NUTRITION KNOWLEDGE, ATTITUDE, AND PRACTICES IN MANAGEMENT OF STAGE 5 CHRONIC KIDNEY DISEASE BY ADULT PATIENTS AT KENYATTA NATIONAL HOSPITAL, KENYA

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A THESIS SUBMITTED IN PARTIAL FULFILMENT OF THE REQUIREMENT FOR THE AWARD OF THE DEGREE OF MASTER OF SCIENCE (FOOD NUTRITION AND DIETETICS) IN THE SCHOOL OF PUBLIC HEALTH AND APPLIED HUMAN SCIENCES OF KENYATTA UNIVERSITY

NOVEMBER, 2019
DECLARATION

This thesis is my original work and has not been presented for a degree in any other university or for any other award.

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DEDICATION
This work is dedicated to my loving mother Hellen Jemaiyo and late father Kiprotich Tanui whose love for me and message of hard work and diligence has led to the realization of this study,

I further dedicate this work to my husband and children for their support and understanding throughout this study.
ACKNOWLEDGEMENT

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<tbody>
<tr>
<td>BP</td>
<td>Blood Pressure</td>
</tr>
<tr>
<td>CAPD</td>
<td>Continuous Ambulatory Peritoneal Dialysis</td>
</tr>
<tr>
<td>CKD</td>
<td>Chronic Kidney Disease</td>
</tr>
<tr>
<td>CPD</td>
<td>Continuous Peritoneal Dialysis</td>
</tr>
<tr>
<td>CRF</td>
<td>Chronic Renal Failure</td>
</tr>
<tr>
<td>eGFR</td>
<td>estimated Glomerular Filtration Rate</td>
</tr>
<tr>
<td>GFR</td>
<td>Glomerular Filtration Rate</td>
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<tr>
<td>DPI</td>
<td>Dietary Protein Intake</td>
</tr>
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<td>ESRD</td>
<td>End Stage Renal Disease</td>
</tr>
<tr>
<td>ESA</td>
<td>Erythropoietin Stimulating Agents</td>
</tr>
<tr>
<td>HD</td>
<td>Haemodialysis</td>
</tr>
<tr>
<td>HTN</td>
<td>Hypertension</td>
</tr>
<tr>
<td>IDWG</td>
<td>Inter Dialytic Weight Gain</td>
</tr>
<tr>
<td>KD</td>
<td>Kidney Disease</td>
</tr>
<tr>
<td>KDIGO</td>
<td>Kidney Disease Improving Global Outcomes</td>
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<tr>
<td>KDOQI</td>
<td>Kidney Dialysis Outcome Quality Initiative</td>
</tr>
<tr>
<td>NKAQH</td>
<td>Nutrition Knowledge Assessment Questionnaire for Haemodialysis</td>
</tr>
<tr>
<td>NIDDK</td>
<td>National Institute of Diabetes and Digestive and Kidney Diseases</td>
</tr>
<tr>
<td>PEM</td>
<td>Protein Energy Malnutrition</td>
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<tr>
<td>WHO</td>
<td>World Health Organization</td>
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OPERATIONAL DEFINITION OF TERMS

Chronic kidney disease (CKD): Diseases affecting normal functioning of the kidneys, they come in stages from normal, mild, moderate progressing on to severe the 5th stage

Stage 1: This is the first stage of kidney failure, without any symptoms. Kidneys perform their functions well with normal glomerular filtration rate >90ml/min/1.73m² but with some damage in the structure, high protein in the blood, blood in urine and structural abnormalities observed on further investigation.

Stage 2: There is mild performance in kidney function with other evidence of kidney reduced GFR at 60-90 ml/min/1.73m² including tubular disorders besides stage 1 symptoms.

Stage 3: Moderate performance in kidney function defined by a GFR of 30-59 mL/min/1.73m² with increased complications in form of high blood pressure, anaemia among the initial stage 1 and 2 symptoms. One may develop fluid retention, fatigue, experience urinary changes with back pain

Stage 4: Severely reduced function reflected by a GFR of 15-29 ml/min/1.73m² with increased kidney damage evidenced by increased wastes in the body with symptoms of bad breathe and loss of appetite, one would require dialysis to survive

Stage 5: The last stage when kidneys function have ceased and support needed to sustain life, this is defined by a GFR of 15 ml/min/1.73m² or less at this stage the kidneys have lost most or all of their function and dialysis or a transplant is required.
Dialysate: Solution in dialysis machines used to remove wastes and excess fluid from the blood

Glomerular filtration rate (GFR): Measure of the rate of kidney function in filtering wastes and excess fluid from the body in ml/minute/1.73m².

Estimated glomerular filtration rate (eGFR): A clinical estimation of the GFR obtained from getting the serum creatinine, this is done through scientific calculation by use of a formulae.

Haemodialysis (HD): A process through which blood from the patient is passed through an artificial kidney for removal of wastes and excess fluid before returning into the body.
ABSTRACT

Stage 5 Chronic Kidney Disease (CKD) is the fifth stage of the Quiet Stages of Chronic Kidney Disease. Optimal nutrition, medical treatment and management are inevitable in improving the quality of life, reducing morbidity and thus mortality of the patients. While there is no clear data on prevalence and incidence rates in Kenya and most developing countries, Kidney Disease is one of the most serious and currently emerging non-communicable diseases and continues to undermine the health of all age groups in Kenya and globally. There is evidence that nutrition intervention greatly alleviates adverse effects of the disease. Paucity of adequate documentation on nutrition knowledge, attitude and management practices justified the need for this study. The purpose of this study was to carry out an assessment of nutrition knowledge, attitude, and practices by adult patients in management of Stage 5 chronic kidney disease. The study was carried out in the renal unit of Kenyatta National Hospital. The study employed cross-sectional analytical design at facility where simple random sampling technique and random number generator were used to get 103 respondents. The researcher administered questionnaire was used to collect information from the respondents. Key Informant Interview (KII) guide was used to get information from health care workers on patients’ nutrition knowledge, attitude and practices in management of their condition. The qualitative and quantitative information obtained from the questionnaire was triangulated with literature review. Descriptive and inferential statistics was analyzed using statistical package for social sciences version 22. Chi-Square was used to find out the association between socio-demographic factors and nutrition knowledge of the patients. Correlation analysis test using Pearson correlation coefficient at 95% confidence with a probability value of p< 0.05 was used as a criterion for establishing statistical significance. The test was used to analyze relationships between nutrition knowledge, attitude and practices among the participants. The findings depicted participants with moderate nutrition knowledge levels regarding dietary intake. Their attitude to nutrition information and management practices was positive. Their ability to put nutritional management prescriptions into practice was poor as determined by duration on dialysis. There is need to improve nutrition knowledge levels of the patients, further enhance their attitudes by engaging participants to take up dietary practices for sustainable impact. This will alleviate complications arising from renal failure thus prolonging and improving the patients’ quality of live. The study generated information that may be useful to the ministry of health in policy formulation and review of operational standards in nutritional management of the condition Other organizations dealing with provision of nutrition care and support services for Stage 5 CKD patients may use results from this study to frequently update their health workers on dynamic nutrition management of their patients. A longitudinal research of similar study is recommended. The study results will be communicated back to the facility to improve and enhance nutrition management practices of patients by health care workers in the facility.
CHAPTER ONE: INTRODUCTION

1.1 Background to the study

Chronic kidney disease (CKD) has been categorized as one of the diseases of public health concern globally (Samar et al., 2018). The disease progresses through various stages resulting in the fifth and last stage when a patient depends on dialysis or transplant for survival (Barnet et al. 2008). Stage 5 CKD has been identified as the end stage of kidney performance increasing morbidity and mortality rates of patients. Globally 4.9-9 million people need renal replacement therapy (RRT) and out of these, only 2.6 million are on dialysis with at least 2.3 million dying prematurely due to inadequate access to RRT (Garcia et al., 2015). In Brazil, between 2000 and 2012, a study indicated an increase in incidence and prevalence rates among stage 5 CKD patients. Prevalence rates ranged between 3.2% - 4.0%/year and incidence rate 1.1% – 2.5%/year. The incidence rate was noted to increase in both sexes, in all parts of the country especially among the older age groups (Lenildo et al., 2014). Increase in prevalence and incidence rates could be attributed to inadequate knowledge on co-morbidities leading to CKD and progression to subsequent stages. The incidence and prevalence rates are based on estimates due to lack of national or regional registries on stage 5 CKD in most developing countries (Naiket at al., 2003). ESRD is projected to increase at the rate of 6-8% in Africa (Ojo A., 2014), with incidence rate estimated at 2.6% (Velandria et al., 2011).

In Sub-Saharan Africa the prevalence and incidence rates of stage 5 CKD are on the increase with communicable and non-communicable risk factors entailed (Stanifer et al., 2014). Stage 5 CKD is prevalent and linked with adverse outcomes like heart diseases and increased mortality due to many associated illnesses (Van der Velde et al., 2011).
CKD is not always identified and managed in an optimal and timely manner (Plantinga et al., 2008). It is said that CKD is a growing problem particularly in the developing countries (Fouque et al., 2017). A systematic review carried out in sub-Saharan Africa, concluded that stage 5 CKD is prevalent and potentially escalating. This was associated with the risk factors of both communicable and non-communicable diseases (Stanifer et al., 2014).

The morbidity and mortality rates of stage 5 CKD was found to be much higher compared to similar rates among the general population (Zoccali et al., 2010). Kidneys’ regulate water and electrolytes like sodium, phosphorus, potassium, magnesium and calcium concentration in the blood and body fluids. Kidneys further produce hormones that help to regulate blood pressure. The organ also helps in formation of the red blood cells besides promoting strength of bones in the body (Kerry et al., 2006). CKD affects proper functioning of the kidneys, progressively and irreversibly leading to stage 5 CKD or chronic renal failure (CRF). When kidneys fail, dialysis or kidney transplant will be required to maintain survival of the victim. Commonly identified causes of CKD locally include chronic glomerulonephritis, high blood pressure and diabetes (Campbell, 2002).

Patients with CKD though the level of failure may be moderate, have increased risk of developing heart diseases (Rossi et al., 2014). Proper nutritional assessments and evaluations are imperative in order to prevent increased rate of loss in performance of the kidneys. There is dire need to manage the co-morbid conditions like cardiovascular diseases, peripheral arterial diseases, stroke, and hypertension normally associated with renal failure (Adeera et al., 2008).
An estimated or measured glomerular filtration rate of less than 60 mL/min/1.73m² is considered abnormal for all adults. A rate greater than 60 mL/min/1.73 m² is considered abnormal if it is accompanied by abnormalities in parameters of urine sediments or abnormal reading of imaging tests results, the patient may have had unusual biopsy results indicating organ abnormalities (Lane et al., 2014).

Clients with CRF develop less kidney functioning at less than 10-15% of capacity. By then, the kidneys are unable to balance excretion processes of urine optimally leading to use of dialysis machines to aid in the excretion of wastes and excess fluids to save life (Harillal., 2006). CRF clients need to modify their diets, by regulating fluid intake, utilizing proteins as per serum albumin level results, regulating mineral intake namely sodium, phosphorous, potassium, among other nutrients. Diet regulation supports the dialysis machine which does not remove all wastes like the natural kidneys. It is very important to equip the patients with dietary information whose utility will be determined by their attitude and management practices.

Waste products do build up in the body between dialysis treatments. It is also very important to monitor fluids between sessions since majority of the patients undergoing dialysis pass very little urine or none. Inadequate or lack of urination leads to building up of water and fluids in various body parts like the lungs, ankles and the heart (Cynda et al., 2010). Knowledge on amount of fluid intake/ input compared to output is key for the patient in order to alleviate complications arising from fluid overload. The patients’ attitude and adherence to guidance on fluid regulation is thus inevitable.
1.2 Problem statement

A study by Wright, 2011 said approximately two thirds of patients in a nephrology clinic for kidney dysfunction reported to have little or no knowledge on foods to avoid with CKD. Not much is known on the aspects of nutrition knowledge, attitude and practices, a critical area in the management of the disease. There is inadequate documentation of similar researches done in Kenya. According to Cupisti et al., 2016, having good knowledge, attitude and practice about management of CKD, prevention and treatment helps decrease likelihood of many dialysis related complications.

Patients experience difficulties during selection of foods that are ideal for their condition as prescribed. Normally tend to choose foods that are familiar and or available to them (Webb et al., 2015). Stage 5 CKD patients need sufficient knowledge on foods ideal for individualized requirements to make decisions basing on their nutritive value, portion sizes and availability of food (Elliot at al., 2015). Protein-energy wasting as an aspect of stage 5 CKD is associated with poor appetite, nausea and vomiting due to increased uremia levels in the body. Adequate knowledge on foods that increase ammonia levels in blood, adherence to the prescribed diet regimen and good practice levels have been linked to prolonged lives and reduction in adverse effects caused by the disorder. Further there is improved quality of life and substantial decline in risks of morbidity and mortality.

The nutritionist at the renal unit of KNH did intermittent education and counseling to patients on dialysis basing on professional knowledge attained, with limited access to current literature. Contemporary guidelines specific to stage 5 CKD were inadequate thus the need for updated information to increase awareness, adherence and practice levels among the patients.
1.3 Purpose of the study

The aim of the study was to determine nutrition knowledge, attitude, and practices in management of stage 5 CKD by renal adult patients at Kenyatta National Hospital, Kenya.

1.4 Objectives of the study

The objectives of the study were;

1. To determine the demographic and socio-economic characteristics of adult stage 5 chronic kidney disease (CKD) patients attending renal unit of Kenyatta National Hospital
2. To establish nutrition knowledge in the management of stage 5 chronic kidney disease (CKD) among renal adult patients in Kenyatta National Hospital
3. To determine the attitude of adult stage 5 chronic kidney disease (CKD) patients to nutritional management of their condition
4. To establish the practices on nutritional management among adult stage 5 chronic kidney disease (CKD) patients in Kenyatta National Hospital
5. To determine the association between demographic, socio-economic factors, and nutrition knowledge, attitude and practices in management of stage 5 chronic kidney disease (CKD) among renal adult patients in Kenyatta National Hospital.

1.5 Hypotheses

H₀₁: There is no significant relationship between socio-demographic characteristics and nutrition knowledge of adult stage 5 chronic kidney disease patients.
H₀₂: There is no significant relationship between nutrition knowledge, attitude and practices in management of stage 5 chronic kidney disease among renal adult patients.

1.6 Significance of the study

The study generated information that may be useful to the nutrition section in the Ministry of Health in designing nutrition interventions through policies, guidelines or strategies to improve health care service provision to stage 5 CKD patients. The findings will be used as reference in future studies focusing on nutrition knowledge attitude and practices among renal patients. Other stakeholders like referral hospitals either in public or private sector offering dialysis may find this study resourceful for improving nutrition knowledge, attitude and management practices by their patients. The study gives highlights on gaps in nutrition knowledge, their attitude to nutrition information and their practice levels in managing the last of the five stages of CKD for patients undergoing haemodialysis.

1.7 Delimitations

The study was restricted to stage 5 CKD adult patients undergoing dialysis in renal unit of Kenyatta National Hospital (KNH) in Nairobi Kenya. This is the main national referral hospital in the country. The results would only be generalized to patients in facilities with the same characteristics.

1.8 Limitations of the study

The data collected was a cross-sectional one done at one point in time and may not reveal whether similar practices would vary over time.
1.9 Conceptual framework

The conceptual framework in figure 1.3 shows the relationship between nutrition knowledge, attitude, and practices and how this may affect nutrition management of stage 5 CKD. The framework was adopted from the theoretical model showing how literacy relates with CRF outcomes (Deva, 2009).

The framework shows how the independent variables relate to each other. These are Socio-demographic variables (Marital status, gender, religion, education level, age, including income and occupation); Knowledge that considers nutrient intake levels, interaction, regulation of salt, fluid and fats and the identification of the co-morbidities associated with CKF; and attitude that looks into the importance of regulating diet, understanding nutrition information and difficulty following dietary regulations in managing stage 5 CKD.

Knowledge levels may be determined by socio-demographic variables and attitude to nutrition information in managing stage 5 CKD. Attitude of the participants to nutrition information and its application may be determined by socio-demographic variables. Nutrition practices could be influenced by socio-demographic characteristics and attitude to nutrition information. Knowledge levels determine the patients’ ability to apply the skills already learnt or known to them. The patients’ perspective to nutrition information may influence their practice levels and vice versa basing on their health performance. The practice levels may also have an effect on the patients’ desire to acquire more information in managing their condition.

The dependent variable being the nutrition management practices entails; reduction in potassium intake, identification of supplements used and their functions; challenges
encountered in feeding; cost of recommended food and use of salt to control blood pressure. It is assumed that the relationship between socio-demographic variables, knowledge level and attitude to nutrition information by stage 5 CKD patients plays a major role in implementation of nutrition management practices.
1.10 Conceptual framework

The framework was adopted from the theoretical model and modified by the researcher (Deva et al., 2009)

**Independent variables**

**Dependent variables**

**Socio-demographic variables**
- Age
- Sex
- Religion
- Education level
- Marital status
- Income & Occupation

**Knowledge**
- Nutrient intake levels
- Nutrient interactions
- Salt, fluid, fat regulations
- Co-morbidities associated with CKF

**Attitude**
- Importance of regulating diet
- Understanding nutrition information
- Difficulty following dietary recommendations

**Nutrition Management Practices**
- Food preparation and consumption
- Reducing potassium intake
- Identifying Supplements used
- Challenges faced when feeding, poor appetite, nausea
- The cost of recommended food is high
- Reducing salt intake to combat pressure

Figure 1.3 Relationship between knowledge, attitude, and practices in nutritional management of stage 5 CKD

Source: Adapted and modified from, Deva and Gordon (2009)
CHAPTER TWO: LITERATURE REVIEW

2.0 Introduction

Nutrition knowledge greatly affect patients overall health outcomes in stage 5 CKD. The type and amount of food taken determines the body’s performance in relation to the condition. Protein sources are imperative in provision of amino acids either of low or high biological value and their utility in the body. Minerals from foods consumed affect electrolyte balance and may interact with certain drugs used. There are common nutritional needs and precautionary measures during various stages of CKD. Hyperkalemia does not usually develop until GFR falls to less than 20-25 mL/min/1.73m² at which point kidneys have decreased ability to excrete potassium (Pradeed A., 2017).

2.1 Summary of literature review

Socio-demographic and economic variables according to the literature review showed an impact on Nutrition Knowledge attitude and practices in management of stage 5 CKD. Participants who obtained nutrition education and counseling had better knowledge (Alipour et al., 2003), developed more positive attitude and practiced nutrition regimen prescribed. Sufficient financial support enabled the subjects to purchase foods that would minimize complications on consumption.

Younger participants exhibited low knowledge and adherence to recommended dietary practices compared to the older ones. Nutrition knowledge levels in literature review showed inadequate to no nutrition knowledge among the study populations in managing stage 5 CKD. Knowledge on interaction between phosphorous and calcium nutrients,
reduction of potassium from fruits and vegetables and also amount of protein and salt to take per day ranged from inadequate to none. Literature review however indicated that though there is awareness of the disease among CRF patients, the magnitude, symptoms, risk factors and strategies of intervention necessitated the need for continuous education and counseling at individual level. The reviewed literature indicated that attitude levels were influenced by social support availability of finance, comorbidities as well as availability and palatability of food. Evidence from literature says that adherence to dietary and medical regimes have constantly remained low, with poor dietary practices being the greatest predictor of mortality (Ramezani et al., 2018). The study addressed this gap by determining nutrition knowledge attitude and practices in management of Stage 5 CKD among renal adult patients at Kenyatta National Hospital, Kenya.

2.2 Overview of nutrition knowledge attitude and practices

Nutrition knowledge among renal patients in every stage is imperative in overall management of the disease. Their attitude towards dietary awareness from education and counseling greatly impacts on their management practices and outcomes in their day to day lives. When the kidneys fail, patients need nutrition knowledge to avert complications that may arise when kidneys are at minimal to nil levels of performance. Attitude towards nutritional management greatly determines their quality of life as well as life expectancy (Beer et al., 2018). A single center cross sectional study on 50 maintenance haemodialysis (MHD) patients in Bangladesh India, showed (63.2%) 40-55 year olds to be aware of renal dietary management regime with adequate knowledge score of 90-95%. Those in the age category between 55-65 years old (50%) had relatively higher nutrition knowledge score of 96-100% (Bhavana et al., 2008).
The same study gave attitude on compliance to prescribed renal dietary regime as 57.9% in 40-55 year old patient’s against 62.5% in the age category of 55-65 years old, both obtaining a score depicting a positive attitude. The study indicated that in spite of age, knowledge and attitude levels were found not to deviate much thus establishing a statistical non-significance (p>0.05). Further, on practice among haemodialysis patients, the study showed that about 80% of the subjects with moderate scores were in the 24 - 40 year old age category. A score of 68.7% of respondents were in the inadequate scoring range among 55-65 years age group. This therefore showed that there was a significant relationship with practice among various age categories from the findings (Bhavana et al., 2014). The study found that although patients showed high and adequate knowledge levels, attitude scores were adequate indicating a positive attitude, but their practice levels in relation to renal dietary regime was poor.

A study on nutrition knowledge attitude and practices among haemodialysis patients in Iraq showed a total score of patients’ nutritional knowledge with a mean and standard deviation of 10.38 ± 4.69 respectively. In total, 26% of subjects had poor knowledge of nutrition, 58% had average and only 16% had a good level of knowledge (Rahele et al., 2014). Overall, the patients' who had a high school education or university degree had Nutrition Knowledge Assessment Questionnaire for Haemodialysis (NKAQH) scores which were significantly higher than those of patients who had primary education or none (14.3 ± 3.95 vs. 9.7 ± 4.23, respectively, P = 0.005).

Another study by Alipour et al., (2003) reported that nutritional knowledge was low in 53% of renal patients. Moreover, they found a significant positive association between educational levels and nutritional knowledge scores. Non adherence rates to attendance
for haemodialysis, proper use of prescribed medications, fluid restrictions and dietary intakes ranged from 0% to 32.3%, 1.2% to 81%, 3.4% to 74% and 1.2% to 82.4% respectively. Poor adherence to the four types of behaviour could have adverse effects in terms of quality of life, increased morbidity rates, high cost in health care provision and also increased mortality rates (Block et al., 2004). Lack of compliance to dietary regimen is estimated to be found among 85% of patients undergoing hemodialysis (Oquendo et al., 2017) affecting their health outcome greatly.

Early CKD education and management have been shown to result in improved pre and post–end stage renal disease (ESRD) outcomes (Kurella et al., 2014). Providing nutrition education to a patient shows improved outcomes in managing ESRD and other chronic diseases (Cavanaugh et al. 2009). When patients fully understand how haemodialysis works, their adherence level to dietary and medical recommendations increase thus reducing hospitalization and mortality risks (Miyata et al., 2018). The outcome of patients therefore can be positively affected by increasing their knowledge levels on nutritional management of ESRD (Alikari, et al., 2015).

2.3 Socio-economic and demographic factors on nutrition management of Stage 5 CKD

In adult HD patients, factors that can influence knowledge and compliance to diet, medication and fluid intake include age, race, marital status, socio-economic status and educational level (Volcova, 2008). Educational level of patients was associated with adherence to fluid restriction. Dietary compliance may be improved by using dietary counseling techniques and that nutrition education motivates patients to change and comply with dietary recommendations (Rambod, 2010). Low socio-economic status is
associated with increased risk of chronic renal failure. Age and a higher monthly income increased nutritional practice levels among the stage 5 CKD patients according to Mousa et al., 2018. In families with lack of nutrition knowledge, the risk of CRF was increased by 110 % and 60 % among men and women respectively.

Galobardes et al., (2001) using education and occupation as socio-economic status indicators showed that lower education and lower occupation contribute independently to determining differences in dietary habits and that their effect is synergistic thus highlighting that several indicators are needed to fully capture someone’s socio-economic status. Another study indicated that nutrition education incorporated with behavior and cognitive components yields good health outcomes (Rizk et al. 2017).

Education may facilitate the acquisition of positive psycho-social and economic skills and may provide protection from adverse influences. This study depicts positive association between level of education and understanding of nutrition and medical instructions including the patient’s ability to apply them according to their body condition (Mousa et al., 2018).

The condition can be observed sooner in patients that ingest a diet rich in potassium or have low serum aldosterone levels. Common sources of low aldosterone levels are diabetes mellitus and use of angiotensin-converting-enzyme (ACE) inhibitors non-steroidal, anti-inflammatory drug (NSAID) or beta blockers. Acidemia or lack of insulin production aggravates hyperkalemia in CKD patients by causing an extracellular shift of potassium such as occurs in the setting of acidemia or from lack of insulin according to Pradeep, (2017).
2.4 Nutrition knowledge of stage 5 CKD patients

A study done by Wannacon, (2008) showed diverse challenges experienced by stage 5 CKD patients in an attempt to slow down progression of the disorder. In his study, he said 91% of the patients sampled stated lack of knowledge and skill concerning types of food and to use when planning their meals and how to manage diseases that came up over time. The study further found out that a large proportions of patients (78.2% - 99.0%) experienced serious lack of knowledge and proper understanding on types of foods restricted, especially proteins, fats, phosphate, potassium, water and minerals. Those who lacked knowledge on sodium intake restriction made up 38.6% of the study population.

This data indicated that patients with renal diseases need appropriate nutritional counseling to control the disease. The effective nutrition counseling in changing dietary habits could have important health benefits and also reduced medication costs (Iris, 2001). Therefore, there is a need for more efficient use of nutrition approaches in order to modify ways of life while improving renal progression among chronic kidney disease patients.

The use of low common salt diet, of less than 5.8 g - (2.3g [100 mmol] was found to decrease blood pressure in people who had no hypertension, according to Sacks et al., (2001).

There is evidence of clinical studies confirming that early introduction of dietary intervention may delay or altogether prevent the rate at which renal disease progressed. A meta-analysis conducted by Iris et al., (2001) on 10 randomized controlled trials assessing the effects of restricting protein diets on patients with CKD and either had
diabetes or not, indicated reduction in risk of getting renal failure or mortality among renal patients who already had no diabetes. A delay in the progression of damage to the nephrons, as evidenced by reduction in GFR or creatinine clearance level, was found among diabetic patients assessed.

In addition, more clinical trials carried out on humans showed that protein restriction as well as modification of different types of proteins taken had an important positive impact in delaying progression and or prevention of renal disease. Lack of sufficient intake of protein and energy diets among hemodialysis patients, led to protein-energy malnutrition this was confounded with the fact that amino acids were lost through metabolism and dialysis processes increasing the rates of mortality among the subjects (Kovesdy et al., 2010). Some studies indicate that consumption of soy-based protein provides a protective effect on proper functioning of the kidneys according to experiments done on animals and on people who had different levels of chronic kidney disease (Azadbhakht, 2003).

Intravenous iron was found to be very crucial in treatment of anemia of renal patients undergoing haemodialysis (KDIGO 2012). On the contrary, a study by Ishida et al., (2014), demonstrates no clear-cut benefits or damage from not giving iron intravenously to renal patients on admission in terms of aggravating or preventing infection among hemodialysis patients. It is however evident that it is very important to prevent anaemia and its associated complications. The kidney disease outcomes quality initiative (KDOQI., 2006) guideline and the kidney disease improving global outcomes (KDIGO 2012,) guideline, recommend use of IV iron by patients on dialysis. Use of Erythropoietin Stimulating Agent (ESA) aids in increasing hemoglobin (Hb) concentration that promotes
formation and increase in blood levels. Approximately two thirds of patients treated in a nephrology clinic for kidney dysfunction reported that they had little or no knowledge of foods to avoid with CKD, medications or symptoms of CKD (Wright, 2011). Poor nutrition knowledge of individualized treatment regime showed increased chances of poor-adherence by the subjects. On the other hand, enhanced patient education and counseling with the objective of improving nutrition knowledge of the patients as well as the value of practicing knowledge gained translating to slow progression of CKD to CRF therefore greatly delaying commencement of dialysis process. (Fischam., 2008). Nutrition knowledge was found to be very important in management of CKD (Adamasco et al., 2014).

2.5 Attitude of Stage 5 CKD patients to nutritional management

Haemodialysis is a treatment that is necessary to maintain life, but cannot replace the functions of the kidneys. Patients going through dialysis process need to be involved in a permanent change of lifestyle. These changes entail dietary regulations, fluid restrictions, complicated medical use of drugs and also frequent sessions to undergo dialysis treatment. (Kaveh et al., 2001). Lack of adherence to dietary regulations and fluid restrictions including use of medication regimes as prescribed increases the risk of adverse effects and reduction in patients’ quality of life (Durose et al., 2004). The mode that patients are required to change their attitude due to their current and critical body condition remains a major challenge that should be to be addressed from time to time.

According to the Theory of Planned Behavior (TPB) on understanding of health behavior, the likelihood of an individual engaging in a specific health behavior is
determined by one’s innate strength to adopt or reject the new behavior. The TPB also
states that perceived behavioral control can have a direct effect on behavior without the
meditating effect of attitudes towards the behavior and subjective norms. Consequently a
patient believing in the physician’s recommended dietary and fluid restrictions often do
so without the mediating effect of their attitude towards the restrictions, or perceptions of
subjective norms regarding the behavior (Azjenet al., 1980). The proportion of patients
who do not need further support could be established over time since individual needs
and perceptions are not similar.

2.6 Nutritional management practices of stage 5 CKD

Achievement of successful implementation of recommended nutritional management
practices by the subjects may be constrained by many factors leading to poor or
inadequate dietary practices (Bossola et al., 2005). These factors may include changes in
the taste of food, symptoms of uraemia accompanied by nausea, vomiting and metallic
taste of food as the major prohibitive symptoms to food intake (Middleton et al., 1999).
There are also dietary restrictions and regulations, (Wilkens et al., 2004) limited food
choices, and depression (Dodell et al., 1993).

Some explanations regarding renal patients experiencing changes in taste of food include;
metabolic disturbances, the deficiency of multiple micronutrients due to decreased food
intake and alterations in peripheral nerve function (Mahan et al., 2012). Drugs may also
either decrease or increase sensitivity to a certain taste. Patients participating in renal
replacement programs, such as HD and continuous ambulatory peritoneal dialysis
(CAPD), and with chronic uraemia have been shown to be affected the most (Mahan et al
Although global recommendations are available, nutrition care requires that it should be individualized based on serum chemistry levels, fluid and electrolyte balance and nutritional status (Schlenker et al., 2011). Non-adherence to fluid restriction and regulated dietary intake, have adverse effects in compromising the patients’ quality of life, increased illnesses and health-care costs including increase in mortality rates among dialysis patients (Block et al., 2004).

Patients with CKD and who are given advice by physicians on change of lifestyle in terms of dietary intake are more likely to comply compared with those who are not advised (Viera et al., 2008). Short term trainings meant to increase physicians’ nutritional knowledge can increase the rate at which physicians discuss, recommend prescribe specific dietary practices and other related activities with patients. This improves satisfaction by patients thus disease outcome (Eckman et al., 2012) In addition reduced cost of health care and quality of life is realized.

Considerable evidence suggests that perceived social support may be a strong predictor of dietary and fluid adherence among haemodialysis patients (Christensen et al., 2002). A survey carried out shows that despite the possible serious side-effects of dietary and fluid-adherence, haemodialysis patients by all accounts consistently exhibit poor adherence (Christensen, 2002) and nutritional status is quite strongly associated with mortality risk (Pifer, 2002). Non-adherence rates to attendance for HD, prescribed medications, fluid restrictions and dietary intake ranges from 0% to 32.3%, 1.2% to 81%, 3.4% to 74% and 1.2% to 82.4% respectively. Non-adherence to these four behaviours
can have disastrous consequences to the quality of life, increased morbidity, healthcare costs and mortality (Block et al., 2004).

2.7 Challenges in nutrition knowledge attitude and practices in management of stage 5 CKD

Nutrition knowledge, attitude, and practice of patients have been found to greatly affect management of stage 5 CKD. Malnutrition specifically protein energy malnutrition is quite common among stage 5 CKD patients, and compromises their chances of survival reducing quality of lives and increasing inflammation. A study by Pasticci et al., (2012) indicated that the needs of haemodialysis patients were more complex than those receiving peritoneal dialysis. A study in Pakistan highlighted the importance of early referral and continued education and counseling by medical professionals (Agrawal et al., 2009).

Patients need to know the stages of CKD and nutrition knowledge on management to avert complications and slow progression of the disease (Mahan et al., 2012). Late referral to a nephrologist or any medical staff from studies done, resulted in serious health consequences that included increased mortality risk (relative risk 1.68 at 1 year), increased morbidity with lower use of antihypertensive drugs. Other consequences include; suboptimal management of bone and mineral metabolism, lower serum albumin, and more use of temporary vascular access with increased risk of infection, prolonged hospital stay as well as reduced access to renal transplant surgeries (Stack et al., 2003). Patients who were advised by physicians to make lifestyle modifications on dietary
regimen were more likely to do so than those who received no such advice (Viera et al., 2008).

Attitude was found not to depend only on awareness but also on social support, financial support, dialysis regimen given, co-morbidities, availability and palatability of food accessed (Bhavana et al., 2014). Social support from studies done gave considerable evidence as a strong predictor of adherence to dietary regulation and fluid restriction (Christensen et al., 2002). Christensen et al., (2002) further said that despite the possible serious side-effects of dietary and fluid-adherence, haemodialysis patients by all accounts consistently exhibited poor adherence.

Lack of adherence to dietary and fluid restrictions including medication prescriptions were found to increase the risks of development of complications and reduction of the subjects’ quality of life (Durose et al., 2004). Global recommendations on dietary and fluid as well as general nutritional management practices are available, however nutrition care must be made considering individual needs basing on serum chemical parameters establishing, fluid balance and patients’ nutritional status (Schlenker et al., 2011).

A descriptive study was conducted on the awareness of kidney disease, among Africans and Americans. The results showed that African Americans awareness of kidney disease was high; that is about 70% but knowledge of the magnitude of the disease, its symptoms, its predisposing risk factors, and strategies for prevention and treatment were low; that is only 38%. These results served to justify the need for continued patient education to all individuals (Norrie et al., 2003). According to the Journal of American
Dietetic Association CRF patients have good knowledge of their diet. However they do not necessarily follow the prescribed diet (Durose et al. 2004). Socio-economic factors have a great impact in practice of nutrition information gathered. Patients may be depressed, be unable to buy their own food, obtain quality food including lack of family or other social support (Ikizler et al, 2013).

2.8 Recommended nutritional management practices in stage 5 CKD

Patients undergoing maintenance hemodialysis (MHD) or chronic peritoneal dialysis (PD) require a dietary prescription of energy intake at 35 kcal/kg/day for patients of age <60 years and 30 kcal/kg for patients of ages ≥60 years. Maintenance hemodialysis patients should be prescribed 1.2 g of protein/kg/day 50% should be of high biological value (KDOQI, 2000). A study on MHD patients, showed that protein intake that is less than 1.2 g/kg/day was associated with lower serum albumin levels and higher morbidity (Waknine, 2012).

These studies suggested that a Dietary Protein Intake (DPI) of about 1.2g/kg/day was necessary to ensure neutral or positive nitrogen balance in most MHD patients known to be clinically stable. It is recommended that at least half of the total protein foods taken should be of high biological value with amino acid content which is known to be similar to that of man (K/DOQI., 2000) besides humans have an efficient utility of amino acids that conserve their body proteins. This efficiency is said to increase with subjects who take less protein diet.

End Stage Renal Disease (ESRD) refer to the last stage of kidney function, thereafter kidneys fail, necessitating commencement of dialysis or kidney transplant in order to
sustain one’s life. Stages 1 and 2 of CKD causes a reduction in GFR which alone cannot be used as a marker of kidneys failing, since GFR may give readings indicating normal organ function or at the borderline of normalcy, other markers sought should include albuminuria. Patients undergoing hemodialysis were found to have a high prevalence of Protein Energy Malnutrition (PEM) and inflammation (Rao et. al., 2008). In order to prevent malnutrition of CRF patients undergoing dialysis, it is essential to carry out periodic nutrition screening that encompasses laboratory assessments, comparison of patients’ initial weight with usual body weight, percentage of ideal body weight, subjective global assessment, and dietary interviews to review their food diaries.

Nutrition education and counseling should be intensive initially and spaced to after every 1-2 months thereafter. If nutrient intake appears inadequate, malnutrition is apparent as adverse events or illnesses may distort the nutritional status of the patients calling for more intensified counseling. Dietary supplements could be provided if protein-calorie needs cannot be met through the recommended diet. Alternative intensive methods like tube feeding special enteral or parenteral feeds may be offered to cover the body’s approximated protein and calorie requirements (Kopple et al., 2001).

According to KDOQI Guidelines MHD and clinically stable patients should take proteins at 1.2g/kg/day of BW and PD clinically stable patients at 1.2-1.3g/kg//day of BW. These intakes are greater than the usually ingested protein intakes of MHD and CPD patients and are also greater than the recommended protein intakes for healthy, non-pregnant and non-lactating adults. This increase is to offset the substantial quantities of amino acids, peptides and proteins removed during dialysis process, and the protein catabolic state
caused by uremia. Protein consumption elevation aids in counteracting increased inflammations in the body, oxidative and carbonyl stresses including bio-incomplete dialysis materials due to MHD and CPD one is exposed to (Kopple et al., 2001). Higher intake of proteins requires higher doses of dialysis, lower intake of protein with sufficient energy intake requires lower doses of dialysis and both could give the same effects on nutritional status (Nakao et al., 2003).

Table 2.1 Recommended nutrient requirements for stage 5 chronic kidney disease

<table>
<thead>
<tr>
<th>NUTRIENT</th>
<th>AMOUNT REQUIRED/DAY</th>
</tr>
</thead>
<tbody>
<tr>
<td>Protein</td>
<td>1.1–1.5 g/kg/day of BW with at least 50% HBV</td>
</tr>
<tr>
<td>Energy</td>
<td>25–35 kcal/kg/day of BW</td>
</tr>
<tr>
<td>Calcium</td>
<td>2 g elemental/day from dietary and medication sources</td>
</tr>
<tr>
<td>Sodium</td>
<td>2.0–3.0 g/day (HD) to control interdialytic fluid gain</td>
</tr>
<tr>
<td>Potassium</td>
<td>2.0–4.0 g/day or 40 mg/kg/day of BW</td>
</tr>
<tr>
<td>Phosphorous</td>
<td>800-1000mg/day</td>
</tr>
<tr>
<td>Fluid</td>
<td>1,000 mL/day (+ urine output if present)</td>
</tr>
</tbody>
</table>

Source: Beto et al., (2014) Ramirez
CHAPTER THREE: METHODOLOGY

3.1 Research design

This was a facility based cross-sectional analytical study that assessed nutrition knowledge attitude and practices in management of stage 5 CKD among renal adult patients. A cross-sectional analytical design was used to facilitate collection of qualitative and quantitative data and enable identification of associations between variables (Katzenellenbogen et al., 2002).

3.2 Study variables

3.2.1 Dependent variable: Nutrition Management Practices of stage 5 Chronic Kidney Disease

3.2.2 Independent variable: Socio-demographics (marital status, age, religion, gender, education level) and economic (occupation and income) variables, knowledge on nutritional management and attitude towards nutritional management.

3.3 Location of the study

The study was carried out at Kenyatta National Hospital the national referral hospital in Nairobi country, Kenya. The facility is well equipped with modern dialysis equipment with well-trained health care workers specialized in managing renal insufficiency among patients undergoing dialysis in the hospital. The Hospital is a teaching and referral facility attracting many patients who are seeking for quality health care services. Patients are referred to the KNH from other smaller level facilities for specialized screening, assessment, treatment and management.
3.4 Target population

The study targeted stage 5 Chronic Kidney Disease adult patients attending renal unit for hemodialysis, a total of 305 patients underwent dialysis every week.

3.4.1 Inclusion criteria: All patients in renal unit at stage 5 of Chronic Kidney Disease who were present at the time of data collection and willing to participate in the study.

3.4.2 Exclusion criteria:

Patients who were eligible and who declined to consent were excluded. This also included those who were in critical condition and were unable to participate in the study.

3.5 Sample Size Determination

The formula used to calculate sample size is by Cochran (Israel, 1992) for population less than 10,000 (Fisher et al., 1998).

\[ N = \frac{Z^2 q (1-p)}{d^2} \]

Where; \( N \) = Sample size

\( Z \) = standard normal deviate corresponding to 95% Confidence Interval (1.96)

\( p \) = Prevalence of the characteristic of interest 50% used as \( p \) was unknown

\( q \) = the proportion of the absence of the characteristic of interest

\( d \) = degree of precision (set at ± 5%)

Substituting in the formula; \( N = (1.96)^2 (0.5) (0.5)/ (0.05)^2 = 384 \)
Since the population size was less than 10,000 (N = 100), the following adjusted formula was used:

\[ nf = \frac{n}{1 + \left(\frac{n}{N}\right)} \]

\[ \frac{384}{1 + \left(\frac{384}{135}\right)} = 99.8 \text{ approx.} 100 \]

10% was added to cater for non-response to make a population of 110, however data for only 103 was reported as non-response rate was 6%.

3.6 Sampling Technique

Simple random technique was used to select 110 patients determined by use of formula shown above. The number was arrived at by use of a random number generator.

The list of all participants was arranged from the first patient listed going for dialysis in the renal unit to the last one. A lower limit and the upper limit were filled in the random number generator and the click button entered. The random numbers were generated and appeared in the box. These were listed down and the exercise repeated until the sample size was attained.

3.7 Research instruments

3.7.1 Questionnaire

A research administered questionnaire with closed ended questions was used to collect information. Section A had 10 questions on socio-demographic factors of the patients (Gender, age, religion, marital status, education level, distance from dialysis center, income level, occupation, source of dialysis support and duration on dialysis). Section B
comprised 14 questions that assessed level of nutrition knowledge of the participants on Proteins, fluids, and minerals. Identification of food types, regulation of intake, food quantities and problems brought about by too much or deficiency in consumption of each nutrient, supplements, comorbidities and nutrition support obtained for every individual was assessed. Section C comprised 6 questions that elicited information on the patients’ attitudes and perceptions towards nutrition management practices. A Likert-scale was used to assess the participants’ attitudes (taking weight, watching type of food taken, poor appetite level, to weight loss, food supplements provided, controlling salt intake, following dietary recommendations and frequency). Section D comprised 10 questions assessing participants’ ability to practice the nutritional recommendation prescribed or learnt. Quantitative data was analyzed using Statistical Package of Social Sciences (SPSS) version 22 and qualitative data as given by Miles et al., (2013).

3.7.2 Key informant interview guide

Key Informant Interview Guide was prepared to provide in-depth information on the nutrition challenges faced by Stage 5 CKD patients, and how to address them. Current source of nutrition information used to address nutrition issues was considered. The team comprised nutritionists who had the duty of carrying out nutrition education, counseling and diet prescription to the CRF patients, physiotherapists, nurses and clinicians attending to the same patients in the renal unit.
3.7.3 Pre-testing of instruments

The data collection tools were pretested at Kenyatta National Hospital where ten patients with similar conditions were interviewed two weeks prior to the study. This facilitated correction and modification of possible ambiguous and unclear questions in the questionnaire. After review of the instruments, all suggested revisions were made before being administered in the actual study. This ensured that the instrument elicited the required information therefore enhancing validity, reliability and accuracy.

3.7.4 Validity of questionnaire

The research assistants were trained on how to ask questions and record data in a standardized way. This was ascertained during the pretesting of the instruments. The questions were then reviewed by a panel of nutrition experts before data collection to ensure questions elicited responses that provided intended information.

3.7.5 Reliability of data collection tools

Test-retest method was used to test reliability of the questionnaire in producing the same responses. The subjects of the pretest were interviewed twice within a span of one week between interviews to assess reliability stability of the questionnaire. Cronbach’s alpha correlation coefficient was used to measure reliability of data collection tools. The reliability coefficient was .84 suggesting that the items used had relatively high internal consistency. Therefore as the average inter-item correlation increased Cronbach’s alpha increased as well causing the number of items to be constant thus acceptable. A comparison was then made between answers obtained from both interviews and necessary adaptations on the questionnaire made. The pretest subjects were allowed to
make comments and give suggestions concerning simplicity and clarity of the questionnaire.

### 3.8 Recruitment and training of research assistants

The researcher recruited two research assistants with a minimum of Diploma in Food Nutrition and Dietetics and with research experience. They were trained on each objective and importance of using it as a guide during the interview. Explanation was made on clarity of each question and how to accurately record responses from the subjects without losing the meaning. Importance of keeping patients confidentiality was emphasized and reinforced as they carried out the interview. This was assured by the researcher through daily debriefing meetings after data collection.

### 3.9 Data collection techniques

#### 3.9.1 Questionnaire

The researcher assisted by two research assistants administered questionnaires to the participants. There was exchange of greetings, self-introduction by researchers and explanation of the contents of the informed consent to those who could not read on their own, this was done before the patient commenced dialysis session after which he /she either signed the consent or declined. Assistance was given for those who not complete the consent form. The exercise was carried out before dialysis sessions ensuring all sections on knowledge attitude and practice were covered. Data collection was done until the sample size was attained.
3.9.2 Key informant interview

The respondents’ consent was sought a week prior to the interview. These were staff purposively selected from the renal unit where they worked. They had different professional backgrounds. The researcher conducted a Key Informant Interview (KII) before or after Continuous Medical Education (CME) sessions carried out early Monday mornings as established in the renal program. This was done using questions as guided by the KII Guide. Responses were written down in note books. The interviews elicited information on the patients’ nutrition knowledge, attitude towards nutrition information and ability to put them into practice.

3.10 Data analysis and interpretation

Data analysis was done as guided by objectives and hypotheses of the study, using descriptive and inferential statistics (Table 3.1). Descriptive statistics such as frequency and percentage were used to describe demographic and socio-economic characteristics of the population. Inferential statistics were done using chi square with an alpha of 0.05 to test association between independent and dependent variables. A percentage value of $P < 0.05$ was used as a criterion for statistical significance as is usually recommended for social sciences (Sproull, 1988). Data from KII was transcribed, responses arranged in general categories identified in the discussion guideline then coded. Common themes were identified, inference made from each theme and conclusions drawn then triangulated with the data from the questionnaire. Results were presented in form of tables Conclusion about the study population was drawn based on statistical findings of the sample.
3.10.1 Nutrition knowledge

All 14 questions on knowledge were scored according to responses made by the participants. Each correct response was awarded one point while zero was awarded for every incorrect response. Participants who scored 0-4 points were categorized as low in nutrition knowledge, 5-9 Moderate, while 10 - 14 high.

3.10.2 Attitude towards nutrition management

Attitude of participants was determined by use of a five Likert-scale. There were 6 statements used to assess attitude. Strongly agree and agree responses were considered positive attitude and the converse was true for strongly disagree, disagree and neutral responses. A score of one was given for every response that depicted a positive attitude and zero for negative attitude. The responses were added up and categorized as positive for scores between 4-6 points and negative for scores ranging between 0-3 points.

3.10.3 Practice on management

Nutritional management practices were measured using five parameters namely; reducing potassium intake, identifying supplements used, feeding norms, accessibility (cost) of recommended food and reducing salt intake to combat pressure. A dummy variable (Nutritional management practiced) was deduced with average mean being the cut point. Score above the mean meant good practice while below the mean was poor. Data from KII was transcribed, responses arranged in general categories identified in the discussion guideline then coded. Common themes were identified, inference made from each theme and conclusions drawn then triangulated with the data from the questionnaire. Results
were presented in form of tables Conclusions about the study population were drawn based on statistical findings of the sample.

Table 3.1 Summary of variable data collection and analysis

<table>
<thead>
<tr>
<th>Objectives</th>
<th>Variables</th>
<th>Data sources</th>
<th>Type of Analysis</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. To determine the demographic and socio-economic characteristics of stage 5 Chronic Kidney Disease patients</td>
<td><strong>Socio-demographic:</strong> Age, sex, marital status education level, occupation, income</td>
<td>Questionnaire, Key Informant Interviews</td>
<td><strong>Descriptive:</strong> Frequency, percentages</td>
</tr>
<tr>
<td>2. To establish nutrition knowledge in management of adult stage 5 Chronic Kidney Disease patients</td>
<td>Knowledge scores</td>
<td>Questionnaire KII</td>
<td><strong>Descriptive:</strong> Frequency, percentages, mean</td>
</tr>
<tr>
<td>3. To determine the attitude of adult stage 5 Chronic Kidney Disease patients</td>
<td>Attitude scores</td>
<td>Questionnaire KII</td>
<td><strong>Descriptive:</strong> Frequency Percentages Mean</td>
</tr>
<tr>
<td>4. To establish the practices on nutritional management of adult stage 5 CKD patients</td>
<td>Ability to follow dietary prescription appropriately, Food access and utility</td>
<td>Questionnaire, Observation</td>
<td><strong>Descriptive:</strong> Frequency, Percentages, Means</td>
</tr>
<tr>
<td>5. To determine the relationship between demographic and socio-economic factors, and nutrition knowledge, attitude and practices in management of adult stage 5 CKD</td>
<td>Age, marital status, gender, education level, Occupation, level of income Knowledge score, Attitude score, Adherence to dietary prescription, access and utility</td>
<td>Questionnaire, Key Informant Interviews</td>
<td><strong>Inferential:</strong> Chi- Square Pearson correlation SPSS version 22</td>
</tr>
</tbody>
</table>
3.11 Logistical and ethical considerations

Approval to conduct research was granted by Graduate School of Kenyatta University and ethical clearance obtained from Kenyatta University Ethics and Research Committee (Appendix A) which could be accessed via email: secretary.kuerc@ku.ac.ke. Research approval (Appendix B) and permit (Appendix C) were obtained from the National Commission for Science, Technology and Innovation (NACOSTI). Study approval was obtained from the administration of Kenyatta National Hospital (Appendix D). Informed written consent was sought from the participants who upon signing led to commencement of the interview (Appendix E). Assurance of privacy and confidentiality of information obtained was done by not having their names written on the questionnaire but anonymous codes were inscribed on them (Appendix F). Study procedures, discomforts and risks, information on benefits as well as rewards was also clarified to the participants and included in the consent form.
4.1 Introduction

The chapter gives comprehensive findings of the study depicted by use of tables, bar graphs, appropriate explanations and descriptions reflecting the actual situation of the sampled population. The target of the study was 110 participants. The actual number sampled was 103 who were eligible and consented to the study all of whom were in stage 5 chronic kidney disease attending renal unit at Kenyatta National Hospital.

4.1.1 Demographic and socio-economic characteristics of the study population

Male respondents made up more of the study population than females 63.1% vs 36.9% (Table 4.1). Most participants had completed secondary school (39.8%), while 26.2% had completed primary and tertiary qualifications, respectively. Only 1% had never attended school. Most participants were Christians (90.3%), 6.8% were traditional African, 1.9% Muslims and 1% were Hindus. Many respondents were unemployed (49.5%), 22.3% were self-employed with 14.6% earning a salary and 13.6% doing casual work. The majority (80.6%) earned less than 20,999Ksh per month. The main source of support was the family (59.2%) or self (35%). Most of the participants were between 30-41 years, at 33% of the sampled population. The least being the elderly who were 66 years of age and above, comprising 7.8% of the respondents.
Table 4.1 Demographic and socio-economic characteristics of the study population

<table>
<thead>
<tr>
<th>Variables</th>
<th>N = 103</th>
<th>n (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Gender</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>65</td>
<td>63.1</td>
</tr>
<tr>
<td>Female</td>
<td>38</td>
<td>36.9</td>
</tr>
<tr>
<td><strong>Marital status</strong></td>
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<tr>
<td>Married</td>
<td>73</td>
<td>70.9</td>
</tr>
<tr>
<td>Single</td>
<td>25</td>
<td>24.3</td>
</tr>
<tr>
<td>Widowed</td>
<td>3</td>
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</tr>
<tr>
<td>Divorced</td>
<td>2</td>
<td>1.9</td>
</tr>
<tr>
<td><strong>Education levels</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>None</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Primary</td>
<td>27</td>
<td>26.2</td>
</tr>
<tr>
<td>Secondary</td>
<td>41</td>
<td>39.8</td>
</tr>
<tr>
<td>Tertiary</td>
<td>27</td>
<td>26.2</td>
</tr>
<tr>
<td>Graduate</td>
<td>7</td>
<td>6.8</td>
</tr>
<tr>
<td><strong>Religion</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Christians</td>
<td>93</td>
<td>90.3</td>
</tr>
<tr>
<td>Traditional African</td>
<td>7</td>
<td>6.8</td>
</tr>
<tr>
<td>Muslims</td>
<td>2</td>
<td>1.9</td>
</tr>
<tr>
<td>Hindu</td>
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<td>1.0</td>
</tr>
<tr>
<td><strong>Main occupation</strong></td>
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<td></td>
</tr>
<tr>
<td>Employed and salaried</td>
<td>15</td>
<td>14.6</td>
</tr>
<tr>
<td>Self-employed</td>
<td>23</td>
<td>22.3</td>
</tr>
<tr>
<td>Casual work</td>
<td>14</td>
<td>13.6</td>
</tr>
<tr>
<td><strong>Unemployed</strong></td>
<td>51</td>
<td>49.5</td>
</tr>
<tr>
<td><strong>Monthly earning</strong></td>
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<td></td>
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<tr>
<td>≤ 20,999</td>
<td>83</td>
<td>80.6</td>
</tr>
<tr>
<td>21,000 – 30,999</td>
<td>7</td>
<td>6.8</td>
</tr>
<tr>
<td>31,000 – 40,999</td>
<td>8</td>
<td>7.8</td>
</tr>
<tr>
<td>41,000 – 50,999</td>
<td>3</td>
<td>2.9</td>
</tr>
<tr>
<td>≥ 51,000</td>
<td>2</td>
<td>1.9</td>
</tr>
<tr>
<td><strong>Source of medical support</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Self</td>
<td>36</td>
<td>35</td>
</tr>
<tr>
<td>Family</td>
<td>61</td>
<td>59.2</td>
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<tr>
<td>External</td>
<td>6</td>
<td>5.8</td>
</tr>
<tr>
<td><strong>Age category</strong></td>
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<td></td>
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<tr>
<td>18-34</td>
<td>34</td>
<td>33</td>
</tr>
<tr>
<td>35-44</td>
<td>26</td>
<td>25</td>
</tr>
<tr>
<td>45-54</td>
<td>16</td>
<td>16</td>
</tr>
<tr>
<td>55-64</td>
<td>15</td>
<td>15</td>
</tr>
<tr>
<td>≥ 65 years</td>
<td>12</td>
<td>11</td>
</tr>
</tbody>
</table>

4.1.2 Knowledge on fluid intake

Over half (61.2%) of the participants said they were expected to decrease fluid intake per day (Table 4.2), 32% said they were required to take fluids moderately, (4.9%) said they should increase fluid intake. Only 2% said they should not change amount of fluid intake.
Fluid intake should be moderated to meet body needs. On knowledge of problems resulting from excess fluid intake 35% said loss of breath. 32% weight gain, 13% lung problems and 1% weight loss. Multiple responses encompassed 19% (n=20) of the study population. Excess fluid intake results in all the options given in the choices except weight loss. These problems are also experienced when patients delay going for dialysis. Pulmonary oedema may result hampering functionality of the heart due to buildup of fluids.

Table 4.2 Knowledge levels on use of fluids

<table>
<thead>
<tr>
<th>Knowledge</th>
<th>Variables</th>
<th>n</th>
<th>(%)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Use of fluids</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No change</td>
<td></td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Increase</td>
<td></td>
<td>5</td>
<td>4.9</td>
</tr>
<tr>
<td>Moderate</td>
<td></td>
<td>33</td>
<td>32</td>
</tr>
<tr>
<td>Decrease</td>
<td></td>
<td>63</td>
<td>61.1</td>
</tr>
<tr>
<td><strong>Problems from excess fluid intake</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Loss of breath</td>
<td></td>
<td>36</td>
<td>55</td>
</tr>
<tr>
<td>Weight Gain</td>
<td></td>
<td>33</td>
<td>22</td>
</tr>
<tr>
<td>Lung problems</td>
<td></td>
<td>13</td>
<td>13</td>
</tr>
<tr>
<td>Weight loss</td>
<td></td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td><strong>Expected fluid intake 500-1000ml/day</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Strongly agree</td>
<td></td>
<td>18</td>
<td>17.5</td>
</tr>
<tr>
<td>Agree</td>
<td></td>
<td>35</td>
<td>34</td>
</tr>
<tr>
<td>Strongly disagree</td>
<td></td>
<td>9</td>
<td>8.7</td>
</tr>
<tr>
<td>Disagree</td>
<td></td>
<td>41</td>
<td>39.8</td>
</tr>
</tbody>
</table>

4.1.3 Knowledge on use of minerals

Most participants (64.1%) said green bananas and potatoes respectively, have high potassium levels compared to other foods (Table 4.3) Green bananas contain 465mg of potassium/100g) while potatoes have 391mg/100g. There were multiple responses from 38.8% participants; 4.9% said milk while 3.9% said fruit. Only 1% said fish and meat
respectively. The standard serum potassium level is 3.5-5 mmol/L (Ahmed et al., 2001). High potassium levels in the body causes irregular heart beat and heart disease which is often fatal. Knowledge on problems that would arise with high levels of potassium in blood indicated 65% of the participants saying itchy skin; 14.6% said dizziness and heart disease respectively, 13.6% said muscle cramps. 7.8% gave multiple responses. Most respondents had no idea on the effects of high potassium levels in the body.

Respondents’ knowledge on use of salt showed majority (87.3%) saying they should avoid or reduce intake; 7.8% said they should take in moderation while 3.9% said they should increase. Only 1% would not change amounts used. Increased salt intake among stage 5 CKD patients is associated with increased thirst and build up of fluid in the body (Nutrition and Hemodialysis, 2013). The participants’ responses on food items with high sodium/salt levels showed 71.4% said sausages 15.5% said lemon while 6.8% and 3.9% boiled maize and dried fruits respectively. Sausages contain salt normally used as a preservative leading to increased levels in the food product.

Almost three quarters of the population therefore were aware of the high salt content in sausages. Three quarters of the participants (75.5%) said high blood pressure would arise on high intake of sodium/salt, 39.6% said heart burns, 28.1% gave multiple responses, 10% said cardiac disease and obesity would result. High salt intake increases electrolyte imbalance affecting osmotic pressure. This leads to increased thirst that result in high water intake in an effort to create the balance. This intercellular fluid imbalance affects the blood pressure, consequently causing high blood pressure sometimes heart burn and cardiac disease.
Table 4.3 Knowledge levels on use of minerals

<table>
<thead>
<tr>
<th>Knowledge Variables</th>
<th>n</th>
<th>(%)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Foods with high potassium levels</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Milk</td>
<td>5</td>
<td>4.9</td>
</tr>
<tr>
<td>Fruits</td>
<td>4</td>
<td>3.9</td>
</tr>
<tr>
<td>Potatoes</td>
<td>66</td>
<td>64.1</td>
</tr>
<tr>
<td>Green bananas</td>
<td>66</td>
<td>64.1</td>
</tr>
<tr>
<td><strong>Problems expected from high potassium levels in the blood</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dizziness</td>
<td>15</td>
<td>14.6</td>
</tr>
<tr>
<td>Itchy skin</td>
<td>67</td>
<td>65</td>
</tr>
<tr>
<td>Muscle cramps</td>
<td>14</td>
<td>13.5</td>
</tr>
<tr>
<td>Heart disease</td>
<td>15</td>
<td>14.6</td>
</tr>
<tr>
<td><strong>Proportion of common salt to be used (2g/day)</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Avoid/reduce</td>
<td>90</td>
<td>87.3</td>
</tr>
<tr>
<td>Moderate</td>
<td>8</td>
<td>7.8</td>
</tr>
<tr>
<td>Increase</td>
<td>4</td>
<td>3.9</td>
</tr>
<tr>
<td>No change</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td><strong>Foods containing high salt levels</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sausages</td>
<td>74</td>
<td>71.4</td>
</tr>
<tr>
<td>Lemon</td>
<td>16</td>
<td>15.5</td>
</tr>
<tr>
<td>Boiled Maize</td>
<td>7</td>
<td>6.8</td>
</tr>
<tr>
<td>Dried Fruits</td>
<td>4</td>
<td>3.9</td>
</tr>
<tr>
<td><strong>Foods rich in calcium</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Milk</td>
<td>57</td>
<td>55.3</td>
</tr>
<tr>
<td>Fish</td>
<td>40</td>
<td>38.8</td>
</tr>
<tr>
<td>Rice</td>
<td>9</td>
<td>8.7</td>
</tr>
<tr>
<td>Fruits</td>
<td>6</td>
<td>5.8</td>
</tr>
<tr>
<td><strong>Problems expected when calcium levels are high</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bone disease</td>
<td>68</td>
<td>57.3</td>
</tr>
<tr>
<td>Muscle cramps</td>
<td>27</td>
<td>26.2</td>
</tr>
<tr>
<td>Vascular calcification</td>
<td>10</td>
<td>9.7</td>
</tr>
<tr>
<td>Vomiting</td>
<td>3</td>
<td>2.9</td>
</tr>
<tr>
<td><strong>Foods rich in phosphorous</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dairy products</td>
<td>57</td>
<td>55.3</td>
</tr>
<tr>
<td>Nuts and seeds</td>
<td>31</td>
<td>30.1</td>
</tr>
<tr>
<td>Fruits</td>
<td>11</td>
<td>10.7</td>
</tr>
<tr>
<td>Vegetables</td>
<td>7</td>
<td>6.8</td>
</tr>
<tr>
<td><strong>Problems expected when phosphorous levels are high in the blood</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Stomachache</td>
<td>55</td>
<td>53.4</td>
</tr>
<tr>
<td>Liver disease</td>
<td>34</td>
<td>33</td>
</tr>
<tr>
<td>Bone &amp; Joint disease</td>
<td>13</td>
<td>12.6</td>
</tr>
<tr>
<td>Cardiac disease</td>
<td>8</td>
<td>7.8</td>
</tr>
</tbody>
</table>
Milk is one of the dairy products containing high calcium levels. Half (50%) of the respondents selected milk as the food rich in calcium, 38.8%, said fish. All other foods rice, meat, fruits and beans each scored less than 10%, 13.6% gave multiple responses. Over fifty percent of the respondents gave dairy products, yoghurt and milk as foods rich in phosphorous (55.3%), a third (30.1%) said nuts and seeds while 10.7% said fruits. While 5.8% said vegetables. Dairy products, yoghurt and milk provide the highest source of phosphorous.

Over fifty percent of participants 57.3% said bone disease would result from high levels of calcium in the body, 26.2% said muscle cramps, 9.7%, 2.9% and 3.9% of the participants said vascular calcification, vomiting and multiple responses respectively. Vascular calcification normally arises due to high build-up of calcium mineral in the body. Most respondents therefore had no knowledge on the consequences of high levels of calcium in the body. Over half of respondents 53.4% said they would have stomachache if they took food high in phosphorous, 33% said liver disease, 12.6% said bone and joint disease and then 10% said cardiac disease, 6.8% of participants gave multiple responses. High phosphorous levels in the body lead to precipitation of calcium and withdrawal from the bones leading to bone disease (osteodystrophy) experienced through weakening and fragility of the clients’ skeletal system. Almost three quarters of the participants (72.8%) reduced/avoided salt intake to normalize blood pressure, 37.9% took less fluid and 3.9% checked their blood pressure daily. Only 1% took less food to manage blood pressure with 15.6% multiple responses.
4.1.4 Knowledge levels on use of proteins

Respondents’ use of proteins showed half of them (50.5%) saying it should be reduced (Table 4.4). 44.7% said it should be taken in moderation, 2.9% there should be no change and 1.9% said it should be increased. Patients undergoing haemodialysis are supposed to increase protein intake as it is lost during dialysis, metabolism and inflammation. Less intake would lead to wasting and finally Protein Energy Malnutrition a condition that increases morbidity and mortality rates. Majority of the respondents (85.4%) said malnutrition would result from low intake of proteins, 13.6% and 10.7% said oedema and bone disease respectively while 11.7% gave multiple responses. Only 1.9% said blood pressure would result. Most participants knew malnutrition would arise from low protein intake. Clarity on how they were expected to use or the right quantity corresponding to their body needs was missing.

Knowledge on co-morbidities or Non communicable diseases leading to stage 5 CKD showed majority of the participants (80.6%) said diabetes, 60.2% said hypertension. There were multiple responses from close to half of the respondents at 49.5% indicating knowledge on diabetes and hypertension as diseases leading to stage 5 CKD. Few participants (7.8%) said heart failure with only 1% saying pneumonia. Kidney disease, diabetes, hypertension and heart failure are diseases that overtime lead to stage 5 CKD. The responses indicated awareness of diabetes and hypertension leading to stage 5 CKD but not heart failure, yet all the three are co-morbidities.
Table 4.4 knowledge levels on use of proteins

<table>
<thead>
<tr>
<th>Knowledge</th>
<th>Variables</th>
<th>n</th>
<th>(%)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Use of proteins</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Reduce</td>
<td></td>
<td>52</td>
<td>50.5</td>
</tr>
<tr>
<td>Moderate</td>
<td></td>
<td>46</td>
<td>44.7</td>
</tr>
<tr>
<td>No change</td>
<td></td>
<td>3</td>
<td>2.9</td>
</tr>
<tr>
<td>Increase</td>
<td></td>
<td>2</td>
<td>1.9</td>
</tr>
<tr>
<td><strong>Problems that may arise due to low protein intake</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Malnutrition</td>
<td></td>
<td>88</td>
<td>85.4</td>
</tr>
<tr>
<td>Oedema</td>
<td></td>
<td>14</td>
<td>13.6</td>
</tr>
<tr>
<td>Bone disease</td>
<td></td>
<td>11</td>
<td>10.7</td>
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<tr>
<td>High Blood pressure</td>
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<td>1.9</td>
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<tr>
<td><strong>Diseases that lead to stage 5 CKD</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Diabetes</td>
<td></td>
<td>83</td>
<td>80.6</td>
</tr>
<tr>
<td>Hypertension</td>
<td></td>
<td>62</td>
<td>60.2</td>
</tr>
<tr>
<td>Heart failure</td>
<td></td>
<td>8</td>
<td>7.8</td>
</tr>
<tr>
<td>Pneumonia</td>
<td></td>
<td>1</td>
<td>1</td>
</tr>
</tbody>
</table>

4.4.5 Knowledge levels among stage 5 chronic kidney disease

Knowledge levels considered all the categories of key food types forming a composite result. The participants’ responses on importance of diet in management of stage 5 CKD indicated 63% as knowledgeable. On nutritional aspects in management of their condition over three quarters were not knowledgeable (76%). Majority of the participants understood nutrition information given as education and counseling by the nutritionist. There were 59% of respondents who did not know that fluid intake was supposed to be moderated. Buildup of extra fluid due to inability of the kidneys to regulate it can raise blood pressure more. Kidneys play an important role in regulating blood pressure with aldosterone hormone. Salt intake was reduced or totally avoided by over three quarters of
Most participants (86%) were not knowledgeable on use of proteins.

### Table 4.5 Knowledge levels among stage 5 chronic kidney disease

<table>
<thead>
<tr>
<th>Variable</th>
<th>n</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Diet is important in management of CKD</strong></td>
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<td></td>
</tr>
<tr>
<td>Not knowledgeable</td>
<td>38</td>
<td>37</td>
</tr>
<tr>
<td>knowledgeable</td>
<td>65</td>
<td>63</td>
</tr>
<tr>
<td><strong>Nutritional aspect of management of CKD</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Not knowledgeable</td>
<td>78</td>
<td>76</td>
</tr>
<tr>
<td>knowledgeable</td>
<td>25</td>
<td>24</td>
</tr>
<tr>
<td><strong>Understanding nutrition information given</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Not knowledgeable</td>
<td>93</td>
<td>18</td>
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<td>knowledgeable</td>
<td>10</td>
<td>82</td>
</tr>
<tr>
<td><strong>Moderate fluid intake for CKD</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Not knowledgeable</td>
<td>61</td>
<td>59</td>
</tr>
<tr>
<td>knowledgeable</td>
<td>42</td>
<td>41</td>
</tr>
<tr>
<td><strong>Reduced sodium for CKD</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Not knowledgeable</td>
<td>80</td>
<td>78</td>
</tr>
<tr>
<td>knowledgeable</td>
<td>23</td>
<td>22</td>
</tr>
<tr>
<td><strong>Moderate use of protein for CKD</strong></td>
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<td></td>
</tr>
<tr>
<td>Not knowledgeable</td>
<td>89</td>
<td>86</td>
</tr>
<tr>
<td>knowledgeable</td>
<td>14</td>
<td>14</td>
</tr>
<tr>
<td><strong>Reduced use of cholesterol rich food</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Not knowledgeable</td>
<td>101</td>
<td>98</td>
</tr>
<tr>
<td>knowledgeable</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td><strong>Reduced use of soluble vitamin A rich foods</strong></td>
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<td></td>
</tr>
<tr>
<td>Not knowledgeable</td>
<td>90</td>
<td>87</td>
</tr>
<tr>
<td>knowledgeable</td>
<td>13</td>
<td>13</td>
</tr>
<tr>
<td><strong>Take upto1000ml of Water daily</strong></td>
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</tr>
<tr>
<td>Not knowledgeable</td>
<td>73</td>
<td>71</td>
</tr>
<tr>
<td>knowledgeable</td>
<td>30</td>
<td>29</td>
</tr>
<tr>
<td><strong>Hypertension lead to CRF</strong></td>
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<td></td>
</tr>
<tr>
<td>Not knowledgeable</td>
<td>10</td>
<td>10</td>
</tr>
<tr>
<td>knowledgeable</td>
<td>93</td>
<td>90</td>
</tr>
</tbody>
</table>

Patient on dialysis, require increased protein intake. This should be consumed at a rate of at least 1.2 g/kg bwt/day, 50% of which should be of high biological value. Use of
cholesterol levels showed that almost all participants 98% did not know that foods high in cholesterol should be reduced. Lack of knowledge on reduction in use of vitamin A rich foods (87%) and use of 500-1000ml of water/day (71%) was realized.

4.2 Nutrition knowledge score

All the questions on knowledge were scored according to responses made by the participants. There were 14 categories of questions used to assess knowledge levels of the participants. Each correct response was awarded one point while zero points were awarded for every incorrect response. Participants who scored 0-4 points were categorized as low in nutrition knowledge (24%), 5-9 Moderate (46%) while 10-14 high (25%) in nutrition knowledge (Table 4.5). Most participants had moderate knowledge levels. Adoption of the Blooms, 1956 standards as cut-off references was used to categorize knowledge scores.

<table>
<thead>
<tr>
<th>N=103</th>
</tr>
</thead>
<tbody>
<tr>
<td>n</td>
</tr>
<tr>
<td>Low</td>
</tr>
<tr>
<td>Moderate</td>
</tr>
<tr>
<td>High</td>
</tr>
</tbody>
</table>

4.3. Attitude of stage 5 CKD patients to nutritional management

Above three quarters (78%) of the participants responses on importance of controlling salt in managing stage 5 CKD depicted a positive attitude towards controlling salt intake
(Table 4.6), 37% had a negative attitude and would not consider it important to control salt. Attitude on value of weighing oneself daily was given as positive by 23% of the participants.

Table 4.6: Attitude of participants to nutritional management

<table>
<thead>
<tr>
<th>Responses</th>
<th>n</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Importance of controlling salt in the diet</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Positive</td>
<td>80</td>
<td>78</td>
</tr>
<tr>
<td>Negative</td>
<td>23</td>
<td>22</td>
</tr>
<tr>
<td>Value of weighing oneself daily</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Positive</td>
<td>24</td>
<td>23</td>
</tr>
<tr>
<td>Negative</td>
<td>79</td>
<td>77</td>
</tr>
<tr>
<td>Watching food types to eat</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Positive</td>
<td>74</td>
<td>72</td>
</tr>
<tr>
<td>Negative</td>
<td>29</td>
<td>31</td>
</tr>
<tr>
<td>Food supplements provide nutrients needed in the body</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Positive</td>
<td>65</td>
<td>63</td>
</tr>
<tr>
<td>Negative</td>
<td>38</td>
<td>37</td>
</tr>
<tr>
<td>Difficulty in following dietary recommendations</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Positive</td>
<td>67</td>
<td>65</td>
</tr>
<tr>
<td>Negative</td>
<td>36</td>
<td>35</td>
</tr>
</tbody>
</table>

Over three quarters (77%) gave responses depicting a negative attitude. Concerning wasting arising from poor appetite and change in the taste of food consumed, 72% of the participants concurred with the statement, that wasting was due to poor appetite and change in the taste of food, a third disagreed due to their negative attitude. Food supplements’ provision of nutrients needed in the body elicited positive attitude from
63% of the participants while 38% did not concur thus a negative attitude. Difficulty in following dietary recommendations elicited responses depicting a positive attitude among 65% of the participants while 35% indicated a negative attitude. In chronic hemodialysis, a patient’s fluid status is reflected by their interdialytic weight gain (IDWG). High IDWG has been associated with complications such as hypertension, congestive heart failure, and even death.

**4.4 Attitude scores to nutritional management of stage 5 CKD**

Attitude of participants was determined by use of a likert type scale. There were 6 statements used to assess attitude. A score of one was given for every response that depicted a positive attitude and zero for negative attitude. The responses were added and categorised as positive for scores between 4-6 and negative for scores ranging between 0-3 (Table 4.7). The responses were used to determine participants who conquered (strongly agree or agree) or disapproved to the statement (strongly disagree or disagree). Most of the respondents had positive attitude to nutrition management practices.

**Table 4.7: Attitude scores to nutritional management of stage 5 CKD**

<table>
<thead>
<tr>
<th></th>
<th>n</th>
<th>Scores (points)</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Positive</td>
<td>82</td>
<td>4 – 6</td>
<td>79.6</td>
</tr>
<tr>
<td>Negative</td>
<td>21</td>
<td>0 – 3</td>
<td>20.4</td>
</tr>
<tr>
<td>TOTAL</td>
<td>103</td>
<td></td>
<td>100</td>
</tr>
</tbody>
</table>

**4.4 Practices on nutritional management among stage 5 CKD patients**

Slightly over half of the respondents (57.3%) ate less fruits and cooked vegetables in a lot of water to reduce the amount of potassium in fruits and vegetables. 42.7% did not know
how reduce potassium levels in food used (Table 4.8). Slightly over half of the respondents could reduce potassium from fruits and vegetables used. Most participants did not know if they were taking iron tablets (77.7%), only 22.3 % took iron tablets. Iron tablets help increase blood levels in the body by facilitating formation of red blood cells. Over half of the participants (64.1%) had no feelings of nausea or vomiting nor constipated, while 39.5% experienced the discomforts.

Table 4.8: Practice on nutrition management

<table>
<thead>
<tr>
<th>Practice parameters</th>
<th>Practice</th>
<th>(n=103) Proportion (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cooking vegetables in much water and eating less fruit to reduce potassium levels</td>
<td>Yes</td>
<td>59 (57.3)</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>44 (42.7)</td>
</tr>
<tr>
<td>Taking iron supplements</td>
<td>Yes</td>
<td>23 (22.3)</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>80 (77.7)</td>
</tr>
<tr>
<td>Feeding without nausea/vomiting/constipation</td>
<td>Yes</td>
<td>37 (35.9)</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>66 (64.1)</td>
</tr>
<tr>
<td>Reducing salt to manage BP</td>
<td>Yes</td>
<td>76 (73.8)</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>27 (26.2)</td>
</tr>
<tr>
<td>Ability to buy, get and take recommended food</td>
<td>Yes</td>
<td>14 (13.6)</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>89 (86.4)</td>
</tr>
</tbody>
</table>

To control blood pressure 73.8% of the participants reduced salt intake, while 26.2 % did not control salt intake. Majority of the participants could not afford to buy and take the recommended dietary regime (86.4%) the remaining 13.5 % bought and took as recommended by the nutritionist. Financial support from family members was essential for better health to the patients. Family support play an important role in practice patterns.
among the patients, due to the high cost implications amount of time spent during hemodialysis.

4.5 Practice scores on nutrition management

More than half of the participants (66%) indicated poor nutrition management practices of their condition (Table 4.9) with scores between 0-2 points. Only slightly above a third of the participants (34%) indicated good nutrition management practices with scores between 3-5 points.

Table 4.9 Practice scores on nutrition management of stage 5 chronic kidney disease

<table>
<thead>
<tr>
<th>Practice</th>
<th>N=103</th>
<th>Scores (points)</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Good</td>
<td>35</td>
<td>3-5</td>
<td>34</td>
</tr>
<tr>
<td>Poor</td>
<td>68</td>
<td>0-2</td>
<td>66</td>
</tr>
<tr>
<td>TOTAL</td>
<td>103</td>
<td></td>
<td>100</td>
</tr>
</tbody>
</table>

4.6 Association between demographic, socio-economic factors and practices in management of stage 5 chronic kidney disease

There was significant association between period on dialysis in months and practices in management of stage 5 chronic kidney disease with p value of <0.001 at 95% C.I, df of 3 (Table 4.10). There were 14 (53, 8%) respondents with less than 3 months duration on dialysis who had good nutrition management practices compared with 12 (46.2%) respondents who displayed poor nutrition management practices. The results showed a decline in nutrition management practices as duration on dialysis increased. Age, education, marital status, education, occupation, monthly income and support for dialysis
had p values of 0.582, 0.998, 0.324, 0.076, 0.833, 0.601 and 0.738 respectively. Education level missed to have a significant difference, though it impacts practice in many studies. This could be attributed to the fact that majority of the respondents (82.8%) had secondary school education and above with only 1% without education, those with primary education were 26.2%. They therefore had better understanding levels requiring continuous follow up to ensure good practices are followed. Chi square was used to determine the association between practices and socio-economic factors in nutrition management of stage 5 CKD.

A study by Marie at al., (2018) shows age to be having a statistically significant associated with practice in hemodialysis, however, it was noted that the effect of age was clinically quite small despite a statistically significant association that exists in this study. Maries study contradicts findings in this study where age has no significant association with practice. Practice levels are associated with other factors like family support though this does not concur with this study.

The results showed that lower levels in quality of life were associated with lower levels of an individual engagement. The study further revealed that age, high monthly income, and living alone all had a positive relationship with engagement with the participants. Only duration on dialysis had a significant difference with practice. The scores showed a tendency of respondents’ reduced levels in practicing the recommended dietary regimen prescribed as their duration on dialysis increased. This could be attributed to the assumption by HCWs that once a participant has acquired nutrition information they remained aware and accountable throughout life. Close follow up and motivation for
behavior change remained essential to maintain participants’ quality of life and focus on any unusual changes that occurred in their bodies.

Table 4.10: Association between demographic, socio-economic factors and practices in management of stage 5 chronic kidney disease

<table>
<thead>
<tr>
<th>Variable</th>
<th>Nutritional management practice (n/%)</th>
<th>$\chi^2$</th>
<th>df</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Age</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt;30 years</td>
<td>16 (66.7)</td>
<td>8 (33.3)</td>
<td>1.986</td>
<td>3</td>
</tr>
<tr>
<td>30-40 years</td>
<td>18 (64.3)</td>
<td>10 (35.7)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>41-50 years</td>
<td>9 (52.9)</td>
<td>8 (47.1)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;50 years</td>
<td>24 (72.7)</td>
<td>9 (27.3)</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Religion</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Christian</td>
<td>54 (65.9)</td>
<td>28 (34.1)</td>
<td>0.005</td>
<td>2</td>
</tr>
<tr>
<td>Muslim/Hindu</td>
<td>8 (66.7)</td>
<td>4 (33.3)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Traditional</td>
<td>6 (66.7)</td>
<td>3 (33.3)</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Marital status</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Married</td>
<td>44 (67.9)</td>
<td>26 (37.1)</td>
<td>0.974</td>
<td>1</td>
</tr>
<tr>
<td>Single/divorced/widowed</td>
<td>24 (72.7)</td>
<td>9 (27.3)</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Period on dialysis in months</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt;3 months</td>
<td>12 (46.2)</td>
<td>14 (53.8)</td>
<td>19.264</td>
<td>3</td>
</tr>
<tr>
<td>3-6 months</td>
<td>6 (35.3)</td>
<td>11 (64.7)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6-12 months</td>
<td>19 (82.6)</td>
<td>4 (17.4)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;12 months</td>
<td>30 (83.3)</td>
<td>6 (16.7)</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Education</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Primary</td>
<td>22 (81.5)</td>
<td>5 (18.5)</td>
<td>6.864</td>
<td>3</td>
</tr>
<tr>
<td>Secondary</td>
<td>24 (58.5)</td>
<td>17 (41.5)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Diploma</td>
<td>15 (55.6)</td>
<td>12 (44.4)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Degree</td>
<td>7 (87.5)</td>
<td>1 (12.5)</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Occupation</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Formal</td>
<td>9 (64.3)</td>
<td>5 (35.7)</td>
<td>0.022</td>
<td>1</td>
</tr>
<tr>
<td>Informal</td>
<td>50 (66.3)</td>
<td>30 (33.7)</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Monthly income</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt;20k</td>
<td>53 (63.9)</td>
<td>30 (36.1)</td>
<td>1.863</td>
<td>1</td>
</tr>
<tr>
<td>20-30</td>
<td>6 (85.1)</td>
<td>1 (14.1)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>31-40k</td>
<td>5 (62.5)</td>
<td>3 (37.5)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;41k</td>
<td>4 (80.0)</td>
<td>1 (20)</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Support for Dialysis</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Self-sponsored</td>
<td>23 (63.9)</td>
<td>13 (36.1)</td>
<td>0.112</td>
<td>1</td>
</tr>
<tr>
<td>Family/Friends</td>
<td>45 (67.2)</td>
<td>22 (32.8)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
4.7 Association between nutrition knowledge and practices

Table 4.13 shows the bivariate analysis between nutrition knowledge and practices in management of stage 5 chronic kidney disease. Knowledge on importance of diet in management of stage 5 CKD (<0.001), moderation of fluid intake (<0.001), reduction in salt/ sodium intake (<0.001), and moderation in protein intake (<0.004) were significantly associated with nutritional management practices of stage 5 CKD. Conversely being not knowledgeable on nutritional aspects in management of stage 5 CKD (0.806), understanding nutrition information (0.672), reduction of cholesterol rich foods (0.547), use of soluble vitamin A rich foods (0.715), intake of up to 1000ml of water/day (0.315) and identification of co-morbidities leading to stage 5 CKD (0.326) were not significantly associated with nutritional management practices. Respondents who were knowledgeable 22 (73.3%) on amount of water to be used (up to 1000ml/ day) tended to practice nutritional management as advised by the nutritionist (0.315). Patients responses to knowledge questions on nutrient levels in different foods was high especially those rich in potassium, phosphorus and salt/ sodium (Section B). There was however low scores on the effects caused by changes in levels of the specific nutrients in the body (in Section D).

A study by Miyata et al., (2018) was carried out to determine haemodialysis knowledge on two groups of patients, one practicing and the other not. Upon analysis, the researcher found that hemodialysis-related knowledge scores did not vary in two groups of patients implying that other factors influence practice not just knowledge scores on nutrition management of haemodialysis. Another study by Durose et al., (2004) compared knowledge on renal diet and complications the diet can cause. He came up with similar
results where patients with more knowledge on renal diet were not related with practices. This could be due to much focus on types of food to restrict basing on education and counseling than impact the variation of nutrients may cause in the body. Food items like green bananas and potatoes were easily identified as high in potassium, but effects of high potassium in the body was not known. A similar trend applies to phosphorous where foods rich in the mineral were identified but not the effects of high serum levels in the body. Salt was the only mineral identified in foods consumed and its effects recognized. This may be due to the taste of salt and the fluid built up and or inter-dialytic weight gained with increased intake of the mineral. Weighing is done every visit before dialysis commences. The statistical significance in the association between knowledge and practice on salt and fluid intake was realized but not on other minerals.

Studies show that up to 75% of hemodialysis patients (Beer, Mountford, and Boundville, 2018) are at a higher risk of malnutrition caused by loss of nutrients from dialysis thus the need for high intake (Hernández Morante et al., 2014). In addition, Hernández et al.,(2014) found that high inflammation is caused by production of cytokine, loss of blood, and effects of uremic syndrome like reduced food intake or appetite. The presence of protein-energy malnutrition is often harmful to patients on hemodialysis due to increased risk of mortality, reduced quality of life, and increased risk of hospitalization (Beer, Mountford, & Boundville, 2018). Uremic state triggers the process of muscle breakdown, which could appear in form of fluid retention (Oquendo, Asencio, & de las Nieves, 2017).
Table 4.13: Association between nutrition knowledge and practices in management of stage 5 chronic kidney disease

<table>
<thead>
<tr>
<th>Variable</th>
<th>Nutritional practices (n/%)</th>
<th>management (df=1)</th>
<th>( \chi^2 ) (p-value)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Diet is important in management of CKD</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Not knowledgeable</td>
<td>16 (42.1)</td>
<td>22 (57.9)</td>
<td><strong>15.350</strong> (&lt;0.001)</td>
</tr>
<tr>
<td>knowledgeable</td>
<td>52 (80)</td>
<td>13 (20)</td>
<td></td>
</tr>
<tr>
<td>Nutritional aspect of management of CKD</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Not knowledgeable</td>
<td>52 (66.7)</td>
<td>26 (33.3)</td>
<td>0.060 (0.806)</td>
</tr>
<tr>
<td>knowledgeable</td>
<td>16 (64.0)</td>
<td>9 (36.0)</td>
<td></td>
</tr>
<tr>
<td>Understanding nutrition information given</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Not knowledgeable</td>
<td>62 (66.7)</td>
<td>31 (33.3)</td>
<td>0.179 (0.672)</td>
</tr>
<tr>
<td>knowledgeable</td>
<td>6 (60)</td>
<td>4 (40)</td>
<td></td>
</tr>
<tr>
<td>Moderate fluid intake for CKD</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Not knowledgeable</td>
<td>49 (80.3)</td>
<td>12 (19.7)</td>
<td>13.652 (&lt;0.001)</td>
</tr>
<tr>
<td>knowledgeable</td>
<td>19 (45.2)</td>
<td>23 (54.8)</td>
<td></td>
</tr>
<tr>
<td>Reduced sodium for CKD</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Not knowledgeable</td>
<td>46 (57.5)</td>
<td>34 (42.5)</td>
<td>11.591 (&lt;0.001)</td>
</tr>
<tr>
<td>knowledgeable</td>
<td>22 (95.7)</td>
<td>1 (4.3)</td>
<td></td>
</tr>
<tr>
<td>Moderate use of protein for CKD</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Not knowledgeable</td>
<td>54 (60.7)</td>
<td>35 (39.3)</td>
<td><strong>8.339 (0.004)</strong></td>
</tr>
<tr>
<td>knowledgeable</td>
<td>14 (100)</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>Reduced use of cholesterol rich food</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Not knowledgeable</td>
<td>66 (65.3)</td>
<td>35 (34.7)</td>
<td>0.547 (fisher exact)</td>
</tr>
<tr>
<td>knowledgeable</td>
<td>2 (100)</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>Reduced use of soluble vitamin</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Not knowledgeable</td>
<td>60 (66.7)</td>
<td>30 (33.3)</td>
<td>0.133 (0.715)</td>
</tr>
<tr>
<td>knowledgeable</td>
<td>8 (61.5)</td>
<td>5 (38.5)</td>
<td></td>
</tr>
<tr>
<td>Take upto1000ml of water daily</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Not knowledgeable</td>
<td>46 (63)</td>
<td>27 (37)</td>
<td>1.009 (0.315)</td>
</tr>
<tr>
<td>knowledgeable</td>
<td>22 (73.3)</td>
<td>8 (26.7)</td>
<td></td>
</tr>
<tr>
<td>Hypertension led to CKD</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Not knowledgeable</td>
<td>8 (80)</td>
<td>2 (20)</td>
<td>0.965 (0.326)</td>
</tr>
<tr>
<td>knowledgeable</td>
<td>60 (64.5)</td>
<td>33 (35.5)</td>
<td></td>
</tr>
</tbody>
</table>

Fisher exact is applied appropriately, significant results bolded (<0.05), df = degree of freedom.
It is therefore important to look beyond weight loss to identify PEM, since this is not often the indicator. According to Beer at al., (2018) the patient’s eating habits become the ultimate contributing factor to malnutrition making dietary intervention crucial in managing stage 5 CKD.

4.8 Association between nutrition attitude and practices

Table 4.14 shows the bivariate analysis between nutrition attitude and practices in management of stage 5 chronic kidney disease. Attitude to taking one’s weight daily (0.017), watching the types of food to eat daily (0.001), use of food supplements to provide nutrients needed by the body (0.001) and following dietary recommendations (<0.022) were significantly associated with practices in management of stage 5 CKD. On the other hand, participants who agreed that wasting was due to poor appetite, change in taste of food 52 (70.3%) and being positive about controlling salt intake 56 (70%) had no statistical significance with nutrition management practices. The two latter variables on attitude however showed that the participants were more likely to practice nutrition management information given though they missed to be statistically significant.

Durose et al (2004); Oquendo et al and de la Nieves (2017) carried out a study using Health belief model or the stages of change model. The study indicated that respondents positive attitude to dietary management even with adequate knowledge may not translate to better practice patterns among hemodialysis patients. More focus should be put to behavior change with follow up actions over time for impact. Duross’s model encouraged patients to find out barriers inhibiting their practices and the possible benefits they could derive from putting nutrition management practices to action. Taking weight and
watching the type of food taken during dialysis is important in predicting fluid or mineral build up in the body. This would prevent complications early improving one’s quality of life. Type and purpose of essential supplements and addressing difficulties in following dietary recommendations could have a positive impact if participants follow the stages of change model that takes their initiative.

Health outcomes of stage 5 CKD can be good if patients are able to have a positive attitude in managing the disease. Attitude entails carrying out nutrition and medical recommendations daily throughout life. Increasing one’s involvement in self-care could improve attitude resulting in overall improvement in quality of life (Mousa, Ataba, Al-ali, Alkaiyat, & Zyoud, 2018). Christensen, et al., (2002) in his study used the self-regulation theory to increase practice on fluid restriction among hemodialysis patients. The self-regulation theory included the central regulatory processes of self-monitoring, self-evaluation, and self-reinforcement in order to achieve success in practicing dietary recommendations. An individual was involved in self-care through weekly group meetings for a period of seven weeks. The results indicated decreased interdialytic weight gain (Christensen, Moran, Wiebe, Ehlers, & Lawton, 2002). Attitude is important in enabling an individual to practice but engaging one closely in support groups with similar conditions can enhance practice.
Table 4.14: Association between nutrition attitude and practices in management of stage 5 chronic kidney disease

<table>
<thead>
<tr>
<th>Variable</th>
<th>Nutritional management practices (n/%)</th>
<th>(df=1) ( \chi^2 ) (p-value)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Poor</td>
<td>Good</td>
</tr>
<tr>
<td>Valuable to weigh daily</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Negative</td>
<td>57 (72.2)</td>
<td>22 (27.8)</td>
</tr>
<tr>
<td>Positive</td>
<td>11 (45.8)</td>
<td>13 (54.2)</td>
</tr>
<tr>
<td>Watching of food types to eat daily</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Negative</td>
<td>41 (89.1)</td>
<td>5 (10.9)</td>
</tr>
<tr>
<td>Positive</td>
<td>27 (47.4)</td>
<td>30 (52.6)</td>
</tr>
<tr>
<td>Poor appetite and change in taste of food led to wasting</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Negative</td>
<td>16 (55.2)</td>
<td>13 (44.8)</td>
</tr>
<tr>
<td>Positive</td>
<td>52 (70.3)</td>
<td>22 (29.7)</td>
</tr>
<tr>
<td>Food supplement provides nutrients needed in the body</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Negative</td>
<td>35 (92.1)</td>
<td>3 (7.9)</td>
</tr>
<tr>
<td>Positive</td>
<td>33 (50.8)</td>
<td>32 (49.2)</td>
</tr>
<tr>
<td>Controlling salt intake is important in CKD management</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Negative</td>
<td>12 (52.2)</td>
<td>11 (47.8)</td>
</tr>
<tr>
<td>Positive</td>
<td>56 (70)</td>
<td>24 (30)</td>
</tr>
<tr>
<td>Difficult in following dietary recommendations</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Negative</td>
<td>29 (80.6)</td>
<td>7 (19.4)</td>
</tr>
<tr>
<td>Positive</td>
<td>39 (58.2)</td>
<td>28 (41.8)</td>
</tr>
</tbody>
</table>

Fisher exact is applied appropriately, significant results bolded (<0.05), df = degree of freedom

4.8.1 Association between knowledge attitude and practice scores

Correlation analysis test using Pearson correlation coefficient showed that there was positive relationship between attitude and nutrition knowledge among the patients \( r = 0.186 \), (Table 4.15). Participants had positive attitude towards nutritional awareness of the recommended foods and their nutritional values, quantification as well as regulation for example of fluids, minerals and proteins.
They also had a positive attitude towards applying the knowledge they had in their daily lives ($r = 0.065$), however there was a negative relationship between knowledge and nutrition practices ($r = -0.039$), where participants could not apply the nutrition knowledge and positive attitude into practice.

Table 4.15: Correlation matrix between knowledge, attitude and practice scores

<table>
<thead>
<tr>
<th></th>
<th>Knowledge scores</th>
<th>Attitude scores</th>
<th>Practice scores</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nutrition knowledge</td>
<td>1</td>
<td>0.186</td>
<td>-0.039</td>
</tr>
<tr>
<td>Nutrition Attitude</td>
<td></td>
<td>1</td>
<td>0.065</td>
</tr>
<tr>
<td>Nutrition practice</td>
<td></td>
<td></td>
<td>1</td>
</tr>
</tbody>
</table>

Correlation is significant at 0.05

4.8.2 Summary of the results

Participants’ knowledge on identification, use and effects of various nutrients in stage 5 CKD was determined. This included the recommended proportion of salt to be used per day. Nutritional management of blood pressure was also established. Problems expected from low protein intake as well as from high levels of phosphorus, calcium and sodium were established. Identification of co-morbidities associated with stage 5 CKD was determined.

Stage 5 CKD adult patients in renal unit had moderate nutrition knowledge in managing their condition. This entailed amount of fluid intake, regulation of minerals and proteins required to avoid more accumulation of proteins in the body. Participants’ had positive attitude to nutrition information and practices, however this was not reflected in diet preparation where a number of the participants were unable to reduce potassium levels
from vegetables before consumption. Most participants took Iron supplements and were certain the drug would increase their blood levels, they however were unable to identify calcium tablets they were using as nutrition supplements. Use of nutrition supplements is essential to meet increased body needs due to nutrient loses through dialysis (Kopple, 2001) increase metabolism and inflammation. Erythropoietin hormone and or iron tablets facilitate production of red blood cells enabling the body to synthesis more blood. Calcium tablets prevent bone disease but if serum levels are excess vascular calcification and related complications sets in. Higher than normal serum phosphorous levels on the other hand precipitates calcium in the blood leading to osteodystrophy.

Over 90% of the participants could not practice the recommended dietary regimen due to financial constraints in purchasing and taking recommended food. The support offered by family members was majorly geared towards dialysis process and procurement of drugs. Establishment on practices based on the subjects’ daily ability to access, prepare and consume the recommended diet regimen. It was also based on their ability to reduce or increase specific nutrient intake, as guided by laboratory investigation parameters. The participants’ nutrition knowledge levels, their attitude and level of needs change in approach to ensure participants understand reasons for dietary regulation and relationship between minerals. This will reduce progression of the disease and enhance a long and better quality of life.
4.9 Key informant interviewees’ responses concerning renal patients’ nutrition knowledge attitude and management practices

The Key Informant Interviewees’ responses concerning the patients’ nutrition knowledge levels attitude and management practices was obtained using the Key Informant Interview Guide (KII). The interview process indicated existence of education and counseling sessions between the nutritionist, nurse or doctor on appropriate diet to be taken and how to regulate each food type depending on laboratory investigation results. Some responses from the interviewees included; “Counseling is based on their laboratory parameters done when the doctor recommends.” Further discussion revealed details on the type and amount of proteins patients were guided on to ensure their serum albumin levels were not too low to cause PEM nor too high to cause proteinuria affecting body function.

Expression of positive attitude was clear from the KII officers who said the participants reported positive attitude and ability to put into practice nutrition information disseminated to them. Generally those who reported loss of appetite were the defaulters who skipped dialysis sessions for a week or more. One of the interviewees a nurse by profession said, “Regular attendance of dialysis sessions enabled the patients eat well without losing appetite. The challenges experienced by patients could be resolved through Ministry of health, hospital and partner support by reducing the cost of nutrition supplements, or inclusion of the cost in National Hospital Insurance Fund (NHIF). Other measures cited were use of media to educate and counsel the general population about the co-morbidities that increases risks of renal failure. Screening of the population could help identify early stages of renal failure by identifying and treating associated diseases
early. An interviewee said, “most cases identified were too late to reverse or slow down the only way to save lives though renal replacement therapy. Updates were obtained through research findings, journals, attending Nutrition fora and from websites.
CHAPTER FIVE: DISCUSSION, CONCLUSION AND RECOMMENDATION

5.1 Introduction

This chapter discusses the interpretation of the results given in chapter 4 and follows the objectives of the study.

5.1: Discussion

5.2 Demographic characteristics of adult, stage 5 chronic kidney disease patients at Kenyatta National Hospital

5.2.1 Gender of participants

There was a preponderance of males in this study (63.1% vs. 36.9%) and this is comparable to similar studies done in Ghana and Nigeria which reported male preponderance (55% vs 45%) and (65.3% vs. 34.7%) respectively in patients with stage 5 CKD (Eghan et al., 2009). Studies in Spain also reported a male dominance (60.9% vs. 39.1%) and 61.2% and 38, 8%) respectively (Goicoechea et al., 2005). This result may be indications that female have better health seeking behavior than male. In addition this might also be a reflection that male are more prone to risk factors like smoking, diabetes and hypertension leading to CKD and eventually CRF.

5.2.2 Marital status of participants

The married cohort made up 70.9% followed by single respondents at 24.3%, widowed respondents were 2.9% and the least divorced (1.9%). The results however vary from a study done in Ghana (Yaw et al., 2014) where the married dominated at 55.7% single at 51%; widowed at 21% and the least divorced at 18% though with similar trend.
5.2.3 Education level of participants

The participants with secondary education were many (39.8%). followed by primary and tertiary institutions both at 26.2%. The results contradicted those of a study done in a tertiary institution in Ghana where participants with primary education were many (45.3%). This was followed by 34% and 8.9% with secondary and tertiary education respectively (Yaw et al., 2014). This could be attributed to the fact that primary and secondary education sponsored by the Kenyan government thus the comparatively high percentage. Nairobi the capital city of Kenya has many school leavers and college graduates seeking for job opportunities thus the big number.

5.2.4 Occupation of stage 5 CKD patients

To determine the socio-economic characteristics of adult stage 5 CKD patients in renal unit, Self-employed respondents made up 22.3% while 14.6% were employed and salaried. The casual laborers accounted for 13.6% while most of the respondents (49.5%) were either unemployed or had other occupations. These results correspond to a study in Canada by Varitsakul et al. (2013) which showed the unemployed at 45% close to this study. Insurance cover met dialysis cost at 50% that of the patient, from the year 2017 the cover meets the cost of two dialysis sessions per week. Three dialysis sessions are recommended in a week for effective removal of wastes from the body.

5.2.5 Nutrition knowledge in regulation of food

Respondents were asked how knowledgeable they were on nutritional management of CRF, 34.9% of them had low nutrition knowledge. This was significantly lower than in a
study done by Alipour et al. (2003) which reported 53% of the participants with low nutrition knowledge.

5.2.6 Knowledge on fluids
To assess knowledge on use of fluids among stage 5CKD patients, respondents were asked what was expected of them in fluid intake. Over half of the participants (61.2%) had sufficient knowledge on what was expected of them in fluid intake. Patient perspectives regarding fluid restriction during hemodialysis were diverse and were likely influenced by many patient characteristics, including their experience with hemodialysis. On the other hand, higher Hb levels (≥12g/dL) were associated with cardiovascular mortality in high IDWG patients but not in low IDWG patients (Toida et al. 2017). Regarding fluid intake 48.5% of respondents disagreed that dialysis patients are expected to take 500mls – 1,000mls of fluid daily, they found the quantity high as per their body experiences with fluids. This is below bar as expected in the guidelines which gives the typical fluid allowance for patients on dialysis as 500 to 1000 mL/day, plus urine output (Rahman et al., 2000). There were therefore low knowledge levels among respondents as only 34% concurred with the recommended 500-1000mL/day.

5.2.7 Knowledge on foods with potassium
Knowledge on foods containing high amounts of potassium was assessed. 64.1% said green bananas and potatoes each. This indicated moderate level of awareness on foods high in potassium among the subjects. Multiple responses followed at 38.8% showing level of uncertainty on the precise foods high in potassium. On assessment of knowledge on problems that would arise with high levels of potassium in blood, 46.6% did not
know. The knowledge scores of hemodialysis patients regarding dietary sources of potassium and their effects were moderate compared with other minerals as studied by Rahele et al., 2014. Fluctuations in serum potassium may lead to cardiac arrhythmia and that is dangerous for hemodialysis patients according to Checherita et al. (2011).

5.2.8 Knowledge on salt/sodium

This study depicted significant level of awareness among the participants on foods containing a lot of salt in them, the recommended amount per day, and complications that come about due to excess intake. Hypertension in dialysis patients is largely attributed to positive sodium balance and volume expansion (Wang et al., 2005). Many patients on dialysis can effectively control blood pressure without drugs on a low-sodium (2 g) diet and a low-sodium (130 mmol) dialysate.

5.2.9 Knowledge on calcium and phosphorus

Over fifty percent of participants (57.3%) said that bone disease would result from high blood levels of calcium, most respondents did not know the problems resulting from high blood levels of calcium, phosphorus nor the relationship between effects of the two minerals. Most respondents, 69% had no knowledge on the effect of high phosphorous levels in the blood. The knowledge scores of hemodialysis patients in Iran according to Rahele (2000) regarding dietary sources of phosphorous, was significantly lower than those of the other food items. He did not however consider calcium in his study which works hand in hand with phosphorus. Inadequate control on dietary intake of phosphorous leads to adverse effects in hemodialysis patients, such as cardiovascular disorders, hyperparathyroidism and osteodystrophy according to Nishizawa et al. (2005).
Therefore, appropriate education of hemodialysis patients to control their dietary phosphorous intake is one of the most important tasks of the entire medical team.

5.2.10 Knowledge on proteins

Half of the participants (50%) said they were expected to reduce protein intake. Most of them (85%) believed that low protein intake would lead to malnutrition. In as much as they had knowledge on the consequences of taking low proteins, they could not quantify the amount nor identify the type of protein ideal for their consumption. Hemodialysis patients lose a significant amount of protein through dialysis, therefore, they should consume enough daily dietary sources (1.2 g/kg bwt/day) of high biological value that produce a low amount of urea, such as poultry or fish as well as egg whites. This recommendation prevents protein-energy malnutrition and decreases mortality rates in hemodialysis patients (Kovesdy et al., 2010).

5.2.11 Knowledge on vitamin supplements

Respondents were asked which problems could result from lack of vitamin supplements in their diet. Most respondents (62.7%) did not know. Use of Vitamin Supplements was not common among most of the respondents. Lacson et al (2012) have made a major contribution in identifying an intervention that may be associated with a potentially dramatic mortality reduction in a population with a very high rate of death and in whom many traditional interventions have not been shown to be effective. Furthermore, the onset of the effect is rapid; the intervention is inexpensive, with supplements costing Ksh 200-500 per week; and there is extremely low potential for harm.
5.2.12 Co-morbidities causing stage 5 CKD

The Study obtained information on Co-Morbidities namely; NCDs that Cause CRF. Heart Failure, Hypertension and Diabetes were the NCDs well known to the study subjects. This reflected high level of awareness on non-communicable diseases causing CRF. Due to lifestyle and environmental change, healthcare improvements had increased potential to survive until old age. NCDs including Coronary Heart Disease (CHD), stroke, Chronic Obstructive Pulmonary Disease (COPD), cancer, type 2 diabetes mellitus (DM) and chronic kidney disease (CKD) are currently the leading causes of adult deaths and disability worldwide (Alwan et al., 2011). The global burden of NCDs is expected to rise further as a result of an increasing global population and demographic shifts especially increases in the older population. Indeed the global population above the age of 60, the age group most affected, is expected to double between 2000 -2050 (World population prospects, 1999).

5.2.13 Attitude to nutrition management

The subjects’ score on attitude to managing their condition by use of diet was high, 75% said diet was very important in managing their kidney problems, 20.4% said it was important. Those who strongly agreed on controlling salt in their diet were over three quarters of the respondents (78.6%) while those who disagreed were 17.5%. The score was very high on the importance of watching daily diet intake (92.9%). An indication of the overall positive attitude they had towards observing dietary intake as prescribed by nutritionists to alleviate the complications arising from defaulting. They however had low to moderate scores 39.8% and 55% on finding nutrition information as very
understandable and moderately understandable respectively. Most of the subjects said nutrition information was understandable to them. This positive attitude however seemed to contradict their practices evidenced by the statement “Prescribed foods are expensive and I cannot afford” by over 90% of the subjects when asked for reasons for not consuming the recommended diet.

5.2.14 Practices in nutrition management

The objective on establishing the practices of adult stage 5 CKD patients in preparation of vegetables to reduce potassium in management of their condition was considered. Slightly over half of the respondents (57.3%) ate less fruits and cooked vegetables in a lot of water to reduce the amount of potassium in fruits and vegetables. This showed moderate ability to carry out nutritional management practices based on their knowledge levels. This contradicted report by Rahele and Nasrin where their subjects had low knowledge on reducing potassium in managing their condition. Fluctuations in serum potassium may lead to cardiac arrhythmia a condition that is dangerous for hemodialysis patients (Checherita, 2011). There is therefore need to educate the participants and their families on dietary sources of potassium and effects of high or low levels in the body.

To establish the practices of adult chronic renal failure patients in use of iron supplements to manage their blood levels, the most consumed supplements were iron tablets/intravenous (63.9%) to increase blood level. This was an indication of practical experiences of the participants throughout the treatment period. Dialysis patients commonly suffer iron loss from gastrointestinal bleeding which Rosenblatt et al., (1982) estimate to be 6.27ml/day in hemodialysis patients, as compared to 3.15 ml/day in non-
dialysis patients with chronic kidney disease (CKD) and 0.83 ml/day in normal volunteers. Further losses are through blood drawing, and/or, most important with hemodialysis, the dialysis treatment itself. Thus, iron deficiency will tend to develop in virtually all dialysis patients unless supplemental iron therapy is given. Patients with chronic renal failure (CRF) are commonly iron deficient. Adequate iron stores are essential for achieving maximum benefit from erythropoietin-stimulating agents (ESAs). Decreased iron stores or decreased availability of iron are the most common reasons for resistance to the effect of these agents. On calcium supplements, 10% of the respondents made up the population consented to using the supplement, while 26% were unable to identify the drugs they were using if they were nutrition supplements or not. Most subjects could not take the prescribed diet due to financial constraints; therefore 96% of them did not put into practice the dietary recommendations.

5.3 Associations between socio-demographic variables and nutrition knowledge, attitude and practices

To determine the association between religion and problems arising due to low protein intake p=0.001, just over 60% of Christians comprising majority of the population said malnutrition would result. The same P value applied for their stand on reducing cholesterol containing fats in cooking. They further suggested avoiding fat soluble capsules p=0.004. This study showed that most Christians had better knowledge, more positive attitude and better practice in dietary management of their condition. Studies indicate that religious involvement is associated with improved attendance at scheduled medical appointments, (Koenig, 1995) greater cooperativeness, better adherence, (Fox S, 1998) and improved medical outcomes.
There was a significant relationship between religion and inability to get recommended food at home \( p=0.019 \). There also have been some results suggesting that religion may have a negative role in patient outcome and health measures. Powell in his study found no link between depth of religiousness and physical health. Christians who comprised the majority in this study seem to concur with previous studies by not showing an effort towards getting the recommended diet at home. This could be due to strong spiritual trust and belief compared to dietary recommendations and or medical prescriptions. Over three quarters of the married participants 76.7% strongly disagreed to calling a nutritionist for consultation about diet management \( p=0.033 \) perhaps due to the charges imposed on service delivery.

On occupation and ability to understand nutrition information passed, 71% on casual labour found it more understandable \( p = 0.002 \). There was a significant relationship between participants whose income level was below or equal to Ksh 20,000 per month and acceptance of foods recommended in their communities \( p=0.000 \), df of 8. Most of them had no taboos or negative customs attached to certain food types. Results from studies done showed that individuals in lower socio-economic groups were at an increased risk for health problems (Pomerleau et al., 1997). Results in this study showed some conformity with the previous studies as participants made efforts to reduce complications which they may not afford to counteract when they defaulted on dietary prescriptions. Most participants said that most foods were acceptable in their communities reducing their susceptibility to dietary complications.
Galobardes et al. (2001) using education and occupation as SES indicators showed that lower education and lower income contribute independently to determining differences in dietary habits and that their effect is synergistic thus highlighting that several indicators are needed to fully capture someone’s socio-economic status.

5.4 Summary of findings

The study population had more males than females in terms of gender. The male participants comprised over half the total respondents and the married cohort comprised almost three quarters of the respondents. Most of them were the young adults with secondary school education and low income of less than Ksh 20,000 per month. Most participants had moderate knowledge on nutrition management of their conditions, basing on fluid, salt, potassium and protein intake. However over fifty percent had no knowledge on relationship between phosphorus and calcium minerals and co-morbidities associated with stage 5 CKD.

Most of the study population had a relatively positive attitude towards nutrition management of their condition. This was clear from their comments on watching diet daily and regulating salt intake. However some of them had a relatively negative attitude towards understanding of nutrition information. Nutritional practices in management of stage 5 CKD were low among most of the study participants. Majority said they could not afford the prescribed diet thus unable to put into practice as necessitated by their condition. A few of them were able to use supplements and to reduce potassium from food as recommended.
The factors that were associated with nutrition knowledge, attitude and practices comprised education, income, occupation, duration on dialysis, gender and age. Associations between demographic and socio-economic factors and nutrition knowledge attitude and practices was significant only with duration on dialysis.

5.5 Conclusion

Most of the study participants were young male adults, married, of low socio-economic status and with secondary school education. The study showed that nutrition knowledge scores in the study population were moderate especially regarding dietary intake and following recommendations for best outcome in nutritional health and overall improvement in quality of life. Knowledge levels was however low in identifying foods rich in phosphorus, calcium and fat soluble vitamins.

Participants in overall had a positive attitude to nutrition management however their attitude to potassium reduction, use of supplements, understanding nutrition information and fluid regulation was negative basing on their education and income levels.

Socio-demographic factors influenced the quality of life and practices regarding nutritional management of renal condition. Practices on nutritional management of the patients’ condition were poor, considering also that 96% of them said they could not afford the recommended diet. Practice scores were poor despite moderate nutrition knowledge levels and positive attitude to the nutrition information. The poor nutrition management practice scores indicated a possibility of having persistent complications among the respondents irrespective of moderate knowledge and positive attitude scores.
There was significant relationship between socio-demographic variables and nutrition knowledge among stage 5 CKD patients, therefore the first hypothesis was rejected. The second hypothesis was also rejected due to the significant relationship between nutrition knowledge, attitude and practices in management of stage 5 CKD.

5.6 Recommendations

Nutrition management needs high level of knowledge on essential nutrients needed by the body, their role, interaction and functions. Increased knowledge levels influence attitudes which may translate to good practices of knowledge acquired. More focus on motivation follow up and practicing nutrition management skills acquired may greatly improve patients’ quality of life.

5.6.1 Recommendations for policy and practice

The Ministry of Health nutrition division, in collaboration with other nutrition institutions, practicing health facilities and relevant stakeholders, should come up with policy statements, guidelines, protocols and strategies specifically on nutritional management of stage 5 CKD. Standard operating procedure and Subjective global assessments need to be adopted to have a universal assessment aiding in prediction of morbidities. This will outline provision of essential nutrition services and mandatory management practices to alleviate complications and slow down progression of the disease.

There should be a meals guideline developed to meet the needs of stage 5 CKD patients. The condition requires more liberal intake of proteins of high biological value unlike the prior stages that need a conservative meal plan.
Essential nutrition supplement prices need to be subsidized or fully covered through insurance to make the commodity accessible to all who need. This will reduce the high financial costs incurred and prevent complications thus improving patients’ quality of life.

5.6.2 Recommendations for practice

1. Patients’ knowledge on nutrition management of their condition may be achieved through frequent and consistent nutrition education and counseling including follow ups. There is need to strengthen nutrition counseling by educating patients on reasons for restricting or modifying dietary regiment not just identifying foods as minerals, proteins or fluids.

2. The attitude of the patients can be further enhanced through strong nutrition advocacy messages for better nutritional management practices. This will create a positive perception of intervention measures prescribed to improve practice levels in selection, purchase and use of the appropriate food types. These messages could be delivered through social or print media, radio or television channels among others.

3. The facility should carry out regular on-job trainings for nutritionists, nurses and doctors working in the renal unit on current and up to date information pertaining to nutrition knowledge, attitude and practices. This would facilitate application and dissemination of the same to renal patients increasing their level of awareness on the role of each and every nutrient in their bodies thus putting knowledge into practice to alleviate complications. This will further enable them understand nutrient interactions and how to regulate them through food intake and supplementation. Nutrition consultation charges
should be included in the National Hospital Insurance Fund (NHIF) like other medical charges to increase access to nutrition education, counselling and supplementation. Practice on the preparation methods to regulate micronutrient concentration may lead to reduction in preventable complications. Patient motivation would help sustain nutrition management practices throughout the duration of dialysis.

5.6.3 Recommendations for research

A longitudinal study should be done to determine nutrition knowledge attitude and practices in management of stage 5 CKD by renal adult patients undergoing dialysis. More studies should be carried out to establish the factors leading to poor nutrition management practices irrespective of moderate knowledge levels and positive attitudes to the information. This could help address complications that are persistent among stage 5 CKD patients getting appropriate interventions with minimal or no positive outcomes. A study should be done to assess the relationship between duration on dialysis and nutrition management practices of stage 5 CKD patients. Nutrition knowledge, attitude and practices among health care providers in renal unit of KNH should be determined.
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APPENDICES

Appendix A: Kenyatta university ethical clearance

[Image of the document]
Appendix B: National council for science, technology and innovation authorization

NATIONAL COMMISSION FOR SCIENCE, TECHNOLOGY AND INNOVATION

Telephone: +254-20-2213471, 2241349, 310571, 2219420
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Email: secretary@nacost.go.ke
Website: www.nacost.go.ke
When replying please quote
Ref: No.

18th December, 2014

NACOSTI/P/14/9647/4288

Julia Jepteken Rotich
Kenyatta University
P.O. Box 43844-00100
NAIROBI.

RE: RESEARCH AUTHORIZATION

Following your application for authority to carry out research on “Nutrition, knowledge attitude and practices in management of end stage renal disease among adult in Renal Unit Kenyatta National Hospital,” I am pleased to inform you that you have been authorized to undertake research in Nairobi County for a period ending 27th October, 2015.

You are advised to report to the Chief Executive Officer, Kenyatta National Hospital, the County Commissioner and the County Director of Education, Nairobi County before embarking on the research project.

On completion of the research, you are required to submit two hard copies and one soft copy in pdf of the research report/thesis to our office.

DR. S. K. LANJAT, OGW
FOR: SECRETARY/CEO

Copy to:

The Chief Executive Officer
Kenyatta National Hospital.

The County Commissioner
Nairobi County.
Appendix C: Research clearance permit

CONDITIONS

1. You must report to the County Commissioner and the County Education Officer of the area before embarking on your research. Failure to do so may lead to the cancellation of your permit.
2. Government Officers will not be interviewed without prior appointment.
3. No questionnaire will be used unless it has been approved.
4. Excavation, filming and collection of biological specimens are subject to further permission from the relevant Government Ministries.
5. You are required to submit at least two(2) hard copies and one(1) soft copy of your final report.
6. The Government of Kenya reserves the right to modify the conditions of this permit including its cancellation without notice.

RESEARCH CLEARANCE PERMIT

Serial No. A 3928
CONDITIONS: see back page

THIS IS TO CERTIFY THAT:

MS. JULIA JEPTEPKENY ROTICH
of KENYATTA UNIVERSITY, 0-30100
eldoret, has been permitted to conduct research in Nairobi County

on the topic: NUTRITION KNOWLEDGE ATTITUDE AND PRACTICES IN MANAGEMENT OF END STAGE RENAL DISEASE AMONG ADULT IN RENAL UNIT KENYATTA NATIONAL HOSPITAL

for the period ending:
27th October, 2015

Applicant's Signature

Secretary
National Commission for Science, Technology and Innovation
Appendix D: Kenyatta National Hospital approval

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

Tel: 2726300/2726450/2726550
Fax: 2725272
Email: knhadmin@knh.or.ke

Ref: KNH/AD-MED/42B/VOL.1

Date: 5th December, 2014

Julia Jeptepkeny Rotich
Department of Foods Nutrition & Dietetics
UNIVERSITY OF NAIROBI.

RE: APPROVAL TO CONDUCT A STUDY AT THE KNH RENAL UNIT

Following approval of your study by the KNH/UoN ERC and completion of the
KNH study registration form, permission is hereby granted for you to collect
data from the KNH Renal Department to enable you complete your study on
"Nutrition knowledge, attitude and practices in management of end stage
renal disease among adult patients in Renal Unit" at Kenyatta National
Hospital, Nairobi County, Kenya.

Kindly liaise with the Assistant Chief Nurse of Renal Unit for facilitation.

DR. W.K.SIGILAI
AG. SAD - MEDICAL SERVICES

Copy to: ACN, Renal Unit
KNH
Appendix E: Informed consent

**Letter of introduction** My name is Julia Rotich. I am a Master of Science student from Kenyatta University. I am conducting a study on “Nutrition Knowledge Attitude and Practices in Management of Chronic Renal Failure among adult patients in renal unit Kenyatta National Hospital.” The information will be used by the ministry of Health to enhance the value of nutrition and its interventions in this hospital as well as other facilities in Kenya.

**Procedures to be followed**
Participation in this study will require that I ask you some questions which will be useful in assessing the nutrition information on the topic given. You have the right to refuse participation in this study. You will get the same care and medical treatment in this hospital or any other clinic at any other time.

Please remember that participation in this study is voluntary. You may ask questions related to the study at any time. You may refuse to respond to any questions and you may stop an interview or being in the study at any time without any consequences to the services you receive in this facility or any other now or in the future.

**Discomforts and risks**
You will be asked questions when undergoing dialysis. This will take about half an hour. You may experience discomfort during the dialysis procedure. If this happens, you may refuse to answer these questions if you so choose. You may also stop the interview at any time.

**Benefits**
If you participate in this study you will help us learn how to provide effective nutrition support and improve nutrition intervention for people with renal failure. If you are found to have a nutrition problem, you will benefit from nutrition assessment, education and counseling.
Rewards

There are no financial or any reward given in participating in the study.

Confidentiality

The interviews and assessments will be conducted in a private setting within renal unit in the clinic. Your name will not be recorded on the questionnaire nor will your contact information be published at the end of the study.

Contact information

If you have any questions you may contact Prof. Kayima on 0719555445 or Dr. Nyamota on 0721347144 or Kenyatta University Ethics Committee on kuerc@ku.ac.ke.

Participant’s statement

The above information regarding my participation in the study is clear to me. I have been given a chance to ask questions and my questions have been answered to my satisfaction. My participation in this study is entirely voluntary. I understand that my records will be kept private and that I can leave the study at any time and will get same care and medical treatment in this hospital today or in any other facility at any other time.

Signature/thumb print of participant-----------------------------------------------

Date------------------------------------------------------------------

I, the undersigned have explained to the volunteer in the language s/he understands, the procedures to be followed in the study and the risks and benefits involved.

Name of Interviewer---------------------------------------------------------------

Interviewers Signature ---------------- Date ----------------
Appendix F: Questionnaire for the interview schedule

Patients; Questionnaire

Nutrition knowledge attitude and practices in management of stage 5 CKD among adult patients attending renal unit at Kenyatta National Hospital, Kenya

Section A (demographic and socio-economic factors)

1. Gender  (1) Male  (2) Female
2. Age ------ yrs.
3. Religion  (1) Christian  (2) Muslim  (3) Hindu  
(4) Traditional African  (5) None  (6) other (specify) 
4. Marital status
(1) Married  (2) Single  (3) Divorced  (4) Widowed
5. Educational level
(1) Primary  (2) Secondary  (3) Tertiary institution  
(4) Graduate  (5) post graduate  (6) other (specify) 
6. Distance from dialysis center
(1) within 5km  (2) 5-10km  
(3) 10-20km  (4) 20-50km  (5) Over 50km
7. What do you do to earn a living?
(1) Employed and salaried  (2) Self-employed 
(3) Casual labor  (4) other (specify) 
8. How much is your monthly earning?
(1) <= 20,000  (2) 21,000 - 30,000  (3) 31,000- 40,000  
(4) 41,000 - 50,000  (5) 51,000 – 60,000  (6) > 70,000
9. Source of Dialysis medical support  (1) Insurance cover  (2) Self  
(3) Family  (4) External –sponsor  

10. Duration on dialysis  ---------------  months

**Section B (Knowledge). Please circle the correct answer**

1. What is expected of you in fluid intake?
   
   (4) Moderate  (3) Decrease  
   (1) Increase  (2) No change  

2. Which of the following problems may result from excess intake of fluids?
   
   (4) Weight gain  (3) lung problems  
   (2) Loss of breath  (1) Weight loss  

3. Dialysis patients are expected to take 500mls - 1000mls of water daily
   
   (4) Strongly agree  (3) Agree  
   (2) Strongly disagree  (1) Disagree  

4. How are you supposed to use proteins?
   
   (4) Moderate  (3) Reduce  
   (2) No change  (1) Increase  

5. What problems may arise due to low intake of proteins?
   
   (4) Malnutrition  (3) Bone disease
6. Which of the following diseases lead to stage 5 Chronic Kidney Disease?

(4) Hypertension  (3) Diabetes
(2) Heart Failure  (1) Pneumonia

7. Which of the following foods contain high amounts of potassium?

(4) Green bananas  (3) Potatoes
(2) Fruits  (1) Milk

8. High potassium level in the blood would cause the following problem

(4) Heart disease  (3) Muscle cramps
(2) Dizziness  (1) Itchy skin

9. What is expected of you in sodium/salt intake?

(4) Reduce  (3) Moderate
(2) No change  (1) Increase

10. Which of the following food items contain a lot of sodium/salt?

(4) Sausages  (3) Lemon
(2) Boiled maize  (1) Dried fruits

11. Which of the following foods contain high amounts of calcium?
12. Which of the following problems are expected when there is high calcium in body?
   (4) Bone disease       (3) Muscle cramps
   (2) Vascular calcification   (1) Vomiting

13. Which of following foods have high amounts of phosphorus?
   (4) Dairy products       (3) Nuts and seeds
   (2) Fruits               (1) Vegetables

14. Which of the following problems may result from high phosphorus in body?
   (4) Bone & Joint disease   (3) Cardiac disease
   (2) Liver disease          (1) Stomachache

Section C (Attitude). Please tick the patient’s responses in the box

1. It is valuable to weighing oneself daily?
   (5) Strongly agree  
   (4) Agree
   (3) Neutral
   (2) Disagree
   (1) Strongly disagree

2. It is Important to watch foods one eats daily
   (5) Strongly agree
3. Poor appetite and change in taste of food can lead to wasting
(5) Strongly agree  □
(4) Agree  □
(3) Neutral  □
(2) Disagree  □
(1) Strongly disagree  □

4. Food supplements provides nutrients needed in the body
(5) Strongly agree  □
(4) Agree  □
(3) Neutral  □
(2) Disagree  □
(1) Strongly disagree  □

5. Controlling salt intake is important in managing stage 5 chronic kidney disease
(5) Strongly agree  □
(4) Agree  □
(3) Neutral  □
(2) Disagree  □
(1) Strongly disagree  □

6. There is difficulty on following dietary recommendations
(5) Strongly agree  □
(4) Agree  □
Section D (Practice)

1. Do you take Iron supplements?
   - (2) Yes □
   - (1) No □

2. When feeding, do you feel nausea, or like vomiting?
   - (2) Yes □
   - (1) No □

3. Do you reduce salt to manage blood pressure?
   - (2) Yes □
   - (1) No □

4. Can one reduce potassium by eating less fruits and boiling vegetables in a lot of water?
   - (2) Yes □
   - (1) No □

5. Are you able to buy or get and take recommended foods?
   - (2) Yes □
   - (1) No □

Thank you for taking your time to answer all the questions in the questionnaire.
Appendix G: Answers to the questionnaire

Section B (Knowledge)

1. (4) Moderate
2. (4) Weight gain (3) Lung problems (2) Loss of weight
3. (4) Strongly Agree; Agree
4. (4) Moderate
5. (4) Malnutrition
6. (4) Hypertension (3) Diabetes (2) Heart Failure
7. (4) Green banana (3) Potatoes
8. (4) Heart disease
9. (4) Reduce
10. (4) Sausage
11. (4) Milk
12. (4) Bone disease (3) Muscle cramps (2) Vascular calcification
13. (4) Dairy products
14. (4) Bone and joint disease (3) Cardiac disease (2) Liver disease
Section C (Attitude)
1. (4) Strongly Agree
2. (4) Strongly Agree
3. (4) Strongly Agree
4. (4) Strongly Agree
5. (4) Strongly Agree
6. (4) Strongly Agree

Section D (Practice)
1. (2) Yes
2. (2) Yes
3. (2) Yes
4. (2) Yes
5. (2) Yes
Appendix H: Key informant interview guide

My name is Julia Rotich from Kenyatta University, Department of Food Nutrition and Dietetics. I thank you all for consenting to take part in this Key Informant Interview. The statement of purpose of the interview is;

“Nutrition Knowledge Attitude and Practices in management of stage 5 Chronic Kidney Disease among adult patients attending renal unit in Kenyatta National Hospital, Kenya”

Your cooperation and participation is very important. Confidentiality on information provided in this interview is assured, and no information given will be attributed to a particular person in any report.

1. What do you think about the level of nutrition knowledge of the stage 5 CKD patients currently undergoing dialysis?
2. What are their attitudes to nutritional management practices prescribed?
3. How are their management practices? (Probe for each nutrient, supplement compared to laboratory parameters)
4. What are the Nutritional challenges facing stage 5 CKD patients? their possible causes (probe; money, knowledge etc)
5. What needs to be done to help nutrition field as a whole address these challenges?
6. What do patients do to overcome these challenges?(relationship between nutrition management)
7. What nutrition support does the hospital provide?(probe)
8. What do you think about the role of nutrition in management of stage 5 CKD (KAP)?
9. What do you think the hospital, state and or other partners should do to help meet nutritional needs facing these patients?
10. Where are you currently getting Nutrition information (which websites, print resources, in person contacts etc)?
11. In future, where would you like to get your nutrition information?

Thank you for your time!
Appendix I: Key Informant Interview Guide Responses

1. The patients have sufficient nutrition knowledge in all nutrients and physical activities, especially for those who have been given nutrition education and counseling by nutritionists.

2. They have very positive attitude, willing to change and do talk to their colleagues expressing agreement to changes experienced when they observe prescribed nutrition information.

3. Nutritional management practices are good as they give feedback on their feeding practices we feel it’s sufficient. They always tell the truth about their practices. Laboratory parameters determine adjustments to be done in dietary practices, supplements and foods rich in specific nutrients we suppose are kept as advised since they are outpatients.

4. Loss of appetite this is due to their condition and delay in going for dialysis. Difficulty in adapting to dietary prescriptions like restricting salt intake. Food ratio used is low initially before they pick up and get used to changes.

5. Counselling of patients should start at the renal clinic for continuity in provision of nutrition support. There should be another nutritionist at the clinic besides the one in the unit. Continuous nutrition education and counseling early enough as they begin dialysis is key, for timely intervention. Initial nutrition education and counseling takes 3 weeks up to a month at the moment. Frequent attendance of dialysis sessions helps prevent more complications.
6. Patient to seek nutrition counseling and try not to miss dialysis sessions. Family support is key in observing recommended diet when patients are not strong enough to provide for themselves.

7. Nutrition support provided include dietary counseling and support, diet provision as practical support in the hospital, individualized nutrient needs and intake, food preparation methods, exercise and cleanliness.

8. Nutrition is key in providing information on electrolyte balance from foods consumed and how to manage them at home or when far from home.

9. The state should provide low cost or waived nutrition supplements and support preventive measures to reduce cases of the condition. It should mainly focus on addressing proper nutritional feeding and periodic medical assessments to prevent Comorbidities’ that lead to kidney failure. New facilities to have a nutritionist conversant with nutrition information in the renal team. Public knowledge in community like through media to create awareness prevent and manage renal diseases should be done by the government.

10. Nutrition information learnt and sharing in Continuous Medical Examinations, researching in nutrition websites and books in the library. Nutrition office and nephrology teaching that has a unit on renal diet.

11. Information from articles, Journals and new researches from other facilities in and out of the country like in Africa and globally. Much is obtained also from nutrition websites and other forums.
Appendix J: Budget of the study

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