other co-morbidities. PEW and protein-energy malnutrition (PEM) are common concerns in patients on maintenance hemodialysis with end-stage kidney disease and are closely linked to morbidity and mortality risks (Halle et al., 2014).

In sub-Saharan Africa, Nigeria, malnutrition was found to be prevalent in 46.7 percent of hemodialysis CKD patients in this study, which was much higher than the 25.7 percent seen in previous research (Oluseyi and Enajite, 2016). In Cameroon, a study identified a prevalence of malnutrition in ESKD patients defined by a low BMI of 29%, which was similar to one found in Morocco, but far higher than most other recent studies done in other settings (Halle et al., 2014).

According to (Palafox-Serdán et al., 2020), dialysis-related malnutrition is caused by a number of factors, including uremic syndrome, comorbidities, and dialysis treatment as a therapy, of importance is that inadequate dialysis dosage or excessive removal are also a concern (Palafox-Serdán et al., 2020). In all stages of chronic renal disease, poor nutritional status is frequent, although it gets increasingly common as the disease advances. Patients on chronic hemodialysis experience a faster loss of skeletal muscle mass and strength, which is linked to a greater death rate and a lower quality of life. Low dietary protein intake, skeletal muscle tissue anabolic resistance, sedentary behavior, and amino acid loss during hemodialysis all affect muscle maintenance in chronic hemodialysis patients. Patients with end-stage renal disease typically have nutritional inadequacy and PEW, according to a cross-sectional recent study in Tanzania. PEW affects 30%–75% of patients and is linked to poor clinical results, low quality of life, and higher mortality rates (Gityamwi et al., 2021).

Despite the existence of dietary guidelines, dialysis patients have lower nutritional intakes than the general population, which continues to decrease as their condition advances. The accumulation of uremic toxins is usually blamed for weak appetite or anorexia. Numerous dietary limits, such as those for salt, potassium, and phosphorus, as well as for hydration, worsen inadequate intakes. Financial status and other socioeconomic factors may have an impact on hemodialysis patients' dietary choices and adequacy. Due to a lack of funds, physical strength, and time, patients who live alone or on a low income may have difficulty cooking proper meals and sticking to the renal diet (Gityamwi et al., 2021).

Without a doubt, following the dietary guidelines increases the chances of better outcomes and reduces the need for undesired treatments like increasing medication, dialysis time, and ultrafiltration prescription. Poor adherence to dietary guidelines has been established in various

studies in the context of CKD, as it has been in other complex chronic conditions (Pereira et al., 2021).

### **1.3. Statement of Problem**

Malnutrition is a significant concern in hemodialysis patients with end-stage kidney disease (ESKD), which increases morbidity and mortality (Espahbodi et al., 2014). It can be caused by a variety of factors, such as insufficient nutritional intake, increased losses, or increased protein catabolism. (Sabatino et al., 2021). Each month on average 140 patients undergo hemodialysis at KNH, and it is estimated that 88 of them have nutritional challenges and are enrolled for nutritional counseling and follow-up (KNH Renal unit register). Diet is the most important easily modifiable intervention that can be implemented with a significant nutritional effect on an ESKD patient with the potential of improving general wellbeing of a hemodialysis patient (Locatelli et al., 2020). However, of concern is the number of patients at KNH coming for HD sessions who clinically appear wasted with deranged biochemical values in spite of the available in-house nutritional counseling and follow up; this end up affecting their general health outcome. Therefore, this study seeks to identify the possible nutritional challenges faced by these patients and recommend support needs aimed at improving their nutritional status.

### **1.4. Justification of the study**

Patients undergoing HD for end stage kidney disease are faced with a myriad of nutritional challenges mainly from the disease process and medical interventions, which may be associated with certain nutritional side effects. Significant focus has been placed on end stage kidney disease patients on hemodialysis and despite these efforts, majority of patients on HD still experience malnutrition as evidenced by deranged biochemical values as well as general mass wasting elicited from patient's physical assessment routinely done prior to dialysis. This study intends to explore the nutritional challenges and support needs for patients who are experiencing undernutrition by identifying these challenges and support needs aimed at improving their nutritional health and quality of life as they continue with renal replacement therapy. The findings of this study are essential in developing strategies that are essential in managing the quality of nutritional care provided to renal disease patients at Kenyatta National Hospital.



### **1.5. Research question**

- i. What factors are associated with nutrition related challenges among patients with end stage kidney disease undergoing hemodialysis?
- ii. What factors are associated with therapy related challenges among patients with end stage kidney disease undergoing hemodialysis?
- iii. What is the association between bio-socio-economic factors and nutritional/therapy related challenges.

### **1.6. Broad objective**

To establish the factors associated with nutrition therapy related challenges and support needs among patients with end-stage kidney disease undergoing hemodialysis at Kenyatta National Hospital.

#### **1.6.1. Specific objectives**

- i. Assess the bio-clinical factors associated with nutrition related challenges among patients with end-stage kidney disease undergoing hemodialysis.
- ii. Evaluate the factors associated with therapy related challenges among patients with ESKD undergoing hemodialysis.
- iii. Establish the association between the bio-socio-economic factors and nutritional/therapy related challenges among patients with ESKD.
- iv. Identify nutrition therapy related support needs for patients with ESKD undergoing HD.

### **1.7. Research hypothesis**

**Null hypothesis:** there is no relationship between socio-economic and bio-clinical nutritional-related factors regarding nutritional challenges faced by ESKD patients undergoing HD at KNH.

**Alternative hypothesis:** there is a relationship between socio-demographics and bio-clinical nutritional-related factors regarding nutritional challenges faced by ESKD patients undergoing HD at KNH.

## **2.0. CHAPTER TWO: LITERATURE REVIEW**

### **2.1. Introduction**

The study objectives guide the review of literature in this chapter. The review begins with an overview of socio-economic related challenges, bio-clinical nutrition related challenges, medical therapy related challenges, association between socio-demographic and bio-clinical nutritional challenges in end stage kidney disease patients. The theoretical model of the study as well as the conceptual framework are also presented in this chapter. The chapter then provides a highlight of the research gaps in the literature reviewed.

### **2.2. Socio-economic factors related challenges and support needs**

End-stage kidney disease is the last stage of chronic kidney disease characterized by irreversible total loss of kidney function. Hemodialysis is an artificial process by which the toxic waste products of food and excess water are removed from the body. (Badrasawi et al., 2021).

Dialysis therapy globally puts patients with renal failure in a financial constraint. Starting dialysis frequently leads to a drop in income while out-of-pocket costs, such as transportation to treatment and medication, rise. Financial dependency leads to a loss of self-esteem and despair, as well as a lack of self-efficacy in terms of health management. Dietary consumption is inadequate because of restricted financial resources. Affordability thus hinders access to hemodialysis and at long run HD dosing and timing is affected. For instance, a descriptive cross-sectional study conducted in Canada showed that there is a significant impact to income from out-of-pocket costs related to dialysis treatment are a significant burden (Sass et al., 2020).

Prior to starting HD treatment, 51% of 231 Chinese working-age HD patients were employed, however, this dropped to 11% after starting treatment. The dialysis regimen and post-dialysis exhaustion were cited as important factors for unemployment by these patients. Patients with HD must stick to a three-session per week dialysis plan, which can take up to 18 hours each week. HD had a 31 percent employment rate, according to data from the Finnish Registry for Kidney Diseases (n = 2637) (Sahathevan et al., 2020).

In a study carried out in Nepal, it was observed that, taste, budgetary restrictions, individual preferences, social status, education level, societal expectations, health, and relationships, as well as source of food trust and convenience, are all known to influence diet-related decisions. Dietary habits and tastes are highly personal (Lamichhane et al., 2018).

A qualitative study done in Ethiopia demonstrated that majority of patients with ESKD experienced difficulty accessing food because of loss of income-generating activities, cost of hemodialysis as well as food and fluid restrictions posed a burden, preventing participants from taking advantage of an available resource. As a result, a sense of reliance on others has been linked to the development of mental illness and nutritional challenge given the inability to afford food to feed themselves (Tadesse et al., 2021).

(Anees et al., 2018) in a systematic review, Pakistan, CKD frequently results in occupational dysfunction and financial insecurity, with a demonstrated detrimental influence on several elements of patients and caregivers' life. The study showed that patients with a higher socioeconomic status have access to therapeutic options for kidney patients such as sufficient dialysis, which reduces morbidity and mortality. These patients can also afford drugs and nutritious meals that help them maintain their hemoglobin levels, regulate renal osteodystrophy, and maintain a healthy metabolic profile.

According to (Kovesdy, KalantarZadeh, et al., 2012), potassium-restricted diets, which may lead to a reduction in fruit and vegetable consumption, could be one of the reasons for inadequate intake of these nutrients. Studies have also shown that hemodialysis patients' nutritional health is challenging due to a lack of dietary diversity, which is influenced by changing food preferences and appetite.

A study revealed non-adherence as a nutritional challenge faced by ESKD patients on HD as reported by (Ozen et al., 2019), in this study, high school graduates were shown to be 4.3 times more likely than illiterate respondents to disregard nutritional and fluid limitations. According to some studies, education has an impact on adherence, but understanding treatment instructions and the value of therapy is probably more significant. Higher levels of knowledge may not always lead to increased patient adherence, according to this study because of professional/social duties and position, highly educated patients may find it challenging to adhere (Ozen et al., 2019).

A study done in Tanzania, demonstrated the critical need that patients with renal failure receive individualized nutrition education that takes into account their nutritional needs, personal traits, and illness condition and be a socio-economically sensitive guideline. Practical recommendations promoting a variety of local and seasonal fruits and vegetables with suitable potassium levels could aid in increasing their consumption. This research has shown that clinical guidelines should be

translated to practical suggestions for patients who are aware of local food availability and population resources to support the nutritional needs of the ESKD patients (Gityamwi et al., 2021).

(Joukar et al., 2019), in a cross-sectional study found that malnutrition is more common in women, the elderly, the unemployed, the uneducated, and those who live in large families. This could be due to the patients' higher psychological and financial stress levels, as well as a lack of supportive activities. He further reports that male gender and younger age were found to be predictive indicators of malnutrition. The level of education was reported in this study to help people improve their social and economic position as well as their access to health care, lower their risk of malnutrition as well as help improves their ability to deal with physical and mental issues, which can lead to better nutrition.

In the US, (Johns et al., 2014), inequalities in health was shown to be represented by area-based socioeconomic status metrics, according to the study. Low area-based socioeconomic status has been associated to poor health outcomes and worse dialysis outcomes, even in the absence of individual-level data on socioeconomic status.

### **2.3. Bio-clinical nutritional related challenges and support needs**

Bio-clinical related challenges refer to a physiological problem or difficulty that affects the nutritional wellbeing of an ESKD patient on HD, which may be related to age, gender, inflammatory processes or comorbidity. Chronic kidney disease is the slow and progressive deterioration of kidney while dialysis is an artificial process by which the toxic waste products of food and excess water are removed from the body (Zha & Qian, 2017).

Patients with ESKD on HD face a myriad of other health related medical conditions, which significantly either contribute to nutritional losses through decreased intake or increased tissue breakdown eventually affecting their nutritional status.

Heart failure (left-ventricular failure) and CKD-mineral bone damage have been linked to nutritional status. Malabsorption as a result of intestinal edema, decreased appetite as a consequence of cytokine production, and challenges with oral intake and meal preparation as a response of lethargy and respiratory issues are all linked (Sahathevan et al., 2020). In a cross-sectional multivariate study conducted in Palestine, it was observed that the patient's age, whether they lived alone or with family, the vintage of their dialysis, the presence of chronic co-morbid disorders, and the total number of chronic drugs were all relevant factors in malnutrition. The study also revealed that malnutrition was much higher among those aged > 60 years (Omari et al., 2019).

A cross-sectional study done in Asia- South Korea showed that in hemodialysis patients, reduced appetite is the most significant contributor to poor intake. Anorexia is a common symptom of chronic kidney failure that develops as the disease progresses. Almost 70% of the participants in this study said they had lost their appetite. In patients on maintenance hemodialysis, a lack of appetite was linked to malnutrition, inflammation, and a poor health outcome (Kim et al., 2015).

Another aspect that contributes to low energy intake is the difficulty of maintaining a healthy diet. Patients undergoing hemodialysis should adhere to the diet therapy given, low-sodium, low-potassium, and low-phosphorus diets are common. These diets can make it difficult for patients to choose foods and, as a result, lead them to lose appetite. Only 30-40% of hemodialysis patients followed their specified food therapy, according to (Kim et al., 2015). Which included salt, potassium, and fluid limitations. More than 70% of hemodialysis participants in this study said they had trouble following the dietary recommendations. It is possible that challenge adhering to diet therapy is one of the most significant impediments to hemodialysis patients getting sufficient nutrition.

Therefore, it is important to control the modifiable factors that influence dietary insufficiency in hemodialysis patients and it should be a priority for health care practitioners to check nutrient adequacy, and the effectiveness of prescribed diet therapy regularly through diet counseling and periodic repetition of earlier instructions a measure to counter the nutritional challenges as demonstrated by (Kim et al., 2015).

(Kim et al., 2015), contents that, to achieve the particular nutritional requirements, each client receiving maintenance hemodialysis therapy should first have their dietary energy consumption carefully evaluated. Second, hemodialysis patients are encouraged to increase their dietary energy intake through proper individualized diet education and monitoring in order to achieve overall nutrient adequacy. Third, because necessary nutrients are not found in a single food but rather in a number of foods, careful attention to the consumption of a variety of food sources should be promoted through targeted nutritional education to ensure nutrient balance. Furthermore, hemodialysis patients with comorbidities like diabetes may have a difficult time sticking to a restricted diet and selecting dietary choices. Patients who are elderly may also have problems. All this should form part of a strong basis of support needs for patients with ESKD on HD with nutritional challenges.

(Ozen et al., 2019), reports in a cross-sectional study done in Turkey that when male patients receive HD therapy for 4 hours a day, 3 days a week and experience exhaustion and drowsiness after dialysis, they may perceive they are unable to do their household tasks. This lack of autonomy may lead males to lose sight of their duty as "man of the home," and majority end up disregarding nutritional therapy related instructions given to them as part of the renal care.

(Avesani et al., 2021) in a narrative review implores that inadequate oral intake of energy and protein due to anorexia, residual uremic toxins, inflammation, metabolic acidosis, and inter-current diseases poses a nutritional challenge to ESKD patients on HD. Moreover, these factors are linked to the advancement of PEW in their own right. In addition, dietary restrictions and comorbidities that impact gastrointestinal function can result in insufficient calorie and protein intake.

(Orozco-González et al., 2022), in a cross-sectional study observed that malnutrition is common in people with ESKD on HD, ranging from 24% to 37%. Attributable to pica, which is increased in people with CKD, as some of these issues, are currently present due to renal dysfunction. They allude that dialysis patient who exhibit pica behaviors might consume a wide range of chemicals that are linked to changes in their metabolic functions.

In the (Orozco-González et al., 2019), study pica consequences include toxicity of consumed substances, gastrointestinal impediments, and calorie intake variations, all of which are essential in people with CKD who are on HD. In patients with CKD on HD, pica may have a greater impact on the effects of kidney impairment, such as anemia, electrolyte and nutritional imbalances, and malnutrition. The importance of considering pica as a nutritional problem is to see if it is linked to the patient's nutritional condition when on dialysis. Pica, for instance, excessive ice consumption, is a condition that can result in insufficient fluid intake, a loss of appetite, and, as a result, poor nutritional status. Excessive ice consumption might result in the patient consuming up to 750 mL of water per day, leading to inter-dialytic weight gain, higher cardiovascular morbidity and mortality, as well as increased blood pressure and volume overload.

(Fitzgerald et al., 2019), in a cross-sectional study noted that altered taste sensation, affects 35% of people with end-stage kidney disease. Reduced taste acuity, difficulty detecting salty flavors, and reports that certain meals taste "metallic-like" are some of the most prevalent taste abnormalities. Taste sensation abnormalities may reduce the palatability of food and consequently reduce adherence to renal diets. Changes in vascular and salivary solute concentrations maybe

caused by ion imbalances, uremic toxins, and this eventually affect feeding pattern of ESKD patients.

#### **2.4. Medical therapy related challenges and support needs**

Malnutrition in HD patients is caused by the early progressive nature of CKD, the adoption of a low protein diet to reduce CKD progression, and the prolonged time of potentially lifesaving HD treatment for patients reaching ESKD. Malnutrition is triggered by HD-induced nutritional losses, multiple dialyzer reuse, HD-induced inflammation, uremia and metabolic acidosis correction efficacy, and dialysis adequacy, frequency, and duration (Sahathevan et al., 2020).

Inflammation, starvation, and nutritional loss during each HD session can all contribute to skeletal muscle wasting in chronic HD patients. Amino acids are one of the nutrients that are lost in the dialysate during HD and are crucial for muscle maintenance. In chronic HD patients, both muscle protein generation and breakdown are increased. The loss of amino acids during HD produces a decrease in plasma amino acid concentrations in fasting patients, according to studies. Furthermore, in fasting patients, HD causes a negative net forearm amino acids balance, which could indicate muscle proteolysis (Hendriks et al., 2020).

In a cross sectional study done at the Netherlands on a sample size of 10 patients with a urine output below 100mls/hr all on HD 3 times per week with high-flux membranes for at least 6months established that during HD, plasma concentrations of most amino acids decreased, resulting in a 20% reduction in plasma tryptophan amino acids concentrations. The study concluded that, during a single HD session, 8–15g of macromolecules are taken from the system, while HD, patients' 0.8-1g of protein per day is the average daily consumption did not entirely compensate for this loss, causing in a considerable drop in circulating plasma amino acid concentrations, according to the current study. This observed amino acid extraction contributes considerably to protein malnutrition in CKD patients, emphasizing the importance of developing effective and individualized dietary interventions to improve nutritional status in individuals undergoing HD (Hendriks et al., 2020).

A significant number of these solutes, which have direct, causes the uremic syndrome or indirect biological actions that can interfere with cell and organ function. Hemodialysis, which is now the most effective treatment for ESKD, only restores kidney function to a limited extent since it is largely effective for removing small water-soluble compounds that circulate without significant protein binding. The larger intermediate molecules are significantly more difficult to eliminate,

and their persistence has been associated to a number of uremia clinical features. They are also suggested to be important in the adverse effects of HD (Faria and de Pinho, 2021).

(Mafra et al., 2019), documented the effects of uremic toxins and how it disrupts the biochemical environment in severe CKD, causing disruptions in the gut microbiota and intestinal barrier. In addition to uremia, the biochemical environment in the uremic intestines is altered by the accumulation of metabolites such as uric acid, poor fiber intake and multi-drug regimens, all of which contribute to inflammation of the gut and a consequent nutrient malabsorption and affect normal gut environment posing a serious nutritional challenge in ESKD patients.

(Mafra et al., 2019), advocates for rigorous nutritional therapy and nutritional supplementation coupled with probiotics which help in maintaining the integrity of the intestinal and modulation of immune response barrier for hemodialysis patients while they are in the hospital. This avoids missing a valuable opportunity to aggressively reverse malnutrition and reduce one of the most serious concerns for hemodialysis patients' mortality; this act as a support need to counter the nutritional challenge common in these vulnerable group.

(Hoshino, 2021), in an observational study documents physical activity has been linked to decreased mortality in both CKD and dialysis. Patients who exercised more than once a week had better outcomes in all countries, regardless of their physical or social circumstances. In numerous observational studies. Strength training has been proven to increase muscle strength, improve skeletal muscle hypertrophy, and enhance health-related quality of life in patients with CKD and ESKD. Psychosocial assistance is limited, and the effects of ESKD and medications on family life are frequently overlooked or ignored. To address these constraints, individual-based psycho educational therapies have become an increasingly important component of effective therapy for a variety of chronic diseases, including ESKD, in recent years. These interventions provide health information and psychosocial support to families in order to encourage coping and adaptation, as well as concrete guidance for crisis management, issue solving, and stress reduction. The educational, relational, and emotional needs of the individual are prioritized in a family-oriented approach. Recent meta-analytic findings on the effectiveness of family-oriented psychosocial therapies across different adult chronic diseases revealed that they were more successful than patient-focused interventions or conventional medical attention for the physical and mental health outcomes of patients and family members (Sousa et al., 2021).



## **2.5 The correlation of nutritional biomarkers and socio-demographic factors**

Age, gender, and the general health of a patient to include weight and presence or absence of other comorbidities are thought to affect the health outcomes of a patient. Some conditions are more common in elderly patients than younger patients are and some diseases are more common in females than males and vice versa.

A cross-sectional study was conducted in Selangor, Malaysia, 112 HD senior individuals were recruited, with 62 men (55.4%) and 50 females (44.6%). The patients completed interview-based questionnaires on socio-demographic factors and nutritional risk. The majority of the patients (50.9%) were of normal weight, while 27.7% and 9.8% were overweight and obese, respectively. The majority of the patients (85.7%) recorded albumin levels that were within the reference ranges. According to the findings, 45.5 percent of the patients were at intermediate risk of malnutrition (Shahrin et al., 2019).

In a cross-sectional study done in Palestine sample size 152 cases, with 73 females and 79 males, it was observed that the initiation of HD is linked to a decrease in functional status in the elderly, which can lead to a vicious cycle of reduced food consumption due to decreased physical function and loss of appetite, resulting in patients' nutritional status deteriorating. Nearly half of hemodialysis patients (45.4 percent) were found to be at high risk of malnutrition in this study. Malnutrition was found to be less common in this group than it had been in previous studies in Egypt (67%) and Baghdad (63.5%), (Shahrin et al., 2019).

The prevalence of malnutrition in this sample, on the other hand, was slightly greater than that reported in a Riyadh research. These disparities in malnutrition frequency can be linked to the Middle East's various diet regimes and environmental diversity. It was also observed that sociodemographic characteristics (HD patients' gender, age, and educational level) were not significant predictors of malnutrition in this multivariate study. Furthermore, the study's findings revealed that patients who were unemployed had a much significant risk of malnutrition than those who were employed. An earlier Palestinian research study by (Rezeq et al., 2018). (Badrasawi et al., 2021) supported this conclusion.

Another study undertaken in a rural hospital in Riyadh, Saudia showed the prevalence of malnutrition among young (55 years old), poor (3,000 riyals a month), unemployed, and illiterate. The age of these hemodialysis patients reflects the young (55 years or younger) demographic of Saudi Arabian hemodialysis patients. Hypertension (29.9%) and diabetes/hypertension (30.6%)

were found to be more common in Saudi HD patients in 2010 than diabetes (12 percent). The majority of patients in this study were hypertensive and diabetic/hypertensive, with a lesser proportion diabetic, reflecting the prevalence of these disorders in the Saudi HD patient's population as a whole. Because many of these HD patients in Jeddah had concomitant disorders, their malnutrition would be aggravated, as HD patients with comorbid diseases are more likely to be malnourished. According to this study, HD patients had some form of malnutrition according to their SGA score, more than half of the patients (54.3%) had some form of malnutrition, either mildly to moderately malnourished (48.7%) or severely malnourished (5.6 percent) (Alharbi and Enrione, 2012).

In the same study, sociodemographic characteristics were compared. When compared to men, 66.4 percent of women were malnourished (46.3 percent.). Women had a lower BMI, greater skin folds, and a smaller MUAC as compared to men. Females also acquired less weight between dialysis than males. Females and males did not have significantly different levels of albumin. Malnutrition was found in a substantially larger percentage of patients aged 55 years (66.3%) than in those aged 55 years (48.9 percent.). When compared to younger patients (55 years), older patients (55 years) gained less interdialytic weight. Nutritional deficiency in HD patients differs by gender. Females were malnourished at a higher rate than males in this study. This could be attributable to the socioeconomic status and lifestyle choices of this particular patient sample, which was not chosen at random. Despite the fact that there were younger HD patients, a higher percentage of elderly HD patients were malnourished. According to studies, elderly HD patients (55 years) are more likely to be malnourished (Alharbi and Enrione, 2012).

## **2.6 Gaps in literature review**

The above reviewed empirical studies point to a consensus that ESKD patients on HD do experience a wide range of socio-economic nutritional related, therapy related, bio-clinical related challenges and they do have their special support needs. It is also evident from the empirical literature that nutrition among HD patients remains sub-optimal in most of the settings. Further, from the many studies reviewed from different regions from different backgrounds, across the world, HD patients remain nutritionally challenged because of different reasons. It is therefore evident that despite the efforts geared towards improving the nutritional status of HD patients, the problem is present and cannot be ignored. Consequently, this research study seeks to unveil results on the nutritional challenges and support needs among HD patients at Kenyatta National Hospital.

## **2.7 Theoretical Model of the study**

The research employed the bio-psychosocial model of health and illness, which asserts that relationships that cause, expression, and outcome of wellness and disease are regulated by a balance of biological, psychological, and social factors. (Engel et al., 1977). If any one component is insufficient, the bio-psychosocial paradigm asserts that the interaction of people's biological makeup (genetics), mental state and behavior (psychology), and social and cultural milieu influences the trajectory of their health-related outcomes. According to the paradigm, the body, mind, and environment all have an impact on each other, and none of these elements are sufficient in and of itself to cause health or illness. The interplay of the three components, biological, psychological, and social, result in a positive health outcome; thus, the purpose of this model is to build a patient-centered care arrangement that is feasible in order to achieve the best possible health outcomes.

### **2.7.1 Biological Influences on Health**

A person's genetic makeup and history of metabolic derangement e.g. uremic toxins that induce disease are examples of biological implications. Many illnesses, such as end-stage kidney disease, are connected to inherited genetic vulnerabilities. For example, having a family history of kidney disease poses the risk. Although genetics plays a significant part in kidney disease, it is also known that other factors, such as non-biological elements in the environment, influence genetic risk.

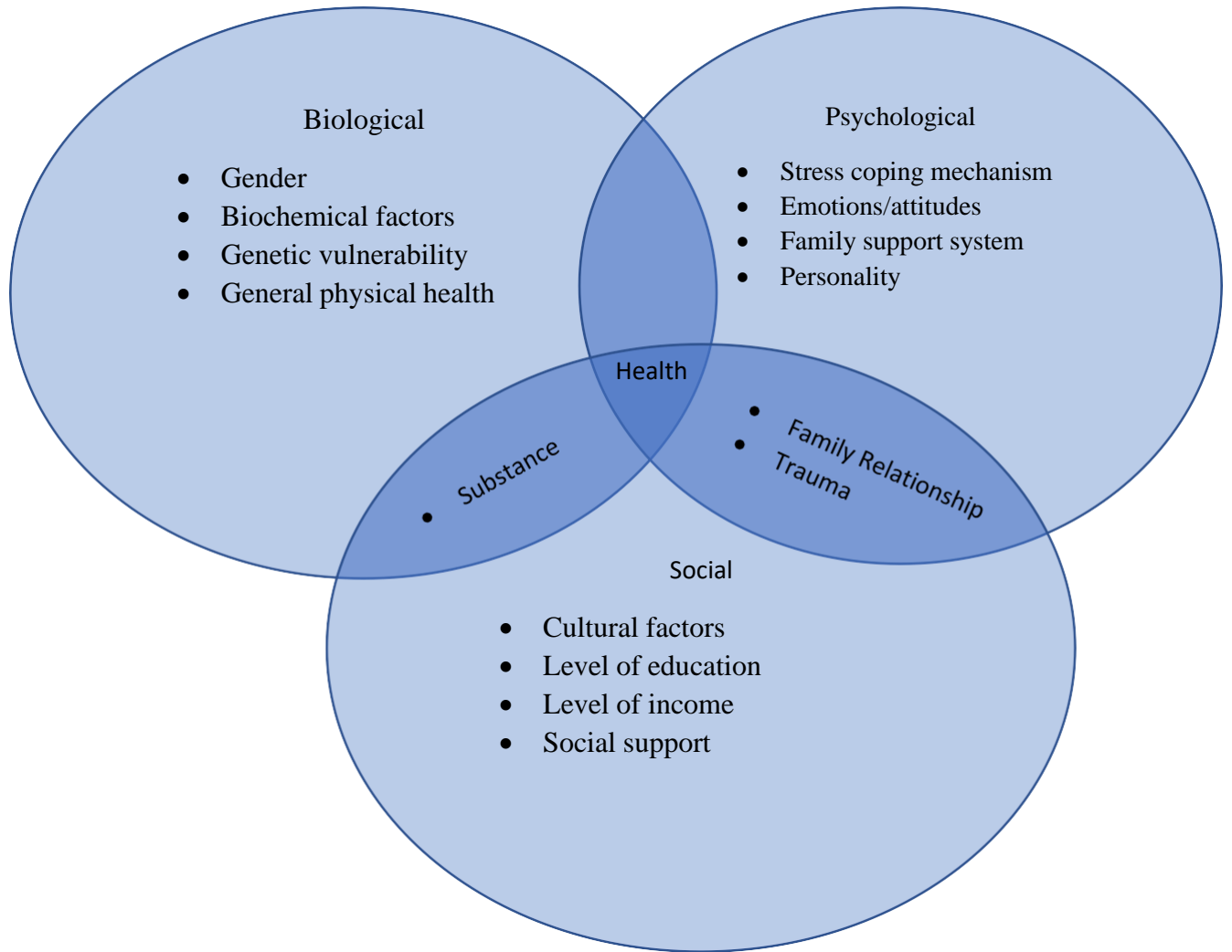
### **2.7.2 Psychological influences on health**

The bio-psychosocial model's psychological component aims to identify possible psychological explanations for health issues such as emotional stress and psychological tension. Individuals who have experienced severe stress are likely to develop hypertension, which increases the risk of kidney injury; conversely, psychological variables may exacerbate biological predisposition by increasing the likelihood of kidney failure in a genetically vulnerable person. Stress may not cause kidney injury on its own, but a person who lives in a stressful environment is more likely to abuse alcohol, smoke more, and engage in risky behaviors such as a sedentary lifestyle, which increases the risk of obesity, diabetes, and hypertension, all of which increase the risk of kidney disease.

### **2.7.3 Socio-economic influences on health related to end stage kidney disease**

Social variables describe how socioeconomic status, culture, poverty, and religion may all have an impact on one's health. For example, losing a job could put one in a position where one cannot afford food or medical care. Furthermore, stressful life experiences can affect an individual's self-

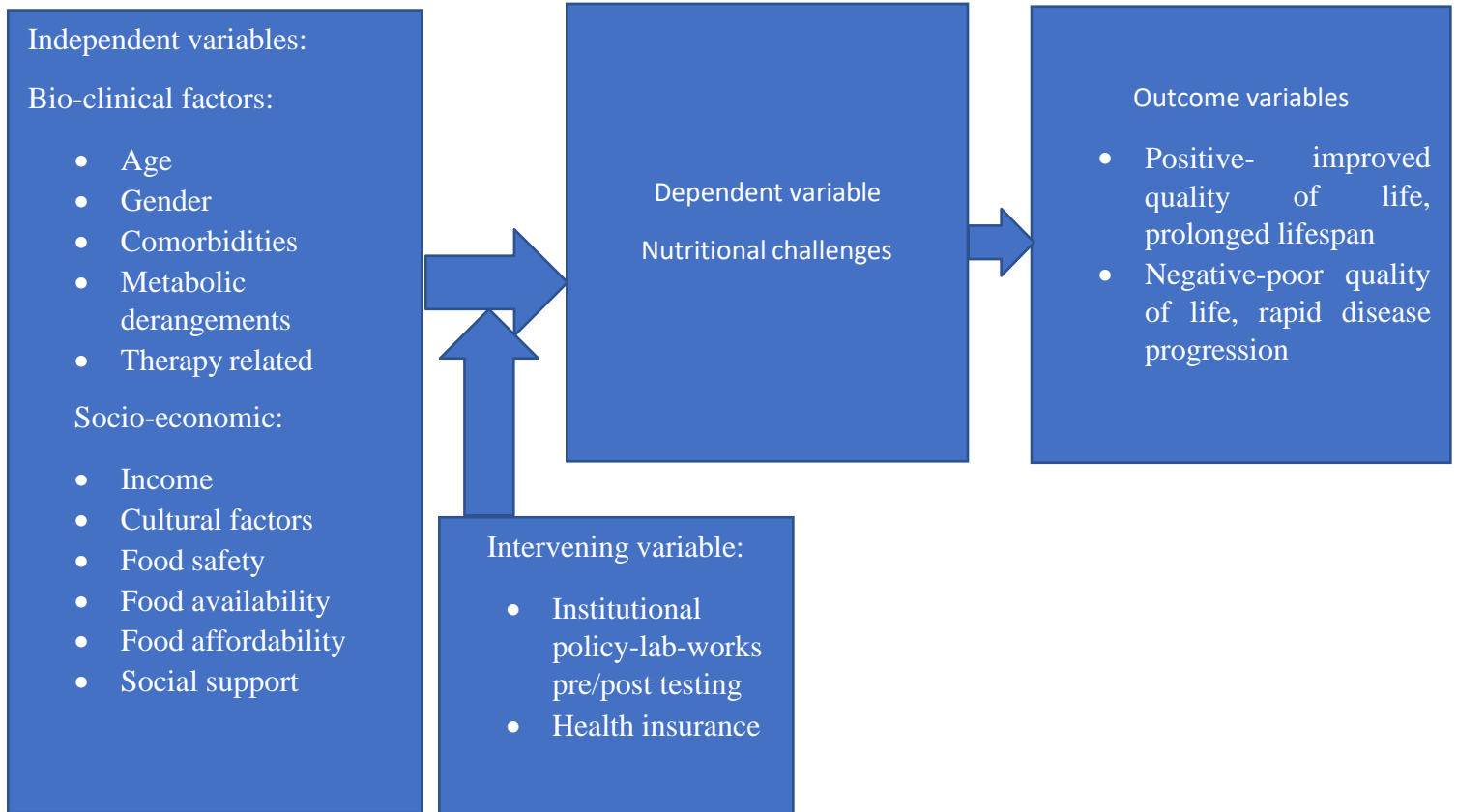
care, which can lead to physical health issues, which can negatively affect a patient's overall health outcome.



**Figure1.** Bio-psycho-social Model of Disease and Illness adopted from (Engel et al., 1977)

## 2.7.4 Conceptual framework

Below is a conceptual framework describing the independent, intervening, dependent, and outcome variables and how each influence the other



### **3.0. CHAPTER THREE: METHODOLOGY**

#### **3.1. Introduction**

The chapter provides an outline of the methodology that were used in the study. It discusses the study design, study area, target population, sample size and sampling technique, inclusion and exclusion criteria, data collection instruments and procedures, pilot testing, validity and reliability of research instrument, data analysis and ethical considerations.

#### **3.2. Study design**

This cross-sectional study employed a quantitative approach where data was collected from adult ESKD patients who have been undergoing HD for at least 6 months in the renal unit. A quantitative approach helped the researcher to have an in-depth exploration and comparison of the variables such as age, gender and socio-economic status in their entirety and without manipulation. This study design describe facts about variables being investigated as they are at the time of study as well as emerging trends. The descriptive method is preferred because it ensures complete and accurate description of a scenario, ensuring that there is minimum bias in data collection (Kothari, 2004).

#### **3.3. Study area**

In 1901, KNH was established as the Native Civil Hospital, having a 40-bed capacity. The King George VI Hospital was renamed after King George VI of the United Kingdom in 1952. The adjacent European Hospital was serving the settler community at the time (now Nairobi Hospital). Kenyatta National Hospital was renamed after the country's founding president, Jomo Kenyatta. With over 6,000 staff and a bed capacity of over 2000 beds, KNH acts as the main referral and teaching hospital serving not only the country but also the larger East African Community. The hospital is located in Upper hill approx. 3.5km west of Nairobi's central business district. A pediatric and adolescent psychiatric clinic, diabetic clinic, general outpatient services, mother and child health clinic, voluntary counseling and testing center, laboratory, Pharmacy, dental services, Comprehensive Care, and TB clinic are just a few of the hospital's integrated services. The Kenya Medical Training College and the University of Nairobi's College of Health Sciences both use KNH as a teaching hospital.

The study took place in the dialysis unit of the medical department, which is one of the largest departments at the hospital. The KNH Renal Unit is located on the first floor and has a bed capacity

of 35. The Renal Unit comprises units for dialysis and a newly built kidney center for patients undergoing kidney transplant. The dialysis unit currently has 21 functional machines that operates on a 24hr shift dialyzing both walk in patients as well as patients admitted in other wards of the hospital in need of dialysis. The key services offered by the Unit are renal replacement therapy for CKD patients in the form of dialysis services or kidney transplant services. In addition, biopsies, insertions, and removal of various devices on renal patients are other services offered to patients in the Unit (KNH Renal Unit, 2021).

### **3.4. Study population**

The study population included all male and female patients diagnosed with ESKD and undergoing HD at the hospital's dialysis unit for a period above 6 months at Kenyatta National Hospital.

### **3.5. Inclusion criteria**

- i. Patients undergoing hemodialysis for ESKD
- ii. Patients above 18 years of age with ESKD who have been undergoing HD for a minimum period of 6 months. 18 years can consent while nutritional changes are mostly observed in patients who have been on prolonged hemodialysis.
- iii. Patients who consented to be interviewed.

### **3.6. Exclusion criteria**

- i. Patients who declined to participate in the study because they were unstable and hence, unable to give a written consent were excluded.
- ii. Patients with dementia or other forms of cognitive impairment because they will not be able comprehend details of the consent form.
- iii. Patients with other severe co-morbidities and admitted during the study period, or deaf and blind patients. Deaf and blind patients will not be able to read and understand the consent form while comorbidities could be the cause of poor nutrition.

### 3.7. Sample size determination

According to KNH Renal unit records (2022), patients with ESKD on HD are 90. The sample size was determined by Fischer's formula (Fischer's et., al., 1999)

$$n = Z^2 \frac{P(1-P)}{e^2}$$

**Where: n = sample size**

Z = level of confidence which is 1.96 associated with a 95% confidence interval; P = the prevalence of patients who have the desired characteristics in the study, and e = margin of error which is 0.05.

$$\begin{aligned} n &= 1.96^2 \frac{0.5(1-0.5)}{0.05^2} \\ &= 384.16. \end{aligned}$$

When the target population is less than 10,000, the desired sample is calculated as follows:

$$nf = \frac{n}{1 + (n/N)}$$

Where nf is the adjusted sample size, n is the sample size earlier on calculated using Fisher's formula, while N is the population size. Since the target population is 90 which is less than 10,000, this formula was applied.

Therefore:

$$nf = \frac{384.16}{1 + \frac{384.16}{90}}$$

Sample size = 73

### 3.8. Sampling procedure

Simple random sampling technique was used to recruit participants into the study. Patients who met the inclusion criteria and agreed to consent were recruited. Data collection was done until the sample size was attained.



### **3.9. Participants' recruitment procedure**

To gain access to the study subjects, the researcher sought ethics committee clearance, then requested authorization from the heads of departments in renal department and the unit's nurse in charge. The researcher notified patients verbally and short memos posted on the hospital's notice board. The study's title, participant eligibility, data collecting length, and researcher's name plus the research assistants' and contact information were included in the memos. The study participants were recruited from Kenyatta National Hospital's dialysis unit. Recruitment took place during each data collection session, with study participants being chosen from unit.

### **3.10. Participant Consenting Procedure**

After the clinical team has assessed the patients, they were asked for their consent. To ensure privacy and minimize service interruptions, the investigator worked with the unit/ward supervisor to arrange for the allocation of a specific room in the unit where the consenting processes and interview took place. The researcher reviewed the information sheet and consent form with the potential participants. The researcher explained the study's relevant components to the participants, including the study's background, nature, and objectives, the study's aim, the consequences of involvement in terms of rewards, and any hazards of participation. Participants were able to ask any questions they wanted for clarification.

### **3.11. Data collection instruments**

The data collection tool for the study was a researcher-administered questionnaire. The questionnaire was chosen as the data collection instrument primarily because of its convenience, suitability to the research problem, and population size. It is also cost-effective (Denscombe, 2014). Both closed-ended and open-ended questions were included in the study. In the first portion of the questionnaires, demographic data was collected. The rest of the questionnaire is comprised of questions that are related to the study's objectives. The questionnaire's questions were designed by the principal investigator to capture information on nutrition like the variety of food readily available, number of meals taken in a day, bio-clinical challenges, hemoglobin level, vomiting, constipation, pain on swallowing and therapy-related issues, number of times the patient comes for HD in a week, the types of medication the patient is on and the number of times taken in a day and whether the patient ever misses the routine prescribed medication, as well as the association between sociodemographic and nutritional challenges and support needs in patients with ESKD on HD.

### **3.12. Data collection procedure**

After receiving ethical clearance and approval from the KNH/UoN Ethics and Research Committee and subsequent approval from the KNH's Renal Unit management, two research assistants were recruited from higher diploma uro-nephrology class of KNH school of Nursing, and were trained to assist in collecting data under the supervision of the principal researcher. The role of the principal investigator was to train the research assistants on data collection and handling, supervise data collection, as well as keep custody of the data collected. The principal researcher also reviewed the patient's notes and lab works done from June 2020 onwards to check for biochemical derangements such as Hb and albumin levels to correlate with the anthropometric physical findings. The role of the research assistants was to obtain consent, administer questionnaires to the study respondents as well as taking the patients' weight, height and mid upper arm circumference (MUAC) and record them in the questionnaire. During the data collection process, the researcher and research assistants did not interfere with the respondents' responses as they respond to the questions on the study instrument. The completed questionnaires were stored securely until data entry and analysis could take place. The data collection process took about 10 consecutive days, with 6-11 participants being interviewed each day.

### **3.13. Pretesting tool**

Pretesting of the study tool was carried out among ESKD patients on HD at the Medical unit, renal ward, at Mbagathi county hospital. Seven questionnaires representing 10% of the study sample were used in the pretesting. Mugenda and Mugenda (2003) asserted that 10% of the sample size is adequate for purposes of pre-testing the research tools. Pretesting was carried out to refine the research tool. Upon pretesting, the data collection instrument was adjusted where questions were not clear and a final validated form of the study instrument was created.

### **3.14. Validity and reliability of the research instruments**

Validity refers to the degree to which an instrument measures what it is supposed to measure (Kothari, 2010) or the degree to which data analysis results accurately represent the phenomena under investigation (Denscombe, 2014). The research instrument was made available to the supervising lecturers and peers, who assisted in determining its content and construct validity, ensuring that the items are appropriately representative of the study subject. The degree to which a research instrument produces consistent results after repeated trials is known as reliability (Nsubuga, 2006). The Cronbach's Alpha Coefficient was used to determine the research instrument's dependability using data from the pilot study. The Cronbach's Alpha Coefficient must be at least 0.70. If the coefficient level is low, the researcher makes the needed changes to improve on the reliability of the research instrument.

### **3.15. Data management plan**

#### **3.15.1. Data analysis**

The Statistical Package for Social Sciences was used to analyze the quantitative data obtained by the closed ended questions (SPSS, version 24). Quantitative data was analyzed using descriptive statistics, which included measures of central tendencies such as mean, median, and mode, as well as percentages and frequencies. Furthermore, based on the quantitative data, the association between research variables was assessed using chi-square test statistics at a significance level of 5%. Tables, graphs, and charts were used to present the findings of the study.

### **3.16. Dissemination of research findings**

The researcher will submit copies of the study findings to the KNH-UoN research ethics committee and the UoN Department of Nursing Sciences library, and they will be published in the University of Nairobi repository later. The researcher will present his findings at appropriate academic and scientific conferences, as well as publish them in high-impact scientific publications.

### **3.17. Ethical considerations**

After applying and presenting the study proposal to the KNH-UoN ethical review board, the researcher requested permission to perform the study from the University of Nairobi, School of Nursing. In addition, the researcher requested the head of the renal department for permission to access the study participants. Participants were informed about their rights as well as the study's desired outcomes.

Before enrolling a participant in the study, the researcher provided them with a voluntary informed consent form to sign to show acceptance to participate in the study. There were no compulsion or incentives for participants, and their identities was not revealed anywhere in the interview guide. All interview notes and questionnaires were kept in a locked closet, with the key and research data on the computer protected by a password. Before they took part in the study, the participants were told about the potential benefits as well as the risks. The consent form included the contact information of a member of the ethics review committee as well as of the supervisor in case they feel their rights were violated during the study.

Participants asked questions and received satisfactory replies. Before signing the consent papers, the researcher asked the participants questions regarding the information that was shared in order to ensure that they understood the study. Following the completion of the study, the researcher provided feedback and recommendations to ensure that the participants benefit from the findings. Participants were guaranteed that the researcher did not have any competing interests in the research.

Participants were assured of their right to withdraw from the research process if they feel compelled or coerced in any way at any time. Justice was respected by ensuring that all participants benefited from the study, if any, without favoring or excluding any of the participants. Participants were treated with respect by paying careful consideration to their decisions and ensuring that they are free to make their own decisions.

### **3.18. Limitations**

Given that an interviewer administered the questionnaire, response bias was anticipated.

### **3.19. Delimitations**

By minimizing attempts to elaborate or clarify any of the questions, the researcher and his assistants attempted to minimize response bias. Additionally, all of the participants were subjected to questions that are essentially the same.

## 4.0. CHAPTER FOUR: RESULTS

### 4.1.Introduction

The study sought to establish the factors associated with nutritional therapy related challenges and support needs among patients with ESKD undergoing hemodialysis at Kenyatta National Hospital. The specific objectives included evaluating the factors associated with nutritional and therapy related challenges, to determine the association between socio-economic factors in ESKD patients and to establish nutritional and therapy support needs for patients with ESKD undergoing HD. 73 questionnaires were distributed, 66 of the questionnaires were completed and returned for analysis representing a 90.4% response rate. The study findings are as follows:

### 4.2.Demographic and socio-economic characteristics of patients

**The demographic characteristics of patients who were involved in the study and with ESKD undergoing haemodialysis were analysed as shown in Table 4.1.**

Table 4.1: Participants' demographic and socio-economic characteristics

	Frequency	Percent
<b>Gender</b>		
Male	39	59.1
Female	27	40.9
Age (Mean , SD)	45.4±16.03	
19 -30 years	10	15.2
31 - 50 years	34	51.5
>50 years	22	33.3
<b>Education level</b>		
Primary education	22	33.3
Secondary level and above	44	66.6
<b>Occupation status</b>		
No income	36	54.5
Formally employed	16	24.2
Self-employment	14	21.2
<b>Average monthly income (Mean, SD) Ksh.</b>	20,789.1(±12,850.4)	
<=Ksh.10,000	24	36.4
Ksh 10,001 - Ksh.30,000	28	42.4
>Ksh. 50,000	14	21.2
<b>Marital status</b>		
Single	28	42.4
Married	38	57.6

<b>Payment for Treatment and upkeep</b>		
Self and NHIF	10	15.2
Family and NHIF	63	95.5
<b>Residence</b>		
Rural area	25	37.9
Urban area	41	62.1
<b>Type of housing</b>		
Permanent	44	66.7
Semi-permanent	22	33.3
<b>Source of water</b>		
Tap water	48	72.7
Borehole	17	25.8
Rain water	1	1.5
<b>Source of energy for cooking and lighting</b>		
Electricity	55	83.3
Solar	8	12.1
Kerosene	17	25.8
Charcoal	22	33.3
Gas	46	69.7
Firewood	7	10.6
<b>Cigarette smoking</b>		
Yes	2	3.0
No	64	96.7

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### 4.3. Factors associated with nutrition related challenges of patients with end-stage kidney disease undergoing hemodialysis.

#### 4.3.1. Patients' Knowledge on importance of nutrition in their care

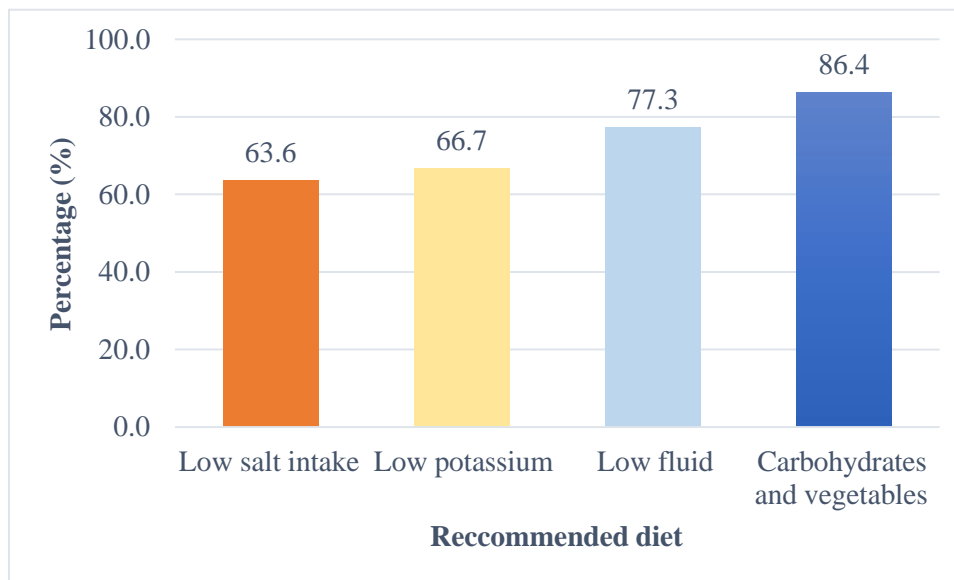
The study participants were asked whether nutrition in care of end-stage kidney disease is important.

##### *Perception on importance of nutrition in ESKD care*

The findings showed that 97% (64) of the respondents had knowledge on significance of nutrition in management of their condition.

#### 4.3.2. Knowledge on recommended diet for patients on hemodialysis

**Figure 1.** Recommended diet following hemodialysis was assessed and presented in a bar chart as shown below



### 4.3.3. Perceived reported dietary regimen

Reported dietary regimen among ESKD patients was investigated and presented in Table 4.2.

Table 4.2: reported dietary regimen among ESKD patients

	Frequency	Percent
<b>Feeding pattern in the last six months</b>		
Good	35	53.0
Poor	29	43.9
Unaffected	2	3.0
<b>Average number of meals per day</b>		
Once	3	4.5
Twice	27	40.9
Thrice	32	48.5
Above three	4	6.1
<b>Type of food comfortable to eat</b>		
Solid foods	40	60.6
Semi solid foods	6	9.1
All foods	20	30.3
<b>Personal food preferences</b>		
Yes	35	53.0
No	31	47.0
<b>Food preferred (n =35)</b>		
Proteins	18	51.4
Carbohydrates	15	42.9
Vegetables	2	5.7
<b>Food readily available</b>		
Animal proteins	51	77.3
Crop proteins	59	89.4
Carbohydrates	66	100.0
<b>Feeding disturbance in last six months</b>		
Vomiting	25	37.9
Abdominal pains	9	13.6
Pain on swallowing	5	7.6
Constipation	27	40.9
Diarrhoea	16	24.2



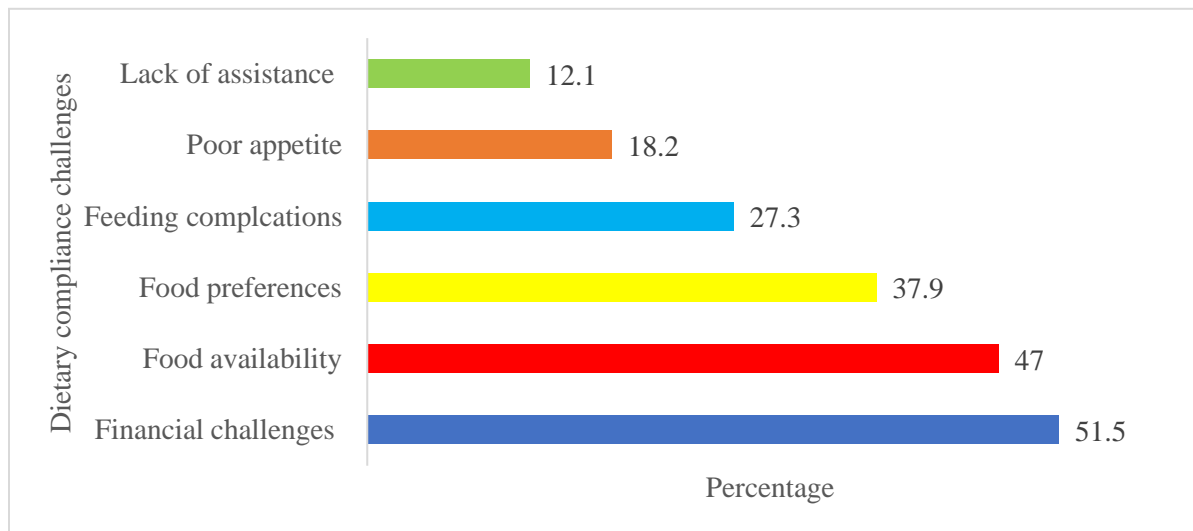
#### 4.3.4. Difficulties in following recommended diet among end stage kidney disease patients

The study participants were also asked whether they have difficulties in following recommended diet:

The findings established that 51.5% (34) of the patients were having difficulties in following the recommended diet.

#### 4.3.5. Dietary compliance challenges

Dietary compliance challenges were assessed among ESKD patients as shown in Figure 4.4.



**Figure 2: Dietary compliance challenges**

#### 4.4. Therapy related challenges in patients with end-stage kidney disease undergoing hemodialysis

The study sought to determine therapy related challenges of patients with ESKD and the results are as shown in Table 4.3.

*Table 4.3: medication related challenges among end-stage disease patients*

	<b>Frequency</b>	<b>Percent</b>
Currently on prescribed medication		
Yes	63	95.5
No	3	4.5
Number of times a day		
1	9	13.6
2	31	47.0
3	23	34.8
Missed your medication		
Yes	21	31.8
No	45	68.2
Reason		
Feeling tiredness	15	22.7
Medicines are complex	8	12.1
Health is deteriorating	18	27.3
No one to remind me if I forget	10	15.2
Low knowledge about the disease	11	16.7
No knowledge on my medications	17	25.8
Medications are unaffordable	44	66.7

The finding indicated that 95.5% (63) of the patients were on prescribed medication. Further, 31.8% (21) of the patients affirmed to having missed their medication with 66.7% (44) citing high cost of medication, deteriorating health condition.

The study participants were also asked about their adherence to hemodialysis therapy as shown in Table 4.4.

Table 4.4: dialysis related challenges among end-stage kidney disease patients

	Frequency	Percent
<b>Number of dialysis per week</b>		
Twice	62	94.0
Thrice	4	6.0
<b>Missed dialysis recently</b>		
Yes	23	34.8
No	43	65.2
<b>Reasons (23)</b>		
Catheter failure	10	43.5
Long queues	7	30.4
Financial challenges	6	26.1

With regards to dialysis 94% (62) have dialysis twice per week, of note is 6% (4) that missed dialysis in the past one month. Catheter failure was the main reason for missing dialysis 43.5% (10), 30.4% (7) long queues while 26.1% (6) cited financial challenges.

#### 4.5 Patients' bio-clinical characteristics.

Assessment of bio-clinical nutritional related factors was conducted as showed in Table 4.5.

Table 4.5: patients' Bio-clinical nutritional challenges of patients with end-stage kidney disease undergoing hemodialysis.

	Frequency	Percent
<b>MUAC</b>		
Malnutrition	28	42.4
Normal	38	57.6
<b>HB levels</b>		
Low level	58	87.9
Normal	5	7.6
High levels	3	4.5
<b>BMI</b>		
Underweight	5	7.6
Normal	55	83.3
Obesity	6	9.1

According to the findings, 42.4% (28) of the patients had malnutrition. The results also showed that 87.9% (58) of the patients were anaemic. On investigating the body mass index, 83.3% (55) of the patients had normal weight.

#### 4.6 Association between patients' socioeconomic factors and malnutrition

Demographic and socio-economic factors associated with nutritional challenges among ESKD patients were investigated as shown in Table 4.6.

**Table 4.6: Patient factors associated with nutritional challenges among end-stage kidney disease patients**

	Malnutrition	Normal	OR (95%CI)	P-value
<b>Gender</b>				
Male	21(75.0)	18(47.4)	3.33(1.15 - 9.68)	0.042
Female	7(25)	20(52.6)	Ref	
<b>Age</b>				
<=30 years	4(14.3)	6(15.8)	0.86(0.19 - 3.98)	0.844
31 - 50 years	16(57.1)	18(47.4)	0.64(0.21 - 1.93)	0.431
>50 years	8(28.6)	14(36.8)	Ref	
<b>Education level</b>				
Primary education	14(50)	8(21.1)	0.38(0.10 - 1.47)	0.161
Secondary level	8(28.6)	21(55.3)	1.75(0.47 - 6.52)	0.404
Tertiary level	6(21.4)	9(23.7)	Ref	
<b>Occupation</b>				
Unemployed	22(78.6)	14(36.8)	Ref	
Formally employed	2(7.1)	14(36.8)	0.26(0.07 - 0.97)	0.045
Self-employment	4(14.3)	10(26.3)	2.80(0.43 - 18.38)	0.283
<b>Marital status</b>				
Single	23(82.1)	5(13.2)	3.51(1.56 - 5.88)	<0.001
Married	5(17.9)	33(86.8)	Ref	
<b>Average household income</b>				
<=Ksh.10,000	12(42.9)	12(31.6)	0.27(0.06 - 1.23)	0.091
Ksh 10,001 - Ksh.30,000	13(46.4)	15(39.5)	0.32(0.07 - 1.38)	0.125
>Ksh. 50,000	3(10.7)	11(28.9)	Ref	
<b>Residence</b>				
Rural area	10(35.7)	15(39.5)	0.85(0.31 - 2.34)	0.802
Urban area	18(64.3)	23(60.5)	Ref	
<b>Type of housing</b>				
Permanent	19(67.9)	25(65.8)	1.10(0.39 - 3.10)	0.557
Semi-permanent	9(32.1)	13(34.2)	Ref	

The findings revealed that there was significant association between gender and malnutrition. Male patients were 3.3 times more likely to have malnutrition (OR =3.33, 95% CI: 1.15 – 9.68, p =0.042). Patients who were formally employed were 74% less likely to have malnutrition compared to those who were unemployed (OR =0.26, 95% CI: 0.07 – 0.97, p=0.045). Further, patients who were single were 3.5 times more likely to have malnutrition compared to those who were married (OR =3.51, 95% CI: 1.56 – 5.88, p<0.001).

**4.7 Support needs for patients with end-stage kidney disease undergoing hemodialysis at Kenyatta National Hospital.**

**Nutrition related support needs**

The patients were asked to provide various support elements that would help improve their nutritional needs as shown in Table 4.7.

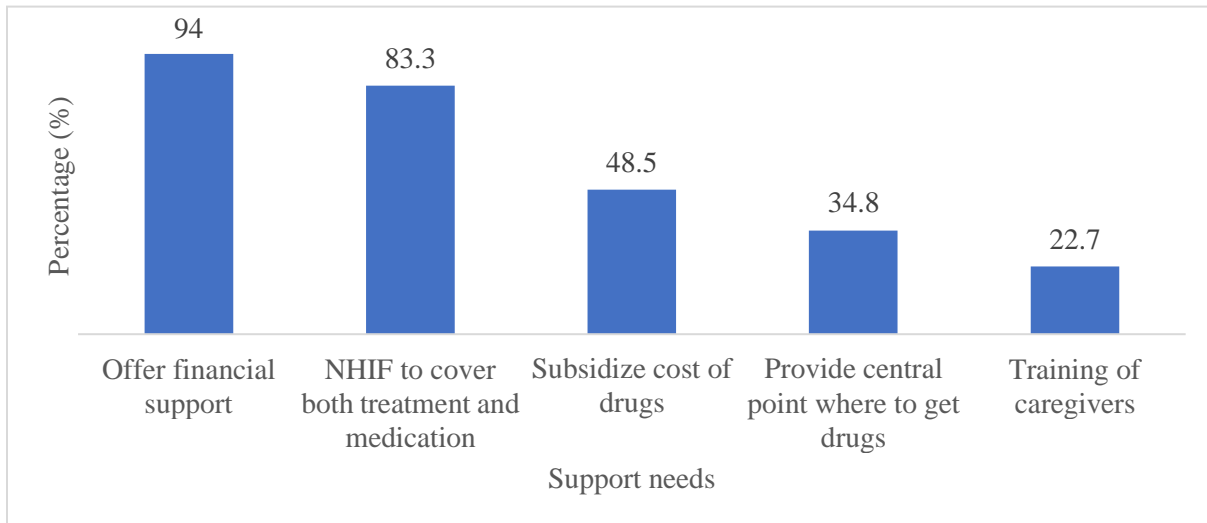
*Table 4.7: Nutrition related support needs of patients with end-stage kidney disease*

Support needs	Frequency (n)	Percentage (%)
Provide financial support	55	83.3
Health education programs on recommended diet	47	71.2
Provision of food support programs	43	65.2
Subsidize treatment cost	25	37.9
Provide many food alternatives	15	22.7

The findings showed that commonly identified support needs included provision of financial support 83.3% (55), utilization of health education programs 71.2% (47), food support programs 65.2% (43) and provision of regular nutritional education 50% (33).

**4.4.1. Therapy related support needs of patients with end-stage kidney disease**

Therapy related support needs were also investigated in this study as showed in Figure 4.5.



**Figure 3: Therapy related support needs**

## **5.0. CHAPTER FIVE: DISCUSSION**

### **5.1. Introduction**

The present study investigated factors associated with nutrition therapy related challenges and support needs for patients with ESKD undergoing HD. The specific objectives included evaluating the factors associated with nutrition therapy related challenges, to determine the association between socio-economic factors in ESKD patients and to establish nutritional and therapy support needs for patients with ESKD undergoing HD. The study explored the characteristics of ESKD patients, nutrition, therapy, bio-clinical related challenges as well as socio-economic association with nutritional challenges and therapy support needs.

### **5.2. Socio-demographic characteristic of end stage kidney disease patients**

The findings revealed that majority of the patients (59.1%) were male. These findings are comparable to previous studies which have revealed that the proportion of men attending hemodialysis is higher than women (Cherono, 2017), (Backhaus et al., 2017) (Balouchi et al., 2018). Cherono et al. (2017), revealed that 56.3% of ESKD patients in Kenya were male. Further, Backhaus et al. (2017) also found that 88% of ESKD respondents were male. The higher proportion of men with ESKD is mainly influenced by the understanding that although more women than men have chronic kidney disease, men reach kidney failure sooner than women do. (Goldberg & Krause, 2016).

Present findings also revealed that the average age was 45 years. These findings compare to a study conducted in Kenya by Wanjiku (2014) which found that the average age of patients with ESKD was 48 years ranging between 18 and 95 years. However, our findings are not in agreement with those from some past studies which found that majority of patients with CKD were aged above 50 years (Riang et al., 2017; Zyga et al., 2015) Riang et al. (2017) and Zyga et al. (2015) also found similar results where the average age of patients with ESKD was 58 years and 59 years respectively. These findings indicate that prevalence of life style diseases is high among this age group and some of them complicate to CKD. CKD is highly prevalent in older adults due to increased comorbidities such as high blood pressure, diabetes, prolonged use of over the counter drugs as well as kidney stones which are common in this age group (Kistler et al., 2021).

Almost half of the study participants had secondary level education as their highest level of education. These findings are consistent with other studies, which have showed secondary level as

highest level of education among ESKD patients (Chan et al., 2014; Mukakarangwa et al., 2018). In Kenya, majority of the population have secondary level of education, which is depicted in the sample size investigated in this study (Census, 2019).

Current findings also established that average household monthly income was \$200. The needs of ESKD patients are many as well as the needs of the family which show that average monthly household income is little. The lower income is explained by high rate of unemployment among ESKD patients. In the present study, 55% of patients who participated in the study were unemployed. Dialysis is a life-changing event for patients at multiple levels. Employment is one of several challenges faced by individuals with progressive CKD transitioning to ESKD. Such patients face multiple disincentives to employment, including medical, logistical, and financial disincentives. These findings are comparable to other past studies which have found that most of ESKD patients are unemployed (Kutner et al., 2008; Helanterä et al., 2012). Employment rates among patients on hemodialysis in the United States have been reported to be as low as 18.9% in one study (Kutner et al., 2008). This seems to be a worldwide problem. A report from Finland by Helanterä et al.(2012) showed a low employment rate of 33% on the basis of data from the Finnish Registry for Kidney Diseases. A recent study from India reported an unemployment rate of 29.9% among patients after initiation of hemodialysis, with rates of loss of employment of 44% among patients initiating hemodialysis, respectively (Lakshmi et al., 2017).

### **5.3. Nutrition related challenges**

Findings from this study revealed that almost all of the patients asserted that nutrition forms part of their care. Nutrition forms an integral part of management among patients with ESKD. These findings are comparable to a study by Kim et al. (2015) who asserted that each client receiving maintenance hemodialysis therapy should first have their dietary energy consumption carefully evaluated. Similarly, is recommended that hemodialysis patients should increase their dietary energy intake through proper individualized diet education and monitoring in order to achieve overall nutrient adequacy. Current findings also established that recommendation included diet with carbohydrates and vegetables, low fluid intake, low potassium and low salt intake. These findings are in line with previous studies which have identified that a healthy balanced diet for ESKD patients is one with low in salt and high in fibre, reduced fat dairy products, whole grains and plenty of water (Mlinšek, 2016; Kenawy et al., 2019). The current findings also established that 52% of ESKD patients were having challenges in following the recommended diet. These



findings however contrast those from Yang et al. (2020) which found that over 60% of the respondents were not adhering to the recommended diet due to poor self-regulation skills and behavior.

The common reasons leading to these challenges include financial challenges, food unavailability, personal food preferences and feeding complications. Kenway et al. (2019) in a study conducted in Kuwait, it was revealed that lack of clear dietary guidelines and financial strain among patients were the main factors contributing to poor adherence to dietary restrictions. The level of noncompliance with dietary restriction was higher in other studies such as a study conducted in Brazil, which revealed that more than half of the respondents were still consuming high fat meat and dairy products as well as carbonated drinks. Failure to follow the defined nutritional guidelines is a significant challenge to the efforts to lead a positive and a high-quality life. Current findings also revealed that ESKD patients were comfortable and preferred having food high in proteins. The fact that it is so difficult to stick to a healthy diet is yet another factor that contributes to poor energy consumption. Patients who are receiving hemodialysis should strictly adhere to the food therapy that has been prescribed for them; typically, these diets will be low in salt, potassium, and phosphorus.

#### **5.4. Therapy related challenges**

The current findings have established that 95% of patients were on prescribed medication with majority of them taking medication twice a day. However, a third of the ESKD patients had missed their medications recently. Adherence to medication is dependent on many elements such as ability to afford the medicines and being able to remember all times to take based on the prescription given. These findings are comparable to a study conducted in Denmark which revealed that it may be easier to maintain medication adherence if patients are assisted in mapping their daily activities and encouraged to link their daily activities with their prescriptions. Facilitating adherence may also involve addressing patients' misconceptions about medications, helping them cope with their side effects, and getting their consent to participate in treatment decisions. The cost of purchasing prescriptions and a lack of knowledge about the indications and effects of medications were obstacles to adherence. By synthesizing and explicitly evaluating the strength of the evidence, the findings in this synthesis add to the body of existing knowledge and support earlier studies (Nielsen et al., 2018). Similarly another study conducted by Sontakke et al., (2015) which found that high cost (21.3%), a complicated dosing schedule (20%), and a fear of side effects (16%) were common

reasons for non-adherence. 68 percent of patients were unaware of the significance of taking each medication. Due to the high expense of medications, 16% quit taking them.

In some studies, patients described the costs of buying prescribed medications as a barrier to adherence. Patients who were financially burdened tried to make their supply of medications last longer by skipping doses, taking lower doses of medicine than prescribed or, alternatively, asking their physician to prescribe double-strength medication to reduce the costs of buying medications (Magacho et al., 2011;Beto et al., 2019).

### **5.5. Bio-clinical nutrition related challenges**

The present findings have established that 42% of ESKD patients had malnutrition. These findings are comparable to studies conducted in African context. A study in Southern Nigeria revealed malnutrition prevalence is 46% (Oluseyi & Enajite, 2016). In Sub-Saharan Africa, it is approximately 42% (Bl et al., 2015). The level of malnutrition has remained relatively high in low-income countries. A cross sectional study conducted in Palestine by Rezeq et al. (2018) investigating nutritional status of hemodialysis patients, results showed that 47% of respondents were malnourished in any way (Rezeq et al., 2018). Further, Agboton et al. (2015) study in Benin, assessing the nutritional status of hemodialysis patients, revealed that the prevalence of malnutrition was 42%. Hypoalbuminemia and pre-dialysis hypocreatinemia were found in 29.53 percent and 52.38 percent of cases, respectively. When viewed separately, BMI and protein consumption have a higher predictive value for our patient's nutritional status. Similarly, another cross-sectional study conducted at two dialysis centres in Niger investigating nutritional status found that 29% of the participants had undernutrition (Moussa et al., 2016).

However, there are studies that have identified a very high rate of malnutrition among patients on hemodialysis. In Bangladesh study, it was found that most of the respondents, 87% who had malnutrition were having an inadequate intake of proteins (Reza et al., 2018).The incidence of terminal chronic kidney disease treated with hemodialysis is steadily increasing, especially among the elderly. Its development is fraught with difficulties, such as protein-energy malnutrition. Another study in Tunisia assessing the predominance of protein-energy malnutrition among elderly HD patients. The findings showed that among elderly malnutrition was 71%, with greater prevalence in women, 78% compared to men, 57% (Faten et al., 2019). As a result, these findings

highlight the fact that protein-energy malnutrition is a frequent and severe pathological condition in elderly hemodialysis patients that can be fatal.

Present findings established that majority of the patients were anaemic. This is comparable to a cross-sectional study conducted in Bangladesh investigating malnutrition in HD patients found that 69% of the patients were men. The assessment of the clinical presentations revealed that 97% of the patients were anaemic, 66.9% had anorexia, 63% of the respondents complained of nausea, 59% complained of vomiting, while 26% complained of diarrhoea. In investigating creatinine and urea levels, it was found that they were high in both women and male respondents (Reza et al., 2018).

### **5.6. Challenges associated with optimal nutrition**

The findings revealed that there was significant association between gender and malnutrition. Male patients were 3.3 times more likely to have malnutrition. Studies have found comparable findings asserting that gender is a significant factor in influencing nutritional challenges (Bl et al., 2015) (McClave et al., 2016). Further a study done in Tanzania found that 69% of the patients were male with an average age of 52 years, while the mean duration of hemodialysis was 22 months (Bramania et al., 2020).

Employment status was also significantly associated with malnutrition. Patients who were unemployed were more likely to have nutritional challenges. These findings are comparable to Angwenyi et al. (2018) in a study conducted in Malawi, which found that there was association between compliance to therapy and source of income among ESKD patients. Alcohol use was associated with higher level of noncompliance to therapy. ESKD patients are discouraged from using alcoholic products because it lowers the strength of their body functionality which in turn wears down their kidney, which is more likely to malfunction, and could lead to kidney disease (Hu et al., 2021).

Patients who were formally employed were 74% less likely to have malnutrition compared to those who were unemployed (OR =0.26, 95%CI: 0.07 – 0.97, p=0.045). Further, patients who were single were 3.5 times more likely to have malnutrition compared to those who were married. These findings are comparable to Bellizzi et al. (2014) who found that monthly income and marital status were key factors influencing physical wellbeing of ESKD patients. Respondents who were single were highly limited in terms of what they could accomplish and did not get support from caregivers

hence making their life difficult. Similarly, Bellizi et al. (2014) also found that 66.4 percent of women were malnourished. Women had a lower BMI, greater skin folds, and a smaller MUAC as compared to men. Females also acquired less weight between dialysis than males. Females and males did not have significantly different levels of albumin. Malnutrition was found in a substantially larger percentage of patients aged 55 years (66.3%) than in those aged below 55 years (48.9 %). Females were malnourished at a higher rate than males in this study. This could be attributable to the socioeconomic status and lifestyle choices of this particular patient sample, which was chosen at random. Despite the fact that there were younger HD patients, a higher percentage of elderly HD patients were malnourished. According to studies, elderly HD (55 years) are more likely to be malnourished (Alharbi and Enrione, 2012). Malnutrition is a common challenge among patients with CKD this may be due to inability of patients to follow recommended dietary and treatment measures.

#### **5.7. Nutritional and therapy support needs**

Majority of the patients in the present study affirmed that key support needs should target government policy to transform the current environment including reduced cost of medication and ensuring that health insurance include both treatment and medication. These findings are comparable to Sontakke et al. (2015) who determined that 42% of respondents thought the government should act to give low-income patients access to free medications. In some studies, patients described the costs of buying prescribed medications as a barrier to adherence.

Similarly comparable findings were also obtained by Hole et al., (2020) which found that there is need to consider supportive care for people of all ages, both those with and approaching ESKD, with special attention to programs in low- and middle-income countries and emphasize that supportive care should be an integrated part of care for patients with advanced CKD. The challenges of delivering supportive care as part of cost-effective, integrated kidney care will vary according to disease epidemiology, health care funding and infrastructure, and the cultural and political issues of a country. An action plan to support the optimal delivery of supportive care across a range of health care and income settings.

## **6.0.CHAPTER SIX: CONCLUSION AND RECOMMENDATIONS**

### **6.3. Conclusion**

The findings have showed that the identified challenges leading to failure to follow recommended diet include financial challenges, recommended food unavailability, having personal food preferences and feeding complications such as constipation and vomiting.

In investigating therapy related factors 32% of the patients stated to have missed taking their medication citing forgetfulness and high cost of medications. Most of the patients were attending dialysis twice a week, 35% had missed dialysis session in the past one month.

Bio-clinical nutritional parameters assessed established that almost half of the patients had malnutrition. There was high rate of anaemia among ESKD patients on hemodialysis (88%).

Male ESKD patients, being unemployed and being single were significantly associated with increased nutritional challenges among ESKD patients on hemodialysis.

Provision of financial support, utilization of health programs, food support programs, enhance NHIF to include medication for people with CKD. This will extend the much-needed financial support required by the patients to facilitate their routine care as well as lessen the disease burden extended to families of the patients. Health programs will go along way in improving the quality of life for the CKD patients undergoing haemodialysis aimed at improving the general wellbeing of the patients.

#### **6.4. Recommendations**

Healthcare providers should train caregivers of patients with end stage kidney disease to ensure improved medication and dialysis attendance as well as adherence to stipulated therapy plans

The government should help cover medical expenses and provide food support programs to patients with CKD to improve their nutritional and medication adherence.

Conduct regular screening of bio-clinical parameters to determine the extent of nutritional challenges the patients are facing and develop specific counter-intervention.

Prioritize dietary and nutritional guidance and monitoring during each dialysis session.

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## APPENDICES

### Appendix I (a): Participant's information statement sheet

**Study Title:** Factors associated with **nutrition therapy related Challenges and Support Needs for Patients with End Stage Kidney Disease Undergoing Hemodialysis at Kenyatta National Hospital.**

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**Introduction:**

I am a student at The University of Nairobi pursuing a Master's of Science Degree in Nursing (Uronephrology Nursing). I am conducting a study titled: **Factors associated with Nutrition therapy related Challenges and Support Needs for Patients with End Stage Kidney Disease Undergoing Hemodialysis at Kenyatta National Hospital.** The purpose of this information is to give you details about the study that will enable you to make an informed decision regarding your participation. You are free to ask questions to clarify any of the aspects we will discuss in this information and consent form. The researcher will also ask you questions regarding the study before you sign the consent form to ascertain your comprehension of the information provided.

- i. **The Purpose of the study:** explore the factors associated with nutrition therapy related challenges and support needs for patients who are experiencing undernutrition by identifying these challenges and support needs aimed at improving their nutritional health and quality of life as they continue with renal replacement therapy. The findings of this study will be used to form the basis for developing strategies that will improve the quality of nutritional care provided to renal disease patients at Kenyatta National Hospital.
- ii. **Risks:** There are no economic or physical risks to participating in the study. However, due to the time taken in responding to question, you may take a longer time than usual at your clinic. Also, during the interview, some questions will require you to disclose some personal information that might trigger some negative feelings and possibly anxiety. If this

happens, the researchers will refer you to the hospital counsellor. The researcher will also endeavor to spend approximately 20 minutes with you.

- iii. **Confidentiality:** Confidentiality will be maintained and the information you provide will only be used for the intended purpose of the study. Besides, your name will not be required on any forms or used during publication of the final report thus ensuring your anonymity. All materials used during the study will be under lock and key and only the persons involved in this study will have access to them. Electronic files will be saved on password protected laptop.
- iv. **Voluntary Participation:** Participation in this study is voluntary. Refusal to take part will not attract any penalty. You retain the right to withdraw from the study without any consequences. You are free not to answer any question during the interview.
- v. **Compensation:** There is no compensation for participating in the study. But these proposed study results may benefit other people like you in the future.
- vi. **Conflict of interest:** The researcher confirms that there is no conflict of interest.

**Consent form**

**Declaration:**

I have read, or has been read to me, the information leaflet for this research project and I understand the contents. I have had the opportunity to ask questions and all my questions have been answered to my satisfaction. I freely and voluntarily agree to be part of this research study, though without prejudice to my legal and ethical rights. I understand that I may withdraw from the study at any time and I have received a copy of this agreement.

**Participant's signature:** .....**Date:** .....

**Witness signature:**.....**Date**.....

**Statement of investigator’s responsibility**

I have explained the nature and purpose of this research study, the procedures to be undertaken and any risks that may be involved. I have offered to answer any questions and fully answered such questions. I believe that the participant understands my explanation and has freely given informed consent.

**Investigator’s signature:** ..... **Date:** .....

**For any Clarification, please contact**

Parkire Mark -0721370500  
School of Nursing Sciences  
University of Nairobi  
P.O Box 19676, Nairobi

Or

Dr. Mary Wanjira Kamau, PhD  
Senior Lecturer, School of Nursing  
University of Nairobi

Or

Dr. Eunice Omondi, PhD  
Senior Lecturer, School of Nursing  
University of Nairobi

**Or**

The Chairman  
KNH-UoN Ethics and Research Committee  
P.O Box 20723,  
Nairobi.  
Tel: 2726300 extension 44102, email uonknh\_erc@uonbi.ac.ke

## **Appendix I (b):**

### **Participant's information statement sheet (Swahili). Karatasi ya taarifa ya mshiriki**

Kichwa cha Utafiti: Changamoto za Lishe na Mahitaji ya Usaidizi kwa Wagonjwa walio na Ugonjwa wa Figo wa Hatua ya Mwisho Wanaofanyiwa Hemodialysis katika Hospitali ya Kitaifa ya Kenyatta.

#### **Mpelelezi:**

Parkire Mark -0721370500

Shule ya Sayansi ya Uuguzi

Chuo Kikuu cha Nairobi

P.O Box 19676, Nairobi

#### **Utangulizi:**

Mimi ni mwanafunzi katika Chuo Kikuu cha Nairobi nikifuata Shahada ya Uzamili ya Sayansi katika Uuguzi (Uuguzi wa Uronephrology). Ninaendesha utafiti unaoitwa: **Changamoto za Lishe na Mahitaji ya Msaada kwa Wagonjwa walio na Ugonjwa wa Figo wa Hatua ya Mwisho Wanaofanyiwa Hemodialysis katika Hospitali ya Kitaifa ya Kenyatta.** Madhumuni ya taarifa hii ni kukupa maelezo kuhusu utafiti ambayo yatakuwezesha kufanya uamuzi sahihi kuhusu ushiriki wako. Uko huru kuuliza maswali ili kufafanua kipengele chochote ambacho tutajadili katika taarifa hii na fomu ya idhini. Mtafiti pia atakuuliza maswali kuhusu utafiti kabla ya kusaini fomu ya idhini ili kuhakikisha ufahamu wako wa taarifa iliyotolewa.

- i. **Madhumuni ya utafiti:** kuchunguza changamoto za lishe na mahitaji ya msaada kwa wagonjwa wanaokabiliwa na utapiamlo kwa kubainisha changamoto hizi na mahitaji ya usaidizi yanayolenga kuboresha afya zao za lishe na ubora wa maisha wanapoendelea na matibabu ya uingizwaji wa figo. Matokeo ya utafiti huu yatatumika kutengeneza msingi wa kubuni mikakati itakayoboresha ubora wa huduma ya lishe inayotolewa kwa wagonjwa wa ugonjwa wa figo katika Hospitali ya Kitaifa ya Kenyatta.
- ii. **Hatari:** Hakuna hatari za kiuchumi au kimwili kwa kushiriki katika utafiti. Hata hivyo, kutokana na muda uliochukuliwa kujibu swali, unaweza kuchukua muda mrefu kuliko kawaida katika kliniki yako. Pia wakati wa mahojiano, baadhi ya maswali yatakuhitaji ufichue taarifa fulani za kibinafsi ambazo zinaweza kusababisha hisia zisizofaa na

pengine wasiwasi. Hili likitokea, watafiti watakuelekeza kwa mshauri wa hospitali. Mtafiti pia atajitahidi kutumia takriban dakika 20 na wewe.

- iii. **Usiri:** Usiri utatunzwa na maelezo utakayotoa yatumika tu kwa madhumuni yaliyokusudiwa ya utafiti. Kando na hilo, jina lako halitahitajika kwenye fomu zozote au kutumiwa wakati wa uchapishaji wa ripoti ya mwisho na hivyo kuhakikisha kutokujulikana kwako. Nyenzo zote zilizotumiwa wakati wa utafiti zitakuwa chini ya kufuli na ufunguo na watu wanaohusika tu katika utafiti huu ndio wataweza kuzifikia. Faili za kielektroniki zitahifadhiwa kwenye kompyuta ndogo iliyolindwa kwa nenosiri.
- iv. **Ushiriki wa Hiari:** Kushiriki katika utafiti huu ni kwa hiari. Kukataa kushiriki hakutavutia adhabu yoyote. Unabaki na haki ya kujiondoa kwenye utafiti bila matokeo yoyote. Uko huru kutojibu swali lolote wakati wa mahojiano.
- v. **Fidia:** Hakuna fidia kwa kushiriki katika utafiti. Lakini matokeo haya ya utafiti yanayopendekezwa yanaweza kuwanufaisha watu wengine kama wewe katika siku zijazo.
- vi. **Mgongano wa kimaslahi:** Mtafiti anathibitisha kuwa hakuna mgongano wa kimaslahi.

**Fomu ya idhini**

**Tamko:** Nimesoma, au nimesomewa, kipeperushi cha taarifa za mradi huu wa utafiti na ninaelewa yaliyomo. Nimepata nafasi ya kuuliza maswali na maswali yangu yote yamejibiwa kwa kuridhika kwangu. Ninakubali kwa uhuru na kwa hiari kuwa sehemu ya utafiti huu, ingawa bila kuathiri haki zangu za kisheria na kimaadili. Ninaelewa kuwa ninaweza kujiondoa kwenye utafiti wakati wowote na nimepokea nakala ya makubaliano haya.

**Sahihi ya mshiriki:** ..... **Tarehe:** .....

**Taarifa ya wajibu wa mpelelezi**

Nimeeleza asili na madhumuni ya utafiti huu, taratibu zinazopaswa kufanywa na hatari zozote zinazoweza kuhusika. Nimejitolea kujibu maswali yoyote na kujibu maswali kama haya kikamilifu. Ninaamini kuwa mshiriki anaelewa maelezo yangu na ametoa kibali cha habari bila malipo.

**Sahihi ya mpelelezi:**..... **Tarehe:** .....

**Kwa Ufafanuzi wowote, tafadhali wasiliana**

Parkire Mark -0721370500  
Shule ya Sayansi ya Uuguzi  
Chuo Kikuu cha Nairobi  
P.O Box 19676, Nairobi

Au

Dr. Mary Wanjira Kamau, PhD  
Mhadhiri Mkuu, Shule ya Uuguzi  
Chuo Kikuu cha Nairobi

Au

Dk Eunice Omondi, PhD  
Mhadhiri Mkuu, Shule ya Uuguzi  
Chuo Kikuu cha Nairobi

Au

Mwenyekiti,  
Kamati ya Maadili na Utafiti ya KNH-UoN  
P.O Box 20723,  
Nairobi.

Simu: 2726300 ext 44102, barua pepe: uonknh\_erc@uonbi.ac.ke \_\_\_\_\_



## **Introduction**

Greetings!

My name is Mark Parkire and I will be facilitating the in-depth interview. Thank you so much for taking the time to be with us today. The interview seeks to explore the nutritional challenges and support needs for patients who are experiencing undernutrition by identifying these challenges and support needs aimed at improving their nutritional health and quality of life as they continue with renal replacement therapy. The findings of this study will be used to form the basis for developing strategies that will improve the quality of nutritional care provided to renal disease patients at Kenyatta National Hospital. This information will be anonymized and will be treated confidentially.

You may withdraw at any time during the interview if you feel uncomfortable answering questions.

Before we begin do you have any question?

## Appendix 2: Questionnaire

**Title of the study: Exploring the factors associated with nutrition and therapy related challenges and Support Needs among ESKD Patients on HD in the Renal Unit - Kenyatta National Hospital.**

Date: .....

Code: .....

### Instructions:

- a) Do not write your name(s) on the questionnaire.**
- b) Tick ALL appropriate responses in the spaces provided in each question.**
- c) Respond to ALL questions. DO NOT leave any questions unanswered**

### Section A:

Bio-socio-economic information of the respondents

1. Gender of the respondent: Male ( ) Female ( )

2. How old are you? .....

3. What is your education level?

No formal education ( ) Primary education ( )

Secondary education ( ) Tertiary education ( )

1. What do you do for a living?

Unemployed ( ) formally employed ( )

Casual labor ( ) Business ( )

Other (specify) .....

2. What is your marital status?

Single ( ) Married ( )

Separated ( ) Divorced ( )

Widowed ( ) Widower ( )

Who pays for your treatment and upkeep?

Self ( ) Partner ( ) Family ( ) NHIF ( )

Others sources specify.....

7. What is your approximate monthly income? .....

8. Where do you stay?

Rural area ( ) urban area ( )

9. Which type of house do you live in?

Permanent house ( ) Temporary house ( )

10. What is your source of water for cooking and other household use?

Tapped ( ) bore hole ( ) Rain water ( ) others specify.....

11. What is your source of power for lighting and cooking?

Electricity ( ) solar ( )

Kerosine ( ) Charcoal ( )

Gas ( ) Fire wood

Others specify.....

12. Do you smoke? Yes ( ) No ( )

13. Do you take alcohol? Yes ( ) No ( )

**Bio clinical information**

Parameters	Male	Female	Age	Outcome
Weight				
Height				
Body mass index				
Mid arm circumference				
Hemoglobin				
Albumin				
Cholesterol levels				

14. Is nutrition essential in your care following your current health condition? Yes ( ) No ( )

15. Briefly and simply, describe the diet recommended to you following hemodialysis?

.....  
.....

16. The following list highlights some of the potential barriers to effective adherence to one's dietary regimen. Kindly tick the ones that apply to you.

List of potential factors contributing to medication non-adherence	Tick the one that applies to you
How has your feeding pattern been the last 6 months?	Good ( )      Poor ( )      unaffected ( )
How many meals do you take in a day?	Once ( )    Twice ( )    Thrice ( )    Above 3 ( )
Which types of food do you find comfortable to eat?	Solid foods ( )    Semi-solid foods ( )    All foods ( )
Do you have any food restrictions that you think affects your feeding?	Medical ( )    Cultural ( )    Religious ( )
Do you have any personal food preferences that affects your feeding?  If yes, please specify.....	Yes ( )    No ( )
What are some of the foods which are readily available to you?	Animal proteins- beef ( ), pork ( ), chicken ( )  Crop proteins- beans ( ), peas ( ), others specify.....  Carbohydrates- ugali ( ), potatoes ( ), rice ( )  Vegetables- Sukuma ( ) cabbages ( ), others specify.....
Have you experienced any feeding disturbance the last 6 months?	Vomiting ( )    Abdominal pains ( )    Pain on swallowing ( )  Constipation ( )    Diarrhea ( )

17. Do you experience difficulties following your recommended nutritional/dietary regimen?

Yes [ ] No [ ]

18. If yes to the above, kindly mention the dietary compliance challenges that you face?

.....  
.....

19. What other needs do you have with respect to your recommended diet?

.....  
.....

20. In your view, what can be done to support you to effectively observe the prescribed end stage kidney disease diet?

.....  
.....

**Section C: Therapy related challenges and support needs**

21. Are you on any prescribed medications?

Yes ( ) No ( ), if yes how many times a day once ( ), Twice ( ), Thrice ( ), above three ( )

22. Have you missed your medication doses, at least three times, in the last one month?

Yes ( ) No ( )

23. The following list highlights some of the potential barriers to effective adherence to one's treatment regimen. Kindly tick the ones that apply to you.

List of potential factors contributing to medication non-adherence	Tick the one that applies to you
Sometimes I feel tired of taking medicines	
My medicines are complex I experience side effects of the medications	
My health is deteriorating Sometimes I forget to take my medication	
No one to remind me if I forget	
Low knowledge about the disease	
I don't have enough knowledge about my medications	
My medications are unaffordable to me as I have low income	

24. Any other reason contributing to you not taking your medications?

.....  
 .....

25. In your view, what can be done to support you to effectively take your medicines?

.....  
 .....

26. How many times do you come for dialysis in a week?

a) Twice ( ) b) Thrice ( )

27. Have you missed your dialysis session recently?

Yes ( ) No ( )

28. If yes to the above question, what made you miss your dialysis?

Briefly explain.....

Thank you for your participation.

**APPENDIX 3: Data analysis sample dummy table**

LEVEL OF SEVERITY WITH GENDER	LOW LEVEL OF SEVERITY	HIGH LEVEL OF SEVIRITY
MALE	20%	35%
FEMALE	10%	25%

**Table A: Relationship between gender and severity of malnutrition in ESKD on HD patients.**

Assuming n =70.


Level of severity with age	Low level of severity	High level of severity
<40yrs of age	25%	5%
>40yrs of age	15%	50%

**Table B: Relationship between age and level of severity of malnutrition in ESKD on HD patients.**


Assuming n =70



## Appendix 4: Approval Letter Erc



UNIVERSITY OF NAIROBI  
FACULTY 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](mailto: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](https://twitter.com/UONKNH_ERC)

Ref: KNH-ERC/A/402

11<sup>th</sup> October, 2022

Mark Parkire  
Reg No. H56/37284/2020  
Dept of Nursing Sciences  
Faculty of Health Sciences  
University of Nairobi



Dear Mark,

**RESEARCH PROPOSAL: NUTRITIONAL CHALLENGES AND SUPPORT NEEDS FOR PATIENTS WITH END STAGE KIDNEY DISEASE UNDERGOING HEMODIALYSIS AT KENYATTA NATIONAL HOSPITAL (P566/06/2022)**

This is to inform you that KNH-UoN ERC has reviewed and approved your above research proposal. Your application approval number is **P566/06/2022**. The approval period is 11<sup>th</sup> October 2022 – 10<sup>th</sup> October 2023.

This approval is subject to compliance with the following requirements;

- i. Only approved documents including (informed consents, study instruments, MTA) will be used.
- ii. All changes including (amendments, deviations, and violations) are submitted for review and approval by KNH-UoN ERC.
- iii. Death and life threatening problems and serious adverse events or unexpected adverse events whether related or unrelated to the study must be reported to KNH-UoN ERC 72 hours of notification.
- iv. Any changes, anticipated or otherwise that may increase the risks or affected 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.
- v. Clearance for export of biological specimens must be obtained from relevant institutions.
- vi. 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.
- vii. Submission of an executive summary report within 90 days upon completion of the study to KNH-UoN ERC.

Prior to commencing your study, you will be expected to obtain a research license from National Commission for Science, Technology and Innovation (NACOSTI) <https://research-portal.nacosti.go.ke> and also obtain other clearances needed.

Yours sincerely,



**DR. BEATRICE K.M. AMUGUNE**  
**SECRETARY, KNH-UoN ERC**

c.c. The Dean, Faculty of Health Sciences, UoN  
The Senior Director, CS, KNH  
The Assistant Director, Health Information Dept., KNH  
The Chairperson, KNH- UoN ERC  
The Chair, Dept, of Nursing Sciences, UoN  
Supervisors: Dr. Mary W Kamau, Dept, of Nursing Sciences, UoN  
Dr. Eunice Omondi, Dept. of Nursing Sciences, UoN

**Appendix 5: Approval Letter from KNH**



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

Tel.: 2726300/2726450/2726565  
Research & Programs: Ext. 44705  
Fax: 2725272  
Email: [knhresearch@gmail.com](mailto:knhresearch@gmail.com)

**Study Registration Certificate**

1. Name of the Principal Investigator/Researcher  
MARK PARKIRE

2. Email address: markireoleparkire@gmail.com Tel No. 0721370500

3. Contact person (if different from PI).....

4. Email address: parkireoleparkire@gmail.com Tel No. 0721370500

5. Study Title  
NUTRITIONAL CHALLENGES AND SUPPORT NEEDS FOR PATIENTS WITH ESKD ON HAEMODIALYSIS AND DIALYSIS UNIT AT KENYATTA NATIONAL HOSPITAL

6. Department where the study will be conducted RENAL UNIT  
(Please attach copy of Abstract)

7. Endorsed by KNH Head of Department where study will be conducted.  
Name: DR. WAMBUI, B.M. Signature [Signature] Date 26/10/2022

8. KNH UoN Ethics Research Committee approved study number \_\_\_\_\_  
(Please attach copy of ERC approval)

9. I MARK PARKIRE commit to submit a report of my study findings to the Department where the study will be conducted and to the Department of Medical Research.  
Signature [Signature] Date 25/10/22

10. Study Registration number (Dept/Number/Year) RENAL UNIT 1198/2022  
(To be completed by Medical Research Department)

11. Research and Program Stamp \_\_\_\_\_

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

## **APPENDIX 6: plagiarism report**