KNOWLEDGE, PRACTICE, BARRIERS AND ENABLERS OF PRE-DIALYSIS CARE AMONG HEALTH SERVICE PROVIDERS AT THE KENYATTA NATIONAL HOSPITAL KENYA

BY

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DECLARATION

I, Lucas Kinuthia Nyarara of registration number H56/33753/2019 hereby declare that this thesis is my original work and has not been presented in any other institution of higher learning nor in any scientific conference. The literature sourced has been referenced accordingly.

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DEDICATION

I wish to dedicate this study to my family for the support and encouragement throughout the course. May God bless you so much.

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LIST OF ABBREVIATIONS AND ACRONYMS

CKD: Chronic kidney disease

ESKD: End stage kidney disease

KRT: Kidney replacement therapy

PD: Peritoneal Dialysis

HD: Hemodialysis

KNH: Kenyatta National Hospital

eGFR: Estimated glomerular filtration rate (eGFR/1.73 m2)

HB: Hemoglobin

NHIF: National Health Insurance Fund

MOH: Ministry of Health

MDPC: Multi-disciplinary pre-dialysis care

HSP: Health service provider

SPSS: Statistical package for data analysis

MDRD: Modification of diet in renal disease

HTN: Hypertension

PCKD: Poly-cystic kidney disease

FGD: Focused group discussion

NACOSTI: National Commission for Science, Technology and Innovation

OPERATIONAL DEFINITIONS OF TERMS

Pre-dialysis Care –is the care the patient with chronic kidney disease (CKD) stage 3 and 4 receives from a clinician which helps in preparing them for KRT and also allows them to make an informed decision before the start of KRT (Janmaat et al., 2018).

Knowledge - Theoretical understanding of a pre-dialysis care acquired through education.

Practice - The actual application of pre-dialysis care knowledge in recruiting and managing patients with CKD stage 3-4 by the health care workers.

Barriers - They are the hindrances and challenges faced by health service providers when offering pre-dialysis care services to patients

Determinants -Are factors like knowledge, practice, and challenges among health service providers that have an impact on how pre-dialysis care is offered.

CKD - pre-dialysis - it is the period from eGFR of <15mls/min per 1.73m2 until 3 months after initiation of dialysis thus including the pre-dialysis and period after dialysis initiation.

Chronic kidney disease- it is a progressive damage to the kidney that results to it loss of function that persists for more than three months with a decreasing size adjusted eGFR<60 ml/min.

Health service provider - They are caregivers offering their services to patients with CKD stage 3 to 4 and they include nephrologists, physicians, specialized nephrology nurses, Nurses, nutritionists and counselors.

Kidney replacement therapy - modalities used to remove the body toxins after failed kidneys and include; kidney transplant and dialytic kidney replacement therapies.

The planned start of dialysis - corresponds to the initiation of dialysis in optimal conditions for the patient with dialysis access of more than four weeks for native arterial venous fistula, two weeks for Prosthetic arterial venous fistula, and more than one week for PD catheters and Central venous catheter for those with no dialysis access possible

Unplanned non-urgent start dialysis is the start of dialysis in patients who had the creation of dialysis access but which is not functional at dialysis start because of complications and consequently require a Central venous catheter.

Predialysis care enablers – These are activities when carried out by health service providers facilitate predialysis care delivery.

ABSTRACT

Introduction- Pre-dialysis care is offered during the period of transition of chronic kidney disease (CKD) to end stage kidney disease (ESKD). Lower mortality has been reported on patients who receive pre-dialysis care as opposed to those who do not. Globally, pre-dialysis care is wanting with developed countries like USA still reporting challenges on pre-dialysis care. In Kenya, Kenyatta National Hospital (KNH), more than 50% of patients are started on kidney replacement therapy (KRT) without any counseling done inferring that pre-dialysis care practice is not well adhered to by the health service provider (Kabinga et al., 2019)

Broad objectives: This study was mainly to determine the level of knowledge, practice, barriers and enablers of pre-dialysis care among health service providers (HSP) at KNH.

Methodology: A cross section study design was used. Data collection was by a pretested questionnaire. Knowledge score was generated and Bloom's modified cut-off points was used to rank the knowledge. Factors associated with knowledge of pre-dialysis care were assessed using binary logistic regression and presented using odds ratios and p-values. Factors that had p values less than 0.25 in the bivariable analysis were selected for the multivariable analysis. Significance of the tests was interpreted at 5% significance level using p values and odds ratios. Quantitative data was analyzed using R version 4.1.2. One focused group discussion (FGD) session was conducted to support quantitative data. Focused group discussion session was audio recorded and later transcribed and analyzed using NVivo 14. Coding for the themes and subthemes was done and findings presented in narrative form together with the reports from the respondent in quotation marks.

Results: The response rate was at 100 % (n=97) with the most of the respondents being nurses at 69% (n=67). Most of the participants were aged between 29 to 38 and in terms of sex female were the majority with 50.5% (n=49). Good knowledge of pre-dialysis was at 37.1 % (n=36) while 52.6% (n=51) of HSP had a fair knowledge. Only 10.3% (n=10) had poor knowledge among the respondents. In practice, more than 70 % (n=60) of end stage kidney disease patients are started on dialysis as an urgent intervention to save their live. Only 14.5% (n=12) of dialysis sessions were planned before initiation. Some of the barriers to pre-dialysis reported were shortages of HSP and lack of pre-dialysis care guideline. Supportive environment was identified as the enabler of pre-dialysis care. The response rate for FGD was 100 % (n=5). After analysis, four themes were developed; Care given before initiation of dialysis, inadequate knowledge of pre-dialysis among nurses and nutritionists, Shortage of resources and Supportive environment.

Conclusions: Pre-dialysis care knowledge at KNH is average with less than forty percent of HSP having good knowledge. Most patients are started on dialysis as urgent measures to save their life. Shortage of HSP, lack of guideline and inadequate knowledge are the main barriers of pre-dialysis care while the main enabler is the supportive environment.

Recommendations: Development of a pre-dialysis clinical practice guideline, continuous medical education on pre-dialysis care, formulation of a committee that will ensure patients are enrolled in pre-dialysis care and finally KNH to continue identifying and mitigating pre-dialysis care barrier.

CHAPTER ONE

1.1. Introduction

Pre-dialysis care is the care offered to patient with chronic kidney disease (CKD) stage 3 to 4 from a team of health service providers which allows them to make an informed decision before the start KRT (Janmaat et al., 2018). The purpose of pre-dialysis care is managing the decreasing function of the kidney while preparing the patient for Kidney replacement therapy (KRT). Timely pre-dialysis care has been associated with delayed initiation of dialysis, better survival and reduction of mortality after initiation of dialysis (Dhanorkar et al., 2022).

1.2. Background

Worldwide, the prevalence of stage 1-5 of CKD is 3.5%, 3.9%, 7.6%, 0.4% and 0.1% respectively. Currently the disease is estimated to affect more than 800 million people globally with an anticipated increase in future. Chronic kidney disease has been noted to be among the top ten causes of mortality worldwide with an increase by 41.5% from the year 1990 to 2017 (Kovesdy, 2022).

Patients with CKD are normally followed up by general practitioners who usually refer them to specialists in case they note progression of CKD. Some of the indicators of CKD progression include; sustained decline in estimated glomerular filtration rate (eGFR) 5 ml/min per 1.73m2/year and increasing level of serum creatinine from baseline result. After referral to a Nephrologist, patients should be enrolled to a multidisciplinary pre-dialysis care program in readiness of KRT (Rossing et al., 2022).

Pre-dialysis is a period of transition of CKD to ESKD and it is normally characterized by increased incidence of complication, high cost of treatment, increased mortality rate and

decreasing eGFR. The transition should be seamless and thus HSP should be proactive in disease assessment, multidisciplinary patient education, timely management of complication and timely shared decision making with the patient on the kidney replacement therapy ("Chinese Clinical Practice Guideline for the Management of 'CKD-PeriDialysis'-the Periods Prior to and in the Early-Stage of Initial Dialysis," 2022).

In United State of America (USA): CKD patient with rapid decrease of eGFR < 30 ml/min per 1.73m2, patients with CKD complication like anemia, patients with high levels of albuminuria and those with hematuria should be referred to Nephrologist for initiation of pre-dialysis nephrology care. According to the Healthy people 2020 initiative, the main objectives of CKD patients is to ensure that all patients receive pre-dialysis care for a period of not less than 12 months before KRT. Unfortunately, recent studies still report more than 70% of patients are started on KRT modalities before the target 12 months pre-dialysis nephrology care (Purnell et al., 2020).

In Kenya, according to Mwenda et al., (2019) on prevalence of CKD in largest tertiary hospitals, a prevalence of 38.6 % was reported. More than 50% were found to be in CKD stage 3-5 and 69.1% of all assessed patients were noted to have hemoglobin (HB) of less than 10g/dl. Kabinga et al., (2019) research on pre-dialysis care patient experience at KNH, poor clinicians' communication was a concern by participants with more than 40% of patients reporting that their results were not discussed with them thus inferring that pre-dialysis care was not effectively done or not done at all.According to Nerbass et al.,(2022) in Brazil on prevalence and determinants of pre-dialysis dietitian follow-up, socioeconomic status, higher education level of patients and Nephrologist referral were highlighted as the main factors contributing to successful dietitian pre-dialysis care of more than 6 months.

Based on the review of both local and international literature, Patients should be taught on various measures to take like reducing salt intake, be prescribed drugs that help in preservation of kidney function and also be guided on protein intake among other measures. Based on the studies reviewed, knowledge of health workers on pre-dialysis care and practice are essential measures for a successful pre-dialysis program. Nevertheless, very few studies assessing knowledge, practice and barriers to pre-dialysis care among health workers have been done and published. The goal of this research will be to assess knowledge, practice and barriers of pre-dialysis care among HSP at Kenyatta national Hospital.

1.3. Statement of the problem

Chronic kidney disease has become one of the leading causes of mortality globally contributing a 4.6% of all-cause mortality in the year 2017. In United states of America (USA), more than 70% of patients are started on KRT modalities before the target 12 months pre-dialysis care (Purnell et al., 2020). In South Africa, there is no registry for CKD patients on pre-dialysis care follow-up nor well defined transition services from CKD to ESKD (Wearne et al., 2019).

According to Kabinga et al., (2019), 57.7%, 81.3% and 76.9 % of patients in renal, diabetic and hypertensive clinics respectively were started on dialysis as an emergency measure to save their life. A temporary vascular access was used on 70% of patients for dialysis.In unpublished statistics at KNH renal information records for the period starting June 2022 to end of December 2022, more than 50% of patients started on dialysis, a temporary vascular access was used. Among the patients who were started on dialysis, 25% were having CKD that had progressed to ESKD. With the estimated increase in the number of patients with ESKD, there is a necessity to cut the cost being incurred on the care of CKD patients

Currently, NHIF has quoted dialysis (HD) as the single largest claim they are paying per year. For instance, in the financial year ending 2021/2022, the institution paid claims amounting to Kenya shillings 2.8 billion which was approximately 22% of all the claims paid. There has been a noted increase of claim every financial year thus necessitating measures to reduce or maintain the cost to a manageable level. For instance, NHIF management with an aim to reduce the cost incurred from dialysis claims, proposed a reduction from weekly expenditure of Ksh 9600 to Ksh 6000 per session. The move was stopped through a court order for patients could not afford the extra cost out of their pockets ("Revealed," 2022)

Currently with more than 50% of CKD patients being started on dialysis with little information about their health condition, pre-dialysis care at KNH is questionable (Kabinga et al., 2019). Presently, no study has been carried out in Kenya seeking to assess knowledge, practice, barriers and enablers of pre-dialysis care among HSP.

1.4. Justification of the study

Pre-dialysis care has proved to be beneficial by cutting the cost of management of patients before they are started on dialysis ("Chinese Clinical Practice Guideline for the Management of 'CKD-PeriDialysis'" 2022). There are 214 renal units in Kenya both public and private which are currently overwhelmed with high numbers of patients requiring in center hemodialysis (Maritim et al., 2022). With an estimated 4.8 million of Kenyan to be suffering from kidney disease by year 2030 (Team, 2019), other home modalities like PD need to be embraced and in center hemodialysis to be used for only patients who are contraindicated to other modalities("Revealed," 2022). Preemptive kidney transplantation should also be recommended to CKD patients with an aim of reducing the number of patients requiring

dialysis. Patients who have undergone pre-dialysis normally are able to make informed decisions on various treatment modality like peritoneal modality, hemodialysis, kidney transplantation and others can choose conservative management(Morrison, 2022). Currently HD is still the commoner modality with 5670 (100 per million people) using it in Kenya(Maritim et al., 2022).

According to Ngaruiya (2022) in a study of barriers to peritoneal dialysis utilization, there was a significant association between patient education on PD and its utilization. In the study findings, only 0.2% of patients on selected hospitals' dialysis units were using peritoneal dialysis technique. The low utilization of PD care can be attributed to lack of pre-dialysis education on treatment modalities of ESKD. This is echoed in a different study on perceived barriers to peritoneal dialysis among Kenya nephrologists in which, 69% of the respondent reported lack of structured education programs for CKD and dialysis. In the same study, only 52% of nephrologists reported having had a shared decision-making session with the patient before the choice of a dialytic therapy (Sokwala et al., 2022).

Predialysis care helps in ensuring the transition period of CKD patients to ESKD is seamless. During the period, the patient is educated on various modalities and preparation like vascular access is carried out in a timely manner. Preparations help in reducing the number of emergencies starts of dialysis which is associated with increased mortality rate and also high cost of care. Pre-dialysis care normally prepare the patients psychologically thus patients adapt to the changes in lifestyles easily as compared to patients started on emergency dialysis(“Chinese Clinical Practice Guideline for the Management of ‘CKD-Peri-Dialysis’-the Periods Prior to and in the Early-Stage of Initial Dialysis,” 2022).

With estimated increase in mortality associated with CKD and a rise in the number of patients requiring dialysis care, pre-dialysis care should be advocated for by the ministry of health with an aim of improving quality of life of patients, reducing medical cost associated with complications of ESKD and also reduce mortality attributed to dialysis (Kovesdy, 2022).

The study will help in improving pre-dialysis care services in the country through development of a guideline or protocols. The findings will also help mitigate the ballooning cost of CKD care by enhancing identified facilitators of pre-dialysis care and addressing the barriers accordingly.

1.5. Research objectives

1.5.1 Broad Objective

To determine the level of knowledge, practice and barriers of pre-dialysis care among health service providers at Kenyatta national hospital.

1.5.2. Specific objectives

1) To assess knowledge of pre-dialysis care among health service providers at KNH
2) To determine the practice of pre-dialysis care among health service providers at KNH.
3) To explore barriers to pre-dialysis care among health service providers.
4) To establish enablers of pre-dialysis care among the health service providers.

1.6. Research questions

The study answered the following questions.

1) What is the level of pre-dialysis care knowledge among health service providers at KNH?
2) What is the current practice of pre-dialysis care at KNH?
3) What are the barriers of pre-dialysis care at KNH?
4) What are the enablers of pre-dialysis care among HSP at KNH?

CHAPTER TWO: LITERATURE REVIEW

2.1. Introduction

In this chapters, literature was reviewed and all objectives were covered. The review was done online from recent published papers and books. Google scholar was the main search engine and papers less than five years both locally and internationally were used and referenced accordingly.

Chronic kidney disease (CKD) is a progressive failure of the kidney function for more than three months characterized by increase of creatinine and urea in blood. Estimated glomerular filtration rate (eGFR) is normally used to categorize CKD into five stages. According to Singh (2008) stage one of CKD the eGFR is usually 90 mls/min/1.73m2 and above while in stage two, the eGFR is between (60-89) mls/min/1.73m2. Stage three usually has two stages categorized as 3a and 3b with eGFR of (45-59) and (30-44) mls/min/1.73m2 respectively. Stage four is normally termed as severely decreased kidney function with eGFR of (15-29) mls/min/1.73m2. Stage five is characterized with eGFR of less than 15 mls/min/1.73m2 and it is normally termed as ESKD and kidney replacement therapy must be initiated (Dhirendra, 2020)

Chronic Kidney Disease has been a persistent concern for healthcare professionals and governments. Statistics show that the condition affects one in every ten people (Kabinga et al., 2019). CKD is diagnosed through laboratory testing where the glomerular filtration rate (GFR) is estimated using a formula like MDRD equation (Kovesdy, 2022). Alternatively, presence of albuminuria or protein or both in urine of more than 30 mg/dl, abnormal urine sediments, abnormalities detected by imagining like Poly-cystic kidney disease and also histology following kidney biopsy with pathological changes(“Diagnostic criteria for CKD -

McMaster Textbook of Internal Medicine," n.d.). Chronic Kidney Disease is a progressive condition as such can result in ESKD that requires KRT for the patient to be able to excrete body waste products (Rossing et al., 2022). Kidney replacement therapies include kidney transplants and dialysis modalities which include intracorporeal and extracorporeal circuits (Kabinga et al., 2019).

Research has shown that the number of people suffering from CKD increases by 8% annually (Zimmerman, n.d.). To reduce the disease burden caused by the CKD, there should be adequate measures to identify, monitor, treat, prevent and offer therapeutic measures (Kovesdy, 2022). One of such measures is pre-dialysis care which can help manage CKD progression to ESKD. However, various research studies show a shortfall in pre-dialysis care which leads to patients lacking even the necessary information required to make an informed decision on different KRT treatment modalities (Sokwala et al., 2022). This chapter offers a comprehensive analysis of previous studies that evaluated pre-dialysis care globally and also in Kenya.

2.2. Pre-dialysis Care

This is the care the patient with CKD stage 3 to 4 receives from a multidisciplinary team of health workers which allows them to make an informed decision before the start of KRT (Janmaat et al., 2018). The care incorporates the caregivers and family members of the patients. The pre-dialysis care purpose is managing the decreasing functionality of the kidney while preparing the patient for KRT. Pre-dialysis care fosters better clinical outcomes among CKD patients. Mostly, pre-dialysis care is a multi-disciplinary approach where different cadres and specialists come together to offer education and specialty care to the patient. Kidney disease improving global outcome (KDIGO) guidelines recommend predialysis care

to start 12 months prior to the initiation of dialysis (Rossing et al., 2022). Research in Taiwan noted that pre-dialysis should occur at least 90 days before the patient starts dialysis (Wang et al., 2022).

2.3. Components of pre-dialysis care

The main goal of pre-dialysis care is to delay the progression of CKD to ESKD even as the patient is being prepared for KRT. This is achieved through various measures like multidisciplinary patient education on lifestyles changes (Rossing et al., 2022).For pre-dialysis care to become effective there are certain components that must be incorporated. For instance, the clinicians should understand the care trajectory for the patient which entails reviewing the patient's perception towards the diagnosis and disease management (Raffray et al., 2020).

Raffray et al (2020) when interrogating the pre-dialysis trajectory of CKD patients established some of the components of pre-dialysis care trajectory. First, the clinicians should offer frequent consultations to CKD patients. Secondly, the clinicians should frequently order, review and discuss laboratory tests with the patients so that the patient can understand disease progression and a suitable treatment modality. Thirdly, the clinicians should note the number of hospitals stays so that they can understand and manage the underlying comorbidities that require management in the hospital set up. Lastly, the clinicians should have a clear procedure for KRT preparation to include; choice of KRT modality by the patient, vaccination of patients against diseases like Hepatitis B, vascular access and psychological care.

2.4. Importance of pre-dialysis care

Starting a CKD patient on pre-dialysis care before dialysis is important because it lowers the mortality rate. In research conducted in Taiwan, it was noted that pre-dialysis care decreases risk of progression to ESKD, enables planned dialysis starts and allows more patients to begin peritoneal dialysis (Wang et al., 2022). Additionally, pre-dialysis care enables the patient to have a positive attitude towards the condition, adopt a self-care technique, comply with treatment advice, maintain a healthier lifestyle, understand complications, and get timely initiation to KRT (Wang *et al*., 2022).

Pre-dialysis care allows clinicians to monitor patients closely and this helps in noting CKD progression thus timely referrals to nephrologists (Kabinga et al., 2019). Early referral to a Nephrologist has been associated with high patients' survival rate, timely management of CKD complication, improved quality of life of patients even after initiation of dialysis (Dhanorkar et al., 2022). Further, (Chan et al., 2019) noted that pre-dialysis care makes the patient understand kidney failure, review available treatments, maintain control of their decision making and share information with caregivers and family.

2.5. Multidisciplinary approach to pre-dialysis care

Ideally, pre-dialysis care should involve a multi-dimensional team. The CKD patients require support, monitoring and education from different specialists. In Taiwan, the Kidney Disease Outcomes Quality Initiative Guidelines outlines that standardized pre-dialysis education should be undertaken by nephrologists, dieticians and nurses (Wang et al., 2022).

The nephrologists are specialists with extensive knowledge in treating kidney disease and they normally recommend the start of dialysis and offer care during the treatments.

Additionally, they educate and support the patient to make a decision of getting a transplant. The physician also participates in pre-dialysis care by conducting special clinics where patients with CKD stage 2-3 are reviewed and managed. Statistics and research show that patients with hypertension and diabetes are the leading cause of ESKD in Kenya. The physicians during the clinics offer the patients with information about the risk of CKD and refer the patient to the nephrologists when they note progression of CKD (Kabinga et al., 2019).

The nephrology nurse performs an instrumental function during pre-dialysis care. Wang *et al* (2022) noted nephrology nurse functions include; contacting patients, ensuring consistent follow-up, educating patients on lifestyle modification, advising patients on risk factors, informing patients on complications of kidney disease, supporting pre-dialysis preparation and reviewing the dialysis modality at least every month with the patient. The nurse also educates the patients on self-care required for different treatment modalities.

Dieticians' advice, monitoring and support during pre-dialysis care become important because CKD patients have special nutrition needs. The dietician helps CKD patients undergoing pre-dialysis care to adjust their diet so that they maintain the functionality of the kidneys. Also, the dietician comes up with a diet that is unique to the needs of the patient. They adjust their diets before the start of dialysis and during dialysis (Nerbass et al., 2022). Other specialists who support pre-dialysis care include pediatricians in case the patient is a child, gynecologists when the patient is pregnant, vascular surgeon for vascular access and counselors (Rossing et al., 2022).

2.6. Pre-dialysis care initiation

Pre-dialysis care should begin before the patient actually needs KRT. According to the KDIGO guideline, pre-dialysis should be started 12 months before the initial dialysis (Rossing et al., 2022). In Taiwan, pre-dialysis starts at least ninety days before initiation of dialysis (Wang *et al*., 2022). According to Bonenkamp et al., (2021) pre-dialysis care should be started if the patient has an estimated glomerular filtration rate of 15ml/min/1.73 m^2 or chronic kidney disease stage 4 with rapid deterioration of kidney function.

In France, the French National Guidelines require pre-dialysis care to start at least 1 year before KRT becomes a feasible occurrence (Raffray et al., 2020). In Kenya, research showed that pre-dialysis care started at least one month resulted in lower mortality rate for patients treated with dialysis (Kabinga et al., 2019).

2.7. Global overview of pre-dialysis Care

Globally, some countries have elaborate guidelines on pre-dialysis care. Taiwan, for instance, established a country wide multi-disciplinary pre-dialysis care (MDPC) program sixteen years ago (Wang *et al*., 2022). Prior to MDPC, the country had implemented a Multidisciplinary pre-dialysis education initiative (MPE) whose aim was to offer screening and education services to populations considered at high risk of suffering from CKD (BUJPH, n.d.). The country performs extensive surveillance of CKD through screening which enables patients to start pre-dialysis care on time because of early detection of the disease. The elaborate pre-dialysis program in Taiwan has seen a steady decline of the mortality rate among CKD patients. Taiwan has implemented Family Practice Integrated Care Project which fosters patient education and accessibility to specialized care within the

community set up (BUJPH, n.d.). Therefore, CKD patients in Taiwan actively seek pre-dialysis care early thus preventing progression of CKD to ESKD.

In the United States, according to the renal registry, more than 80% of patients are currently starting their dialysis using a temporary access. One of the contributing factors is failure of health service providers to clearly educate the patients on vascular access during predialysis care. According to a different study in Singapore, though there is a clearly prescribed pathway on predialysis care in the country, more than 85% of patients requiring KRT were found not to have a dialysis plan before the initiation on dialysis (Griva et al., 2020).Patients lack effective preventative care because the physicians limit the accessibility of specialized care. Further, the reimbursement strategy in the USA limits the ability of the hospitals to offer pre-dialysis care to CKD patients. The U.S Preventive Services Task Force does not endorse screening of CKD patients not presenting symptoms because it has no probative value (BUJPH, n.d.). The non-endorsement of screening services means that patients get a diagnosis when it is too late and therefore do not get pre-dialysis care.

France established the pre-dialysis guidelines in 2012. The CKD patients receive multidisciplinary care from primary caregivers and specialists in the outpatient setup (Canaud and Couchoud, 2021). The patient attends the clinic regularly for consultations, assessments, testing and monitoring. The referent practitioner educates the patient on the different treatment modalities. The Nephrologist makes the determination on when treatment should start. Despite the existence of the program, over thirty percent of the CKD patients end up receiving emergency dialysis (Raffray et al., 2020).

In Kenya, research shows that pre-dialysis care is performed minimally. For instance, (Kabinga et al., 2019) noted that physicians, who conduct specialized clinics for patients with

hypertension, renal and diabetes, fail to educate the patients on the health condition and how it predisposes them to CKD. In the study close to half of the patients complained of not receiving information about tests conducted. The country does not have a proactive approach to screening with almost fifty percent of patients with CKD stage 5 not aware of their medical status.

Yonga et al., (2022) on the factors influencing uptake of peritoneal dialysis in Kenya, the findings were that 65% of the patients had no information regarding the treatment modality. The unawareness of a treatment modality means that the patients did not receive pre-dialysis care. Additionally, almost seventy percent of the nephrologists noted that the country lacked a dialysis education program (Sokwala et al., 2022). Ngaruiya, (2022), over eighty percent of the patients had not heard about peritoneal dialysis and were undergoing hemodialysis because it was the only choice presented to them. Therefore, there is a challenge in the pre-dialysis education in Kenya which limits the patient's ability to make informed decisions.

2.8. Health service providers knowledge on pre-dialysis care –Kenya and globally

Clinician knowledge is crucial to effective pre-dialysis care. The knowledge facet interrogates the clinician's understanding on causes of disease, diagnosis and treatment of CKD. The clinician should have good knowledge on the estimated Glomerular filtrate as a test to evaluate the functioning of the kidneys. Besides, they should understand how to refer the patient to a Nephrologist. Further, they should have comprehensive knowledge on risk factors of CKD ("Knowledge, attitude, and practices toward chronic kidney disease among care providers in Jimma town: cross-sectional study | BMC Public Health | Full Text," n.d.).

In a randomized controlled trial carried out in Thailand, patients with CKD were allocated into either interventional group or a control group and followed up for two years. The health

workers in the intervention group were provided with educational materials, program training and practice guideline checklist for care of the patients. After the two years of follow up, the intervention group had a lower rate of eGFR declines than the control group. The results implied that empowered health workers with CKD educational materials and practice guideline can result to reduction in progression of CKD (Moura-Neto et al., 2021)

In a study in Cameroon on factors associated with late presentation of patients with CKD, the prevalence was found to be more than 70% and 50% of the causes were reported to be contributed by physicians(Marie Patrice et al., 2019). In another study on knowledge of physicians on CKD, more than 70 % did not know the various stages of CKD and only 39% knew about PD. Lack of knowledge on various CKD stages can result in inappropriate management of CKD patients leading to late referral of patients to nephrologists resulting in emergency initiation of dialysis (Haddiya et al., 2020).

In a study conducted in Ethiopia, the male residents had higher knowledge of CKD than female residents and specialists (Wolide et al., 2020). Most of the residents understood that eGFR assesses kidney function better than urine and serum creatinine tests. A study conducted in Nigeria on knowledge of CKD by non-nephrology nurses, more than 35 % were found to have poor knowledge (Adejumo et al., 2018). In another study carried out in Rwanda on knowledge of CKD among nurses, 84% of respondents were found to have a moderate knowledge (Emmanuel Gapira et al., 2020).

In Kenya, 20% of the nephrologists noted that inadequate knowledge limits their ability to offer peritoneal dialysis to patients (Sokwala et al., 2022). They also highlighted that there are no programs currently running to ensure that nephrologists get regular medical training on KRT. The study outlined lack of nursing expertise as one of the hindrances to proper

utilization of PD as a treatment modality. In another research involving patients suffering from CKD attending renal, hypertension and diabetes attending outpatient clinics, the finding showed that health service providers did not update CKD patients on disease progression, test results, kidney failure, probable complications and nutrition (Kabinga et al., 2019). However, the level of education offered differed among the different clinics and also there were a number of patients who did not receive any information about dialysis.

2.9. Health service provider practice of pre-dialysis care- Kenya and globally

Predialysis care is normally carried out in one-on-one sessions or a classroom setting where patients meet with health care workers. Individual patients can also have a counseling session with the health worker during their review and they discuss various ways of delaying ESKD and preparation measures of KRT. Predialysis education programs should specify the frequency of the session and duration of each session. There are countries with practice guidelines on pre-dialysis care which prescribe how health workers dispense their care. If the country lacks the pre-dialysis guidelines, then the health workers offer care based on their knowledge, skills and discretion. The main objective of health workers in pre-dialysis care is to prevent disease progression and improve treatment outcomes.

In the USA, the research on increasing PD utilization identified that clinician's bias and perspective on PD has contributed to low PD uptake among patients (Flanagin et al., 2020). For example, the clinician will recommend HD because they are skeptical of the benefits of PD. A Study done in Europe on self-rated knowledge and competence on management of CKD, only 30% of primary caregivers were confident in management of CKD patients without support (Seidu et al., 2022).

In China, the prevalence of CKD by 2017 was 10.8%, approximately a total of 120 million patients. With high numbers of patients with CKD, there was a need for developing a management practice guideline for transitioning periods of CKD to ESKD ("Chinese Clinical Practice Guideline for the Management of 'CKD-PeriDialysis'-the Periods Prior to and in the Early-Stage of Initial Dialysis," 2022). A practice guideline called CKD-pre dialysis was developed to help standardize the management of patients with CKD across the country. In the guideline, two periods were identified; pre-dialysis period to include non-dialysis dependent patients with CKD (eGFR < 15 mls/min per 1.73m2) and dialysis dependent patients from initiation of dialysis up to 3 months. The duration of the two periods were approximated to take 1-2 years with the pre-dialysis period estimated to be the longest. During the period, the care was to include disease assessment and monitoring, patient education on lifestyle, diet, protection of upper limbs blood vessels, modes of KRT and early preparation on either of the selected modality ("Chinese Clinical Practice Guideline for the Management of 'CKD-PeriDialysis'-the Periods Prior to and in the Early-Stage of Initial Dialysis," 2022).

In Kenya, research shows poor health workers' practice in pre-dialysis care. For instance, Kabinga et al., (2019) observed that the physician failed to share the test results with patients who are at risk of CKD. Also, the physician lacked to educate the patient about predisposition factors to kidney failure. The physicians also did not give timely referrals to nephrologists despite caring for the patient with progressing CKD in various outpatient clinics.

In research to evaluate the barriers to peritoneal dialysis in Kenya, the findings showed that the patients were not well educated on the different KRT modalities (Ngaruiya, 2022) .

Majority of the patients who would benefit from PD were on HD because of lack of pre-dialysis education. Furthermore, nephrologist preference influences patient's pre-dialysis care in Kenya. In research conducted in a national hospital in Kenya, 45% of the patients strongly agreed that nephrologist preference was the main factor that influenced their current KRT modality thus inferring that nephrologist did not offer pre-dialysis care effectively to patients (Yonga et al., 2022).

2.10. Barriers to pre-dialysis care Kenya and globally

Pre-dialysis care aims at reducing the incidences of ESKD through education and patient support. Although pre-dialysis care presents lots of benefits, the health workers experience certain limitations that deter their effectiveness in offering the much-needed pre-dialysis care. For instance, the health workers seem to have a preexisting practice that jeopardizes the ability of the patient to choose a treatment modality. In a conference organized by Kidney Disease Improving Global Outcomes noted that clinicians have to derogate from the practice of treating CKD patients collectively rather than individually (Chan et al., 2019).

2.10.1. Lack of Expertise

Globally, lack of expertise in PD modality among the health workers interferes with pre-dialysis care. The clinician will not be comfortable discussing the PD modality during pre-dialysis care because they lack the expertise on PD catheter insertion. This barrier was noted during the KDIGO Controversies Conference (Chan et al., 2019). Ngaruiya, (2022) noted that the health workers lack experience for PD catheter insertion. This can be inferred to be a barrier to predialysis care for patients who are not educated to make an informed decision.

2.10.2. Shortage of Health Service Providers

Pre-dialysis care is ideally supposed to be conducted by a multidisciplinary team which includes a nephrologist. However, in Kenya, the number of nephrologists is extremely low which hinders effective pre-dialysis care. Statistics show that currently there are only 41 nephrologists who serve an estimated CKD population of four million (Maritim, Twahir, and Davids, 2022). The University of Nairobi in collaboration with East Africa Kidney Institute has helped improve the numbers through training but the numbers are still low. Also, the scarcity of nephrologists in the country makes it hard for patients to access consultation services especially for those living in the rural setting (Kabinga et al., 2019).

2.10.3. Poor communication and coordination among Physicians

In a qualitative study carried out in Singapore, health service providers' highlighted lack of clear information on vascular access during patient education as one of the contributing factors to initiation of dialysis using temporary access. Secondarily, complexity and high load of vascular access information to patients was acknowledged as the other factor contributing (Griva et al., 2020).

The multi-dimensional approach in pre-dialysis care requires the different actors to communicate on time and coordinate for better patient outcomes. Research has shown that the general physicians who conduct outpatient clinics for patients at risk of CKD fail to communicate with the nephrologist on time (Kabinga et al., 2019). The lack of timely communication contributes to late referral which translates to emergency dialysis starts. The patient who suffers from the communication mishap does not get the required pre-dialysis care which affects their decision making and mortality rate.

2.10.4. Pre-existing Biases, Preferences and Assumptions

The clinician's biases and preferences might interfere with how they conduct pre-dialysis care. For instance, clinicians who prefer one treatment modality over another might not be objective in their pre-dialysis care. Personal biases can limit the quality of pre-dialysis care offered to CKD patients. For instance, if the clinician feels they do not have up to date information on a certain treatment, they might withhold the option from the patient because of their inability to answer all the questions that might be asked during pre-dialysis care (Dallimore et al., 2021). Additionally, clinician biases about the traits of the patient such as their disabilities, sexuality, race, age and education level can interfere with how clinicians relay information to patients during pre-dialysis care.

2.10.5. Lack of standardized pre-dialysis guidelines

Pre-dialysis guidelines are important because they establish the healthcare stakeholders involved in taking care of CKD patients and when to start. The guidelines bring standardization which ensures that every patient gets all the information they need to make an informed decision about their care. In Kenya, research has shown in-existence of such a guideline (Sokwala et al., 2022). Therefore, patients get diverse information from the healthcare workers.

For instance, the uptake of PD as a treatment modality among CKD patients remains relatively low because the physicians and nephrologists fail to educate the patients about it. The lack of a guideline also makes it impossible to have regular screening of patients who are at risk of CKD and are attending outpatient clinics. Thus, initiation of dialysis occurs without pre-dialysis education because the patient presents symptomatically and is in need of emergency dialysis within 24 or 48 hours(Sokwala et al., 2022).

Taiwan has an elaborate guideline that has translated to lower mortality rate among CKD patients. There is also the Kidney Disease Improving Global Outcomes (KDIGO) guideline which advocates for better management of CKD risk factors such as blood pressure and diabetes. Kenya should develop a guideline on pre-dialysis care to support the healthcare providers and patients achieve better outcomes.

2.11. Enablers of pre-dialysis care Kenya and globally

In Singapore, the government offers pre-dialysis care for free or at subsidized rates thus encouraging the patients to utilize the services. Timely referral and clearly standardized predialysis pathways guidelines are also acknowledged as facilitators of predialysis care in Singapore. However, only 44% of patients starting dialysis in Singapore have a good understanding of dialysis and are ready for lifestyle changes associated with KRT(Griva et al., 2020). In another study on dialysis initiation and modality choice among CKD patients, out of pocket expenditure and lack of reimbursement policies on money spent on predialysis care was one of hindrances of its utilization (Chan et al., 2019).

Effective education on different KRT modalities and use of decision-making aids has been highlighted as one of the enablers of predialysis care. Approximately 50% of patients with ESKD will be able to achieve self-care dialysis at home when proper training is done. Health service providers should employ various training materials to include tours or video records of patients using various KRT modalities (Chan et al., 2019).

Support of primary care providers (PCP) who mainly manage early stages of CKD is one of the enablers of predialysis care. According to a study on barriers and enablers of CKD, training of PCP will help them manage CKD and also ensure timely referral to a specialist.

Timely referral usually will ensure an ample time for predialysis care which will translate to better patients' outcomes (Neale et al., 2020)

Collaboration between physicians, nurses, nutritionists and counselors is also an enhancer for pre-dialysis care. Predialysis care should be offered in a multidisciplinary setup to ensure patients benefit from services of various specialized health service providers. A good working relationship between different cadres taking care of patients with CKD stage 3-4 is very healthy for predialysis care. Finally, advancement of technology has been reported to be an enabler in management of CKD. Improved CKD management will translate to improved predialysis care which will result in better patient outcomes (Neale et al., 2020).

2.12. Conclusion and Research Gap

According to the reviewed literature, predialysis care practice globally is wanting despite the reported benefits to the patients. With the growing number of patients requiring KRT, it is paramount to enforce predialysis care to be carried out on all patients. Health workers capacity development on predialysis care should also be prioritized to ensure that care is standardized and offered in a timely manner.

The pre-dialysis care guideline will allow the clinicians and patients to work together towards delaying the progression of CKD to ESKD. The patient will understand the different treatment modalities, their benefits and risks. Also, through the pre-dialysis education, the patient will be willing to make some lifestyle modifications that will help preserve kidney function.

Throughout the literature review, it was noted that in Kenya there is little if any research on pre-dialysis care and the role of the clinician in the same. There is also limited research done

on practice and barriers of pre-dialysis care among clinicians and the findings in the literature review were inferences from reviewed literature.

2.13 Theoretical model

The study adopted the Betty Neuman theory of system model that deals with stress reduction with an aim of maintaining patients' health. The theory defines stressors as adverse conditions which disturb the equilibrium of the individuals, families and groups triggering them to respond by reactions. Individuals according to the theory are assumed to be an open system that has various lines of reaction towards the stressors (Alligood, 2021).

The role of a HSP is to enforce the various lines protecting the individuals against the various stressors. The stressors can be categorized into factors which are within an individual called intrapersonal factors and extra personal factors (Idowu et al., 2022).HSP normally provides holistic care to individuals at different levels to include primary, secondary and tertiary levels with an aim to enforce the various lines against stressors.

At the primary level HSP main role is to give health education on diet. HSP should discourage use of processed food which contains a lot of sodium that can result in HTN which affects the kidneys. Individuals who are overweight and obese should be encouraged to reduce their weight through various healthy measures like exercise to ensure that they don’t acquire lifestyle diseases that can cause CKD. Screening against CKD is also another activity carried out at the primary level. HSP normally checks individuals blood pressure which when high can lead to CKD.

At secondary level, the main stressors are diabetes mellitus, hypertension, polycystic kidney disease, and acute kidney injury. The main role of HSP is to ensure that the disease doesn’t

progress to ESKD. At this level, Pre-dialysis care should be offered by HSP with an aim of enforcing various concentric lines of defenses. Patients who are in CKD stage 3-4 have various health concerns that require a multidisciplinary team. The general body immunity of a patient with CKD is weak thus the individual is prone to many diseases.

At the tertiary level, the main stressors are uremia, anemia, mineral bone disorder, metabolic disorders and electrolytes imbalances. The main role of the HSP is to ensure that the patient receives adequate dialysis and if possible, kidney transplantation is done. Treatment for various complications should be done in a timely manner to avoid irreversible damage to various body organs (RN, 2019).

2.14. CONCEPTUAL FRAMEWORK

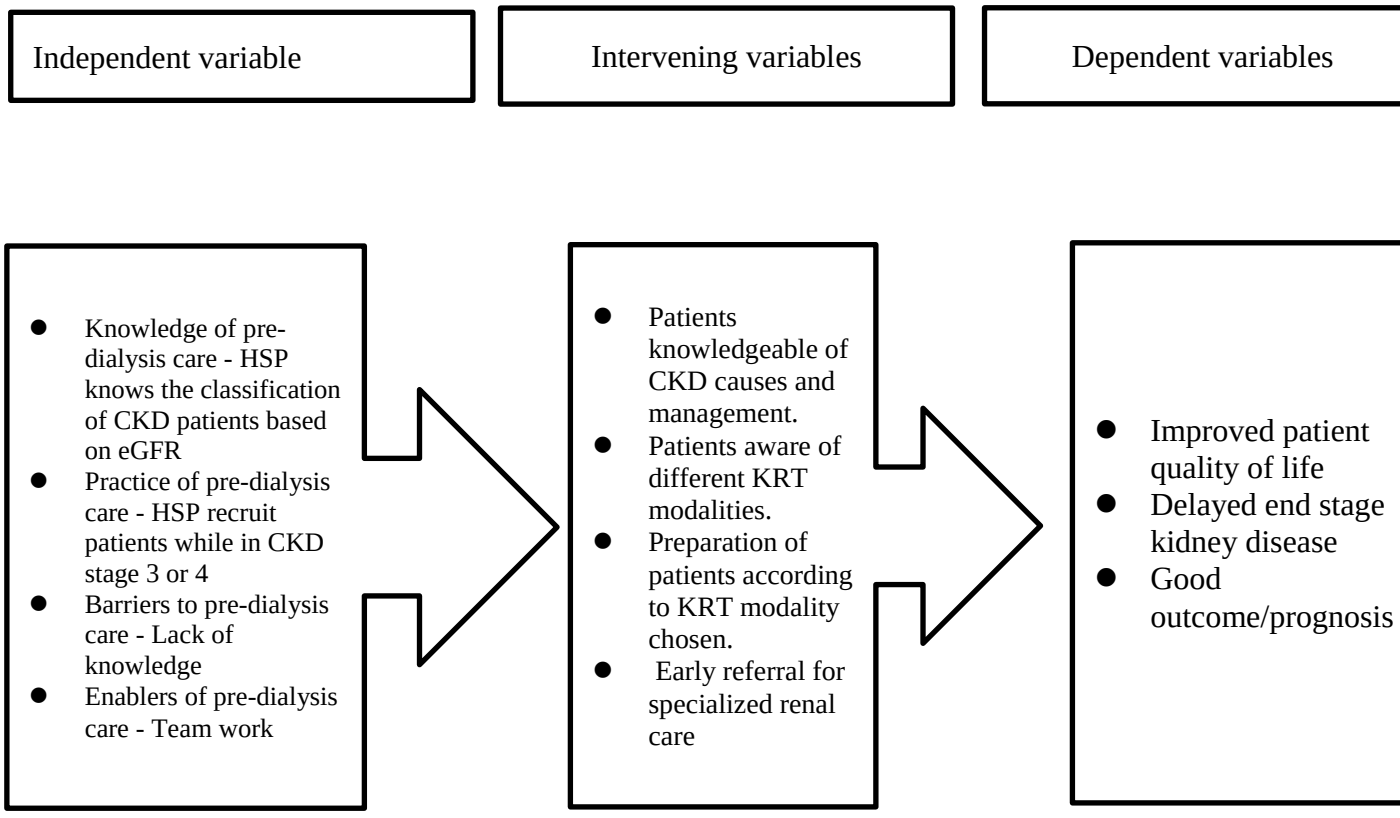

Figure 1: Conceptual framework

CHAPTER THREE: METHODOLOGY

3.1. Introduction

The chapter describes the general framework of how the research study was carried out. This includes: research design, sampling procedure, study area, study instruments, ethical considerations and results dissemination.

3.2. Study design

A cross sectional study design was used. A mixed method was used to assess determinants of pre-dialysis care among health service providers working at KNH. A pretested structured questionnaire was used to collect quantitative data while qualitative data was collected using focused group discussion (FGD) under help of interview guide.

3.3. Study area

The study was conducted at the Kenyatta national hospital (KNH) which is a teaching and referral facility located at the capital city of Kenya, Nairobi. The hospital was founded in the year 1900 as a native civil hospital with a capacity of 40 beds. Currently the hospital has a capacity of over 2000 beds with more than 6000 members of staff. KNH serves as a national referral and to a larger extent as also a referral center for the east Africa region. KNH serves as a teaching hospital for the University of Nairobi and medical colleges in Kenya because of its high number of patients and specialized care. Some of the services offered at the hospital include: voluntary counseling and testing, pediatric and adolescent clinic, psychiatric clinic, diabetic and hypertension clinic, outpatient services, accident and emergency services, maternal and child health clinic, Pharmacy, dental services, renal replacement services

mainly HD and kidney transplant, critical care services, Occupational and Physiotherapy services. The study was conducted in the renal unit, renal ward 7A and renal clinic 24 which are the main residential areas of HSP taking care of patients with CKD.

3.4. Study population

Study population is health service providers working in the renal related units to include specialized nephrology physicians, general physician, renal nurses, nutritionists and counselors. The health service provider offers care to patients suffering from CKD stage 3-4 who require pre-dialysis care.

Table 1: Study population frame for quantitative study

S|No	Category	Number
1	Specialized nephrology physician	4
2	General physician	10
3	Renal Nurses	77
4	Nutritionists	4
5	Counselors	2
	Total	98

3.5. Study population for qualitative arm of the study

The heads of department were purposely selected to be interviewed in the FGD. The heads of the departments are the highest in the ranking thus likely to have more experience in attending to issues of the department and also in decision making.

Table 2: Study population frame for qualitative study

S|No	Category	Number
1	Head Specialized Nephrology physician	1
2	Head of general physician	1
3	Nurse in charge Renal unit	1
4	Nutritionists	1
5	Counselors	1
	Total	**5**

3.6. Inclusion/ Exclusion criteria

3.6.1. Inclusion criteria

Health service providers who were taking care of CKD stage 3 -5 patients and had worked in the department for more than three months were included in the study. Only HSP who voluntarily gave consent to participate in the study were included. Heads of department who had been in the role for more than three months and consented to participate in the study were included in the Focused group discussion.

3.6.2. Exclusion Criteria

Health service providers who had not worked in the departments for more than three months were excluded from the study.

Health service providers who at the time of the study were sick or on leave were not involved in the study.

3.7. Sample size Determination

The sample size was calculated from the target population using Cochran's formulas (1977). A sample size entails a portion of the population targeted which is procedurally selected(Oso and Onen, 2009).

$$n=(p(q)z\ 2)/\ (e\ 2)$$

$$n= (1.96)\ (1.96)\ (0.5)0.5)/\ (0.1)\ (0.1)$$

$$=96.04$$

$$\mathbf{= 96}$$

n = Sample size

z = Confidence level

p = Proportion of an attribute that is present in the population

q = 1- p estimate of variance

3.8. Sampling Procedure

3.8.1 Sampling technique

Health service providers were grouped in their cadres and proportionate done on each of the cadres to ensure that individuals in different subgroups were included in the sample(Sakharkar, 2023). Within each professional area (Specialized nephrology physicians, general physicians in renal wards and clinics, Renal nurses, nutritionists and counselors) a convenient sampling was used to select the participants until the target number of each cadre was achieved.

Table 3: Sampling Frame proportion

S|No	Category	Target population	Proportionate	Sample size
1	Specialized Nephrology physician	5	0.051	5
2	General physician	10	0.102	10
2	Renal Nurses	77	0.786	75
3	Nutritionists	4	0.041	4
4	Counselors	2	0.020	2
	Total	**98**	**1.000**	**96**

3.8.2 Qualitative Sampling method

Head of specialized nephrology physician, general physicians in renal wards and clinics, Renal unit nurse in charge, nutritionists in charge of the renal unit and counselors were purposively selected to participate in FGD. Heads of the department are the highest in the hierarchy thus likely to have more experience for they attend to many issues of the department and also participate in ward decision making. Selection of head from different cadres ensured diverse of opinion.

3.9 Variables

Independent variable

Demographic characteristics, knowledge of the participants, pre-dialysis care practice, barriers to pre-dialysis care and enablers of pre-dialysis care are the independent variables that were assessed using quantitative and qualitative approaches.

Intervening variables

Patients well educated on CKD risk factors, categorization and management at all stages. Chronic kidney disease patients well educated on different KRT modalities and their preparation of patients according to KRT modality chosen. Early referral for specialized renal care.

Dependent variables

Delay in progression of CKD to ESKD, Patients quality of life improved and good outcome/prognosis.

3.10 Data collection procedure

A total of fifteen structured questionnaires were pretested at Kenyatta university referral hospital which is a national referral in Kenya. Five questions were found to not to be clear during the pretesting activity and they were re-framed to ensure clarity. Furthermore, it helped in checking whether the asked questions were understandable by the respondents before the actual data collection was done. Pretesting also aided in determining whether the questionnaire was reliable by checking the consistency of the responses. A voice recorder was used to collect qualitative data.

Socio-demographic data

A questionnaire was used to collect demographic characteristics of the respondent like age, gender, cadre, years of experience in the current position.

Knowledge, Practice, Barriers and Enablers data

A questionnaire was used to collect data of knowledge, practice, barriers and enablers of pre-dialysis care at KNH. The questionnaire had closed-ended questions that respondents filled without any external support or any reference. A session of FGD was conducted at the renal unit boardroom and open-ended questions contained in the interview guide were asked.

Participants were the head of the different specialties including specialized nephrology physician, general physician head, renal unit nurse in charge, nutritionist and a renal unit counselor. The session was held after the ward rounds and at the most convenient time for all the participants.

3.11 Respondents consenting procedure for quantitative and qualitative participants

Quantitative study

Health service providers selected to participate were approached during their free time to avoid interruption of services. Participants were allowed time to read through consent forms. Questions regarding the research were answered by the principal researcher and any clarification attended to accordingly before filling of the questionnaire. Data was collected from participants who gave consent only.

Qualitative study

The heads of different cadres in the renal unit were approached and requested to participate in an FGD. A convenient day was chosen by each one of them and a consensus was reached on a Thursday afternoon. After assembling in the renal unit boardroom, the participants were informed of the discussion, norms to be observed during the discussion. A verbal consent was obtained and an interview guide used to guide the discussion.

3.12. Ethical consideration

Privacy and confidentiality: The approval and clearance to carry out the study was sought from the KNH-UON review ethics board and National commission for science technology and innovation (NACOSTI) as described below. Furthermore, permission was also sought

from KNH research administrator and University of Nairobi department of nursing. A room was identified in the renal unit where most of the participants filled their questionnaire in order to ensure privacy and confidentiality.

Informed consent: The participants were informed of their rights to participate or decline participation in the study. Voluntary participation was ensured and all participants signed informed consent forms without any coercion or enticement as directed by KNH-UON ethics committee and NACOSTI.

Risk: There were no potential risks associated in participating in this research since, the information was not to be used against the participant in any way whatsoever. All the regulations of safety as stipulated by KNH-UON ethics committee and NACOSTI were adhered to in ensuring that participants were protected from any harm.

Beneficence: There were no direct benefits for participating in the study. The researcher will share the findings with study participants in a continuous medical education to ensure they benefit from the findings.

Justice: Justice was ensured by the researcher by distributing any potential benefit or risk across all the respondents.

3.13 Validity and reliability

Validity: It refers to the extent to which the findings reflect the population being studied and also how generalizable the results are to the entire population of interest. The researcher self-administered a questionnaire and ensured all the clarification were done before the participants filled the questionnaire. Pretesting of the questionnaire helped in ensuring validity of the questionnaire by identifying problems in questions interpretation. Furthermore, it helped in checking whether the asked questions were understandable by the respondents before the actual data collection was done.

Reliability: It refers to the extent to which an instrument gives you the same results every time it is used. The questionnaire was pretested at Kenyatta university referral hospital which is at the same level with KNH where the data was collected. Pretesting aided in determining whether the questionnaire was reliable by checking the consistency of the responses. All identified issues like unclear questions were corrected before data collection.

3.14 Rigor of the qualitative research

The researcher ensured that the findings were correct and accurately reflected the phenomenon under study. In order to ensure precision of the findings the following elements were guaranteed; dependability and confirmability.

Dependability: The capacity to hold data steady across time. To do this, the researcher kept a thorough audit trail by making sure all phases and steps of the data collection procedure were documented.

Confirmability: The ability of data to accurately reflect the information provided by participants is known as confirmability. In order to confirm the validity of the conclusions, the researcher used participant quotes.

3.13 Data management plan

Quantitative data management

After each day of data collection, data was cleaned and questionnaires which were complete, data was entered into a personal computer for analysis. Participants did not write any identifier on the questionnaire and that ensured anonymity. The researcher entered data alone

on a personal computer with a password to ensure confidentiality and safety of the data collected and stored.

Data analysis and presentation

Data was analyzed in R version 4.1.2. Quantitative data like overall knowledge score was summarized using medians and interquartile ranges. Categorical data like age, education level and gender were summarized using frequencies and proportions.

Overall knowledge and practice score were generated from individual questions that tested knowledge. Each correct question attracted one mark. The marks were summed and converted into percentages. Bloom's modified cut-off points were used to rank the knowledge score where; <60% = poor, 60-79% = fair and >79% = good. (Khaled et al., 2020)

Table 4: Bloom's modified cut-off points

Score	Grade
<60	Poor
60-79	Fair
80-100	Good

Factors associated with knowledge of pre-dialysis care were assessed using binary logistic regression and presented using odds ratios and p-values. Factors that had p values less than 0.25 in the bivariable analysis were selected for the multivariable model (Hosmer, Lemeshow and Sturdivant, 2013).

Significance of the tests was interpreted at 5% significance level using p values and odds ratios. Factors with p values less than 0.05 were considered significant. Odds ratios whose confidence intervals did not traverse one were also considered significant.

Qualitative data management

The Audio Recordings were transcribed verbatim and written in word as text. Thematic analysis was used to generate themes and subthemes after reading the transcripts over and over to synthesize the respondents' statements. Coding for the themes and subthemes was done in NVivo 14. The main themes were identified followed by the generation of subthemes. The themes and subthemes were then presented in narrative form together with the reports from the respondent in quotation marks.

3.14 Study results dissemination plan

The researcher will submit a copy of the findings to the KNH-UON ethics committee. A copy of the final document will also be submitted to the UON department of nursing library. The research findings will be published in the UON repository and also in high impact scientific journals. The findings will also be presented in scientific conferences.

3.15 Study limitation and delimitation

Study delimitation

The study was carried out on HSP taking care of patients with CKD stage 3-5 at Kenyatta National Hospital. Only HSPs who had worked in the department for more than three months were included in the study.

Study limitation

The target population was small thus generalization of the results might not be possible because of the error associated with small sample size. Because of the shortage of HSP at KNH, the number of patients assigned to each service provider was high. This resulted in the

HSP being busy throughout the day and only having a few minutes tea break. This was mainly overcome by approaching the HSP after the shift or during lunch breaks.

CHAPTER FOUR: RESULTS

Introduction

In this chapter, the findings were discussed in respect to the study objectives for both qualitative and quantitative approach. Quantitative data was analyzed using version R 4.1.2 and presented accordingly. Qualitative data was analyzed using NVivo 14. Coding for the themes and subthemes was done. The main themes were identified followed by the generation of subthemes. The themes and subthemes were then presented in narrative form together with the reports from the respondent in quotation marks.

Response rate

There was a 100% (n=97) response rate and all the questionnaires administered were returned. Participants who met inclusion criteria and gave consent to participate were enrolled in the study. Medical officers, nutritionists and nurses' interns together with new employees in the renal departments were excluded from participating. Participants of the focused group discussion were purposively selected and the response rate was at 100% (n=5).

4.1 Quantitative results

4.1.1 Characteristics of the study participants

Of the 97 enrolled participants female were the most at 50.5% (n = 49) and male were 49.5% (n = 48). In regards to age, 34% (n = 33) were aged between 29 to 38 years, 32% (n = 31) were aged between 39 to 48 years and 33.7% (n = 23) were aged 48 years and above. The rest were aged below 29 years. In terms of cadres, most at 51.5% (n = 50) of the respondents were renal nurses followed by 17.5% (n = 17) general nurses and 19.6% (n = 19) being medical

residents. The rest of the cadres are shown in table 4.1. Out of the 97 respondents, 56 of them provided information on years of experience of which 55.4% (n = 31) had a professional experience of five years and below. In terms of the level of education, the majority 48.5% (n = 47) of the participants were holders of a higher diploma, 19.6% (n = 19) had a bachelor's degree and 18.6% (n = 18) had postgraduate qualifications. The rest were holders of basic diplomas (Table 5).

Table 5: Description of the study participants (N = 97)

Characteristic	Description	Frequency	Percent (%)
Age in years	<29	10	10.3
	29-38	33	34.0
	39-48	31	32.0
	≥48	23	23.7
Gender	Female	49	50.5
	Male	48	49.5
Cadre	Medical officer	3	3.1
	Counselor	1	1.0
	Medical residents	19	19.6
	Nephrologist	2	2.1
	General nurses	17	17.5
	Nutritionists	5	5.2
	Renal nurses	50	51.5
Years of experience	≤5	31	55.4
	>5	25	44.6
Level of education	Diploma	13	13.4
	Higher Diploma	47	48.5
	Bachelors	19	19.6
	Postgraduate	18	18.6

4.1.2: Pre-dialysis care-related information

With regards to pre-dialysis care training, 53.6% (n = 52) had been trained while the rest had not. Those who responded that they carried out pre-dialysis care before the initiation of dialysis were 83.5% (n = 81). When the respondents were asked about the source of information on pre-dialysis care, they responded as follows; basic training 85.1% (n = 74), in-service training 68% (n =66), scientific conferences 56.7% (n = 55), print and electronic

media 42.3% (n = 41). Those who responded that they got the information from colleagues were 36.1% (n = 35) as highlighted in table 6.

Table 6: Pre-dialysis care-related information (N = 97)

Characteristic	Description	Frequency	Percent (%)
Trained in pre-dialysis care	Yes	52	53.6
	No	45	46.4
Carries out pre-dialysis care before initiation of dialysis	Yes	81	83.5
	No	16	16.5
Source of information on pre-dialysis care			
Basic training		74	85.1
In-service training		66	68.0
Scientific conference		55	56.7
Print and electronic media		41	42.3
Colleagues		35	36.1

4.1.3: Knowledge of pre-dialysis care

The knowledge of pre-dialysis care was tested based on 23 items. Each correct response attracted one mark. The marks were summed up for all respondent and converted into a percentage. Table 4.3 shows those who responded correctly to the questions were; 91.8% (n = 89) said pre-dialysis care should be carried out by a multidisciplinary team, 100% (n = 97) were able to identify the composition of the multidisciplinary team, 87.6% (n = 85) said pre-dialysis care entails kidney restorative services, supportive and palliative care.

Of the 97 respondents, 89.7% (n = 87) correctly said that lack of preparedness and an urgent start of dialysis is associated with lower survival and higher morbidity, and 96.9% (n = 94) said pre-dialysis care reduces the cost of initiating a patient on dialysis. The rest of the responses to the knowledge items are shown in Table 4.3. A summary of knowledge of pre-dialysis care is shown in Figures 2 and 3.

Table 7: Knowledge of predialysis care (N=97)

Statement	Frequency	Percent (%)
Pre-dialysis care should be offered by a multidisciplinary team	89	91.8
Nephrologists, Medical Doctors, Renal Nurses, Vascular Surgeons, Nutritionists, and Counselors should be included in the Multidisciplinary Team	97	100
Pre-dialysis care entails kidney restorative care services, supportive care and palliative care services	85	87.6
Lack of patient preparedness and an urgent start to dialysis are associated with lower survival and higher morbidity	87	89.7
Pre-dialysis care saves the health care cost of CKD management, delays the progression of CKD to ESKD, and is associated with better patient outcomes after initiation of dialysis.	94	96.9
Patients with progressive CKD and who are at high risk of kidney failure should have Vascular access created to mature before the initiation of dialysis	82	92.1
Signs and symptoms of CKD requiring KRT		
Water retention	93	95.9
Nausea and vomiting	81	83.5
Loss of appetite	82	84.5
Increased fatigue	81	83.5
Stage of CKD at which dialysis is initiated		
Stage 3-4	41	42.3
Chronic kidney disease progression factors		
Hypertension	94	96.9
Obesity	51	52.6
Hyperlipidemia	73	75.3
Hyperglycemia	70	72.2
CKD metabolic complications		
Hypovitaminosis D	59	60.8
Anemia	68	70.1
Cardiovascular disease	56	57.7
Hyperparathyroidism	50	51.5
Hyperphosphatemia	71	73.2
Metabolic Acidosis	87	93.5
Pre-dialysis care should be started when eGFR ranges between 5 and 10 ml/min/1.73 m2 with symptoms or signs attributable to kidney failure		
False	37	38.1
When should CKD patients be enrolled in a pre-dialysis care program?		
More than 12 months before initiation of dialysis	20	20.6

4.1.5 Distribution of overall knowledge of pre-dialysis care

The density plot below shows the distribution of knowledge of pre-dialysis care. The knowledge score was left skewed where the majority of the respondents scored 70% and below. The minimum knowledge score was 30.4% while the maximum was 95.7%. The median knowledge score was 73.9% with an interquartile range of 65.2% to 82.6%. The mean knowledge score was 74.0%.

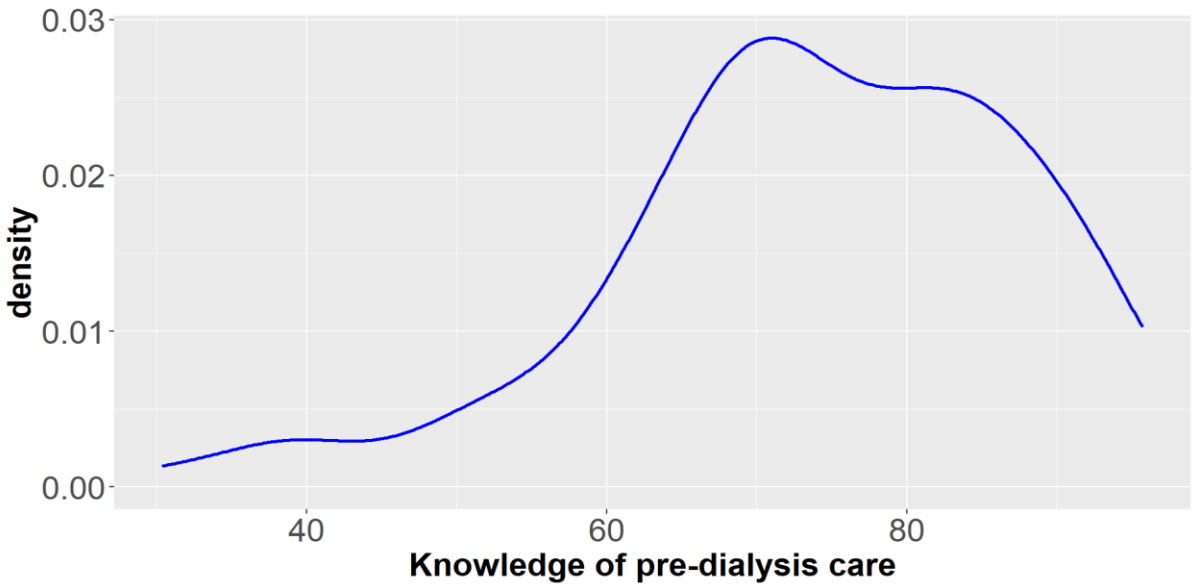

Figure 2: Destiny plot showing distribution of pre-dialysis care knowledge

Knowledge was ranked using Bloom's modified cut-off points as described in the methodology. Figure 3 below shows the categories of pre-dialysis care knowledge.

In terms of overall knowledge of pre-dialysis care, the majority 52.6% (n = 51) of the respondents had a fair score and 37.1% (n = 36) got a good score. The rest got a poor score.

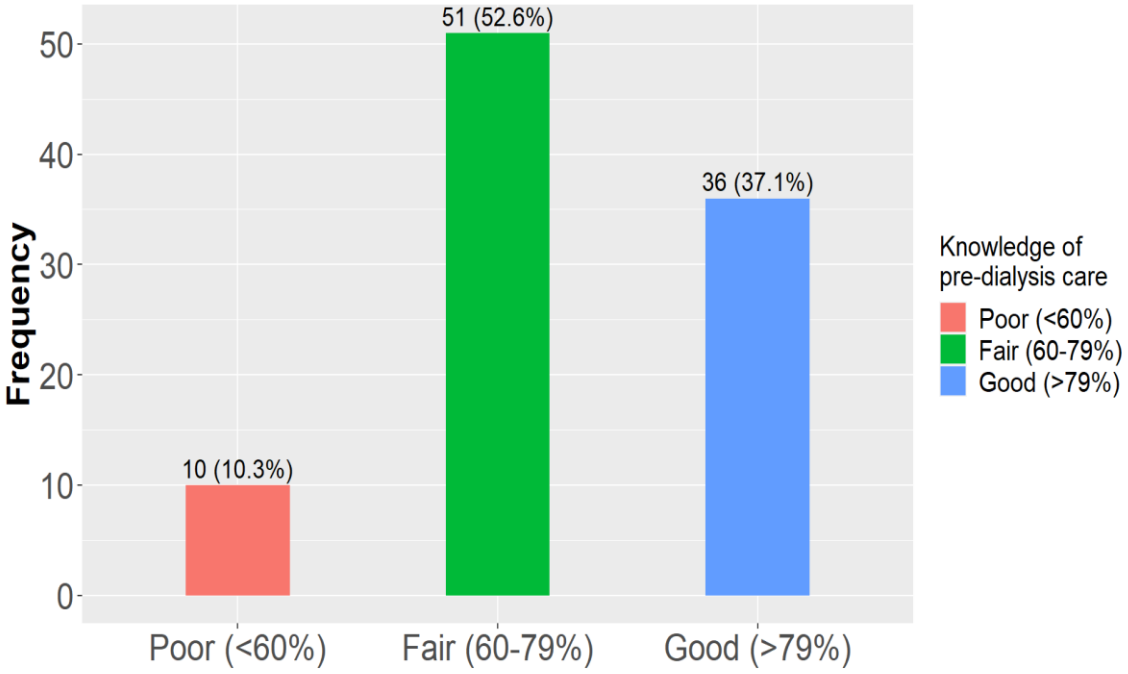

Figure 3: Overall knowledge of pre-dialysis care

4.1.6: Knowledge of pre-dialysis care by gender

Table 4.4 shows the mean score of knowledge of pre-dialysis care by gender. The female respondents had a mean of 74.2% and males got 73.7% (Table 8).

Table 7: Mean score by gender (N = 97)

Gender	Frequency	Mean (SD)
Male	48	73.7 (14.8)
Female	49	74.2 (12.6)

4.1.7: Knowledge of pre-dialysis care by cadre

The respondents were grouped into 3 cadres namely; doctors, nurses and others (nutritionists and counselors). Doctors scored the highest with a mean of 81.4% ±7.73 and others followed with a mean of 76.6% ±17.5. Nurses scored 71.2% ±13.8 (Table 9).

Table 8: Mean score of knowledge of pre-dialysis care by cadre

Cadre	Frequency	Mean (SD)
Doctors	24	81.4 (7.73)
Nurses	67	71.2 (13.8)
Others (**Counselors and nutritionists**)	6	76.6 (17.5)

4.1.8: Knowledge of pre-dialysis care by level of education

Table 4.6 shows performance by level of education. The respondents with postgraduate education scored the highest with a mean of 80.4% ±9.1, bachelors 76.9% ± 10.9, diploma with 71.2% ±16.2 and lastly higher diploma with 71% ±14.6 (Table 10).

Table 9: Pre-dialysis care knowledge in regard to level of education

Level of education	Frequency	Mean (SD)
Postgraduate	18	80.4 (9.10)
Bachelors	19	76.9 (10.9)
Higher Diploma	47	71.0 (14.6)
Diploma	13	71.2 (16.2)

4.1.9: Factors associated with knowledge of pre-dialysis care

Two factors were associated with the knowledge of pre-dialysis care before adjusting for potential confounders i.e., age of the health worker and years of experience ($P<0.05$).

As shown in Table 4.7, health workers aged between 29 and 38 years were 7 times more likely to have poor or fair knowledge as opposed to having good knowledge compared to those aged between 18 to 19 years, OR 7.00 (95% CI 1.27, 38.48). Health workers between the ages 39 to 48 years were 13.72 times more likely to have poor or fair knowledge of pre-

dialysis care compared to those aged between 18 and 28 years, OR 13.72 (95% CI 2.35, 80.0). Those aged between 49 and 58 years were 6.22 times more likely to have poor or fair knowledge of pre-dialysis care as opposed to having good knowledge compared to those aged between 18 to 28 years, OR 6.22 (95% CI 1.07, 36.23).

In terms of experience, health workers with five years and below of clinical experience were 68% less likely to have poor or fair knowledge of pre-dialysis care as opposed to having good knowledge compared to those with more than five years of clinical experience, OR 0.32 (95% CI 0.10, 0.99) Table 11.

Table 10: Factors associated with knowledge of pre-dialysis care among HSP

Factor	**Description**	**Knowledge of pre-dialysis**			
		Poor/fair	Good	**Crude OR (95% CI)**	**P value**
Age in years	18-28	2	8	***Reference***	
	29-38	21	12	7.00 (1.27, 38.48)	0.028
	39-48	24	7	13.72 (2.35, 80.0)	0.002
	49-58	14	9	6.22 (1.07, 36.23)	0.050
Gender	Female	31	18	1.03 (0.45, 2.36)	0.938
	Male	30	18	***Reference***	
Cadre	Others	4	4	***Reference***	
	Nurses	49	18	2.72 (0.62, 12.05)	0.222
	Doctors	8	14	0.57 (0.11, 2.93)	0.678
Years of experience	Five and below	14	17	0.32 (0.10, 0.99)	0.044
	Above five	18	7	***Reference***	

4.1.10: Multivariable analysis

Factors that had p-values of less than 0.25 under bivariable analysis (Hosmer, Lemeshow and Sturdivant, 2013) were selected for multivariable analysis. None of the two factors were associated with knowledge of pre-dialysis care after adjustment ($p>0.05$) at 5% significance level.

After adjusting for years of experience, health workers aged between 29 and 38 years were 2.95 times more likely to have poor or fair knowledge as opposed to having good knowledge compared to those aged between 18 to 19 years, OR 2.95 (95% CI 0.34, 6.45). Health workers between the ages 39 to 48 years were 13.72 times more likely to have poor or fair knowledge of pre-dialysis care compared to those aged between 18 and 28 years, OR 13.72 (95% CI 2.35, 80.0). Those aged between 49 and 58 years were 5.08 times more likely to have poor or fair knowledge of pre-dialysis care as opposed to having good knowledge compared to those aged between 18 to 28 years, OR 5.08 (95% CI 0.44, 131.75).

After adjusting for age, health workers with five years and below of clinical experience were 53% less likely to have poor or fair knowledge of pre-dialysis care as opposed to having good knowledge compared to those with more than five years of clinical experience, OR 0.47 (95% CI 0.13, 1.64) Table 12.

Table 11: Factors associated with knowledge of pre-dialysis care

Factor	**Description**	**Knowledge of pe-dialysis**			
		Poor/fair	Good	**Adjusted OR (95% CI)**	**P value**
Age in years	18-28	2	8	***Reference***	
	29-38	21	12	2.95 (0.34, 6.45)	0.377
	39-48	24	7	5.95 (0.64, 136.99)	0.157
	49-58	14	9	5.08 (0.44, 131.75)	0.230
Years of experience	five and below	14	17	0.47 (0.13, 1.64)	0.236
	Above five	18	7	***Reference***	

4.1.11: Correlation between knowledge of pre-dialysis care and years of experience

Figure 4 shows the correlation between the years of experience and knowledge of pre-dialysis care. The correlation coefficient (R = -0.22) indicates a weak negative correlation between years of experience and knowledge of pre-dialysis care. The negative correlation means the knowledge of pre-dialysis care decreased with years of experience.

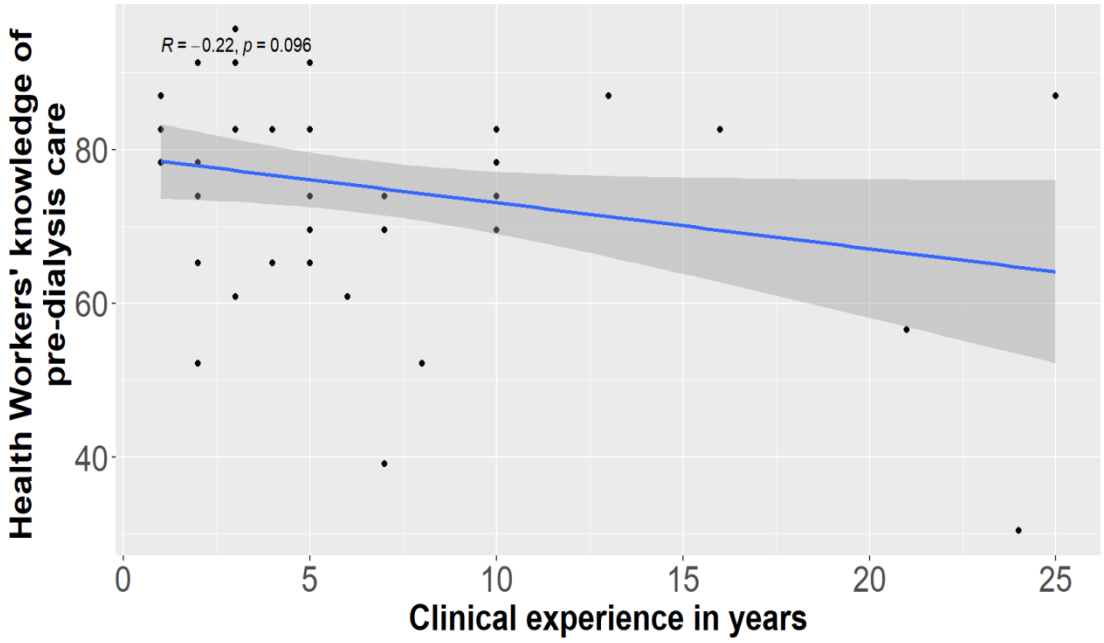

Figure 4: Correlation between Health service provider knowledge and years of clinical experience

4.1.12: Practice of pre-dialysis care among health service providers at KNH

Of the 97 respondents, 82.5% (N = 80) said they had participated in the initiation of patients on dialysis. The dialysis approaches used by the respondents included urgent 68.7% (n = 57), planned 14.5% (n = 12), and non-urgent 13.2% (n = 11). The rest of the dialysis was not planned. The types of vascular access used for dialysis included temporary catheters 80% (n = 68), arteriovenous fistula 10.6% (n = 9) and permanent tunneled catheters 9.4% (n = 8) Table 13.

Table 12: Approaches to pre-dialysis care (N = 97)

Characteristic	Description	Frequency	(%)
Participated in the initiation of patients in dialysis.	Yes	80	82.5
The approach of dialysis initiation used	Planned	12	14.5
	Not planned	3	3.6
	Urgent	57	68.7
	Non-urgent	11	13.2
Type of vascular access used	Temporary catheter	68	80
	Permanent tunneled catheter	8	9.4
	Arteriovenous fistula	9	10.6

4.1.13: Educational approaches used by health workers during pre-dialysis care

We also sought to know what the health workers do during the practice of pre-dialysis care. Table 14 below shows the various educational approaches used by health workers during pre-dialysis care.

Of the 97 respondents, 84.5% (n = 82) regularly told their patients the importance of taking medication while 15.5% (n = 15) did so occasionally. Dietary restrictions were regularly discussed by 82.5% (n = 80) of respondents and occasionally by 17.5% (n = 17). In terms of blood pressure monitoring, 60.8% (n = 59) of the respondents regularly encouraged their patients to do monitoring and 37.1% (n = 36) did so occasionally. The rest did not advise their patients to monitor their blood pressure. The majority 69.1% (n = 67) of the respondents regularly educated their patients on the symptoms that would require medical attention while

27.8% (n = 27) only did so occasionally. In terms of encouraging CKD patients to exercise, 56.7% (n = 55) of the respondents said they did so regularly and 38.1% (n = 37) did so occasionally. Respondents were also asked whether they taught their patients things to avoid like NSAIDS, tobacco products, alcohol and salt substituents of which 76.3% (n = 74) said they did so regularly and 21.6% (n = 21) said they did so occasionally.

Table 13: Educational approaches used by health workers during pre-dialysis care (N = 97)

Practice	**Yes regularly n (%)**	**Occasionally n (%)**	**Not at all n (%)**
I discuss with my patients on importance of taking medication as directed	82 (84.5%)	15 (15.5%)	
I discuss dietary restrictions with my patients on dietary restrictions including salt restriction, protein, alcohol, smoking and cholesterol intake.	80 (82.5%)	17 (17.5%)	
I encourage my patient to have a record of BP monitoring at home.	59 (60.8%)	36 (37.1%)	2 (2.1%)
I usually teach my patients about various symptoms requiring medical attention like unexplained headaches, chest pain, and shortness of breath, nausea & vomiting and RBS out of range.	67 (69.1%)	27 (27.8%)	3 (3.1%)
I usually encourage my CKD patients to exercise	55 (56.7%)	37 (38.1%)	5 (5.2%)
I usually teach and remind my patients of the things to avoid like NSAIDS, tobacco products, alcohol and salt substituents.	74 (76.3%)	21 (21.6%)	2 (2.1%)

Overall score on practice of pre-dialysis care

Of the 97 study participants, 11% (n = 11) demonstrated a poor score, 23% (n = 22) had a fair score. The rest had a good score (Figure 5)

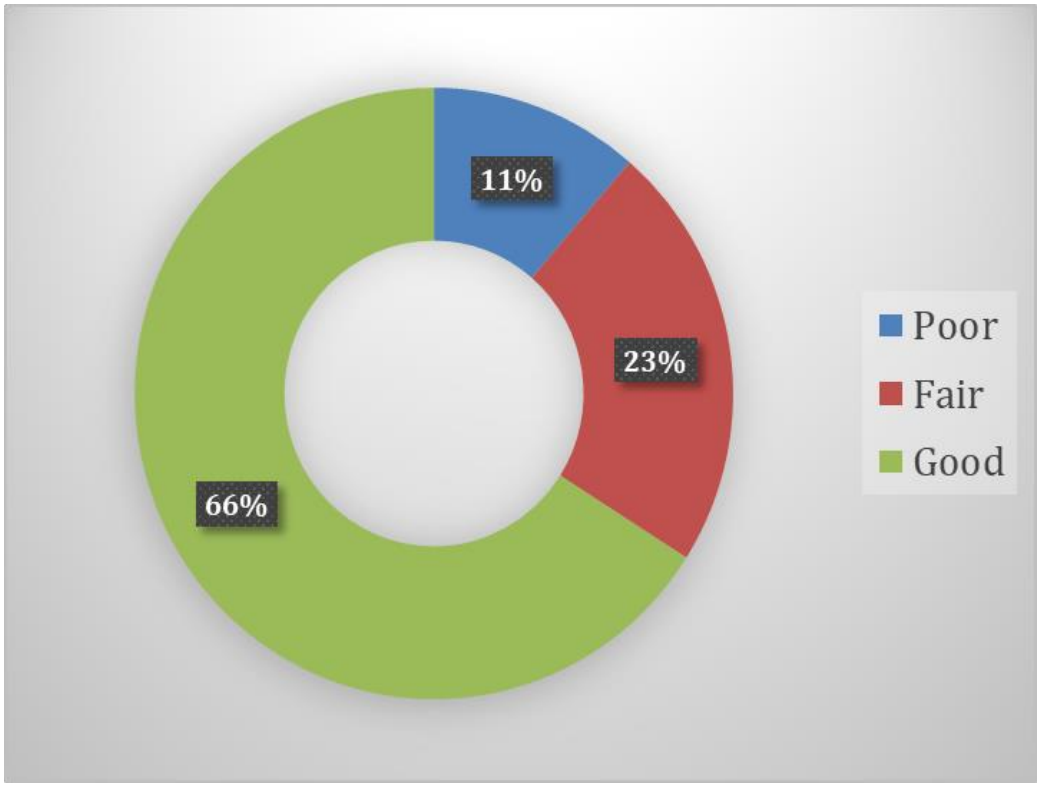

Figure 5: Overall score on practice of pre-dialysis care

Factors associated with practice of pre-dialysis care among the health service providers

None of the factors assessed was fully significantly associated with the practice of pre-dialysis care at 5% significance level (P>0.05). The third level of age (39-48) years was significantly associated with practice of pre-dialysis care before adjusting for potential confounders (p<0.05). Health service providers between ages 29 to 38 years were 67% less likely to score poor/fair in practice of pre-dialysis compared to those aged between 18 to 28

years, OR 0.33 (95% CI 0.08, 1.43). Health workers between the ages 39 to 48 years were 81% less likely to score poor or fair in the practice of pre-dialysis care compared to those aged between 18 to 28 years, OR 0.19 (95% CI 0.04, 0.89)

Being a doctor reduced the odds of poor/fair score on practice of pre-dialysis care by 22% compared to other health workers (counselors and nutritionists), OR 0.78 (95% CI 0.14, 4.21). Nurses had 13% lower odds of poor/fair score on practice of pre-dialysis care compared to others (counselors and nutritionists) OR 0.87 (0.19, 3.97) Table 15.

Table 14: Factors associated with practice of pre-dialysis care among the health service provider

		Practice of pre-dialysis			
Factor	**Description**	Poor/fair	Good	**Crude OR (95% CI)**	**P value**
ge in years	18-28	6	4	***Reference***	
	29-38	11	22	0.33 (0.08, 1.43)	0.158
	39-48	7	24	**0.19 (0.04, 0.89)**	0.048
	49-58	9	14	0.43 (0.09, 1.95)	0.448
Gender	Female	14	35	0.61 (0.26, 1.43)	0.252
	Male	19	29	***Reference***	
Cadre	Others	3	5	***Reference***	
	Nurses	23	44	0.87 (0.19, 3.97)	1.000
	Doctors	7	15	0.78 (0.14, 4.21)	1.000
Years of xperience	Five and below	10	21	0.61 (0.20, 1.80)	0.367
	Above five	11	14	***Reference***	

4.1.14: Barriers to pre-dialysis care

We also sought to know the challenges encountered by the respondents in the provision of pre-dialysis care. Table 9 below shows the possible challenges and the responses. Poor communication among health service providers was selected by 55.7% (n = 54), shortage of service providers 75.3% (n = 73), lack of guidelines for pre-dialysis care 64.9% (n = 63), patients not adhering to medical education 72.2% (n = 70) a and lack of necessary expertise on all modality of KRT 55.7% (n = 55) Table 16.

Table 15: Barriers to pre-dialysis care (N = 97)

Characteristics	Description	Frequency	Percent (%)
Poor communication among health service providers	Yes	54	55.7
Shortage of providers	Yes	73	75.3
Lack of guidelines	Yes	63	64.9
Nonadherence to medical education	Yes	70	72.2
Lack of necessary expertise on all modalities of KRT	Yes	54	55.7

4.1.15: Possible enablers of pre-dialysis care

Respondents were also asked about the possible enablers of pre-dialysis care. The figure below shows the possible enablers of pre-dialysis care as per the respondents. Having pre-dialysis care guidelines 86.6% (n = 84), employing more staff to curb shortages 85.6% (n = 83), embracing teamwork in the clinical areas 79.4% (n = 77) and training of staff on pre-dialysis care 84.5% (n = 82).

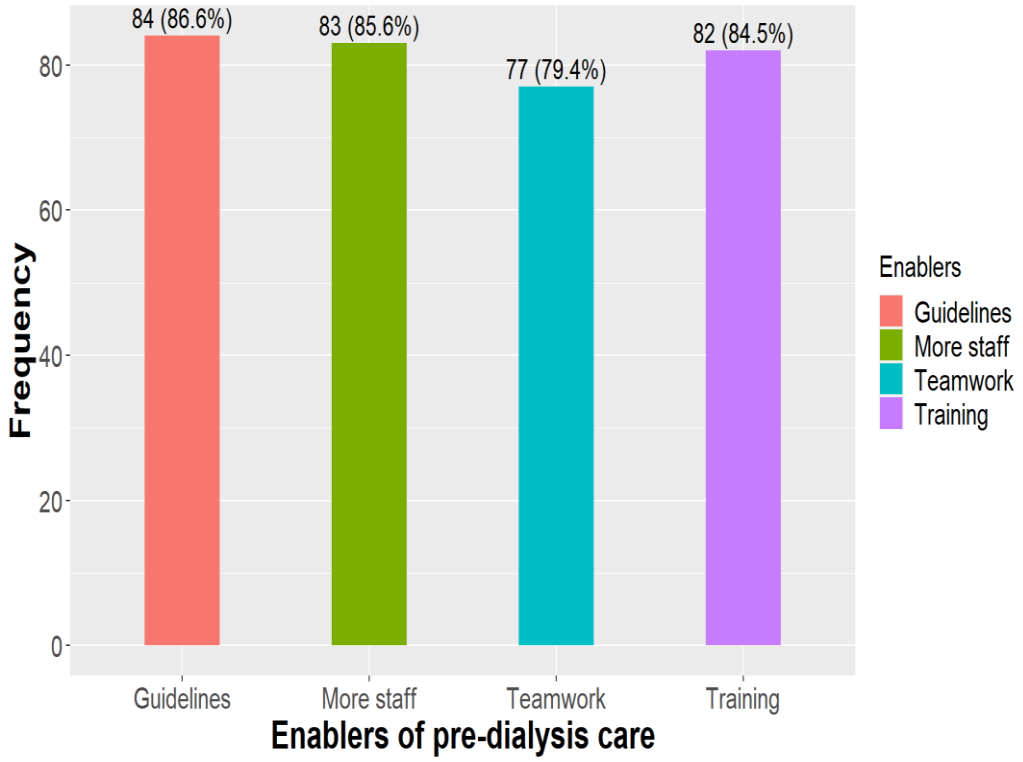

Figure 6: Enablers of pre-dialysis care

4.1.16: Enablers of pre-dialysis care

Table 17 below shows the opinions of the respondents on other possible enablers of pre-dialysis care. Respondents were asked whether KNH has provided them with a CKD action plan of which 11.3% (n = 11) strongly agreed, 50.5% (n = 49) agreed, 30.9% (n = 30) disagreed and 7.2% (n = 7) strongly disagreed. On whether teamwork in a multidisciplinary approach enabled the respondents to carry out pre-dialysis care, 34% (n = 33) strongly agreed, 57.7% (n = 56) agreed and 8.3% (n = 8) disagreed.

When asked whether continuous medical education on pre-dialysis care at KNH enables them to carry out pre-dialysis care, 32% (n = 31) strongly agreed, 48.5% (n = 47) agreed and 19.6% (n = 19) disagreed. As to whether early referral of CKD

patients by general practitioners enabled them to carry out pre-dialysis care, 39.2% (n = 38) strongly agreed, 32% (n = 31) agreed, 18.6% (n = 18) disagreed and 10.3% (n = 10) strongly disagreed.

Table 16: Possible enablers of pre-dialysis care (N = 97)

Enabler	**Strongly Agree n (%)**	**Agree n (%)**	**Disagree n (%)**	**Strongly Disagree n (%)**
KNH has provided us with a CKD action plan that helps us in pre-dialysis care	11 (11.3%)	49 (50.5%)	30 (30.9%)	7 (7.2%)
Teamwork in a multidisciplinary committee enables me to carry out pre-dialysis care	33 (34%)	56 (57.7%)	8 (8.3%)	
Continuous medical education on pre-dialysis care at KNH enables us to carry out pre-dialysis care	31 (32%)	47 (48.5%)	19 (19.6%)	
Early referral of CKD patients by general practitioners enables us to carry out pre-dialysis care	38 (39.2%)	31 (32%)	18 (18.6%)	10 (10.3%)

4.2: Qualitative aspect of the study

This section presents the qualitative aspect of the study results. The responses given on the understanding, barriers and enablers of pre-dialysis care are presented in Table 18 below and then described thereafter.

Table 17: Themes and subthemes [1]

Objectives	Theme	Subthemes
Understanding of pre-dialysis care among health service providers at KNH	Care given before initiation of dialysis	Preventing progression of disease
		Conservative management
To explore barriers to pre-dialysis care among health service providers	Inadequate knowledge of pre-dialysis care	Inadequate knowledge of pre-dialysis among nurse and nutritionists
		Lack of Continuous medical education
	Shortage of resources	Shortage of staff
		Resource shortage for patients
To establish enablers of pre-dialysis care among the health service providers	Supportive environment	Multidisciplinary teamwork
		Infrastructural support

4.2.1: Understanding of pre-dialysis care among health service providers at KNH

The respondents reported that pre-dialysis care is the care given to patients before the initiation of the actual dialysis. Patients with kidney complications usually have other preceding conditions e.g., diabetes and hypertension that lead to kidney disease. It is very important to control these conditions even when dialysis is inevitable. The care before initiation of dialysis presented two main subthemes; preventing progression of disease and conservative management.

4.2.1.1: Preventing progression of the disease

One respondent said that patients needing pre-dialysis either have hypertension or hyperglycinemia and that it was important to control hyperglycemia and hypertension to prevent progression of chronic kidney disease. This respondent further added that during pre-dialysis care, the patient can be prepared for vascular access, and advise them on fistula.

"*Okay, pre-dialysis care is the care before the initiation of dialysis. These are the patients who are mainly hypertensive, hyperglycaemic thus you are trying to control hyperglycemia and hypertension just to prevent the progression to chronic kidney disease. You can prepare your patient for vascular access, and you advise them on fistula*". [P2]

4.2.1.2: Conservative management

Another respondent reported that pre-dialysis care is the care given to potential kidney failure patients. This may include patients with high blood pressure, diabetes or other conditions that can lead to kidney failure. This respondent reported that this care is usually conservative where it does not have to include dialysis.

"*Pre-dialysis care, according to me, means the care that we give to a patient who is a potential kidney failure patient or maybe someone has high blood pressure, diabetes or any condition that may result in kidney failure. That is the care that you give like conservative management which does not mean that it has to be dialysis, or a kidney failure that has not reached where dialysis*". [P1]

4.2.2: Barriers to pre-dialysis care among health service providers

For efficient delivery of pre-dialysis care services by the health service providers, the possible barriers need to be highly minimized or rid of completely. According to the responses given, the delivery of pre-dialysis care has its fair challenges. The challenges identified were; inadequate knowledge of pre-dialysis care and shortage of resources.

4.2.2.1: Inadequate knowledge of pre-dialysis care

The health service providers who are tasked with caring for pre-dialysis patients need to have expertise in the area and know what is exactly required. Some respondents reported that some of the health service providers do not have the requisite knowledge to provide pre-dialysis care. Two sub themes emerged from inadequate knowledge of pre-dialysis care namely; inadequate knowledge of pre-dialysis among nurses and nutritionists, and lack of continuous medical education

4.2.2.2: Inadequate knowledge of pre-dialysis care among nurses and nutritionists

One respondent said that few nurses know how to take care of renal patients. The respondent went ahead to give an example of how she/he did not know much about renal when working in casualty.

"*Barriers of pre-dialysis care, according to me, very few nurses have knowledge on how to take care of renal patients. For instance, when I was working in casualty I did not know much about renal and how to take care of this patient*". [P1]

"*There are a number of them and one of them that I can remember is not only in Kenyatta, even outside, is the lack of competent or specialized renal nutritionists. We have few nutritionists who are trained to handle renal patients. There is a big gap there*". [P4]

4.2.2.3: Lack of continuous medical education

It was reported that there is no continuous medical education (CMEs) of pre-dialysis care. The CMEs can be greatly beneficial especially to service providers who are not trained in nephrology. They can also act as refresher courses for those who are trained in the discipline of nephrology and boost pre-dialysis care services for the benefit of the patients.

"*Another barrier is that we do not carry out continuous medical education, whereby there should be a continuous education where renal nurses sensitize other nurses on how to take care of these patients. There are some patients who develop renal failure when they are in the ward and they are admitted when they are okay and because of lack of knowledge and shortages, they develop renal failure, especially when there is a need for fluid replacement*". [P1]

4.2.2.4: Shortage of resources

Shortages are mainly due to scarcity of resources. This is mainly due to inadequate human resources and lack of finances. The main sub themes that emerged under this theme were; shortage of staff and resource shortage on the part of the patients.

4.2.2.4.1: Shortage of staff

Shortage of health care staff is a common phenomenon in low-resource settings. This highly affects service delivery. The services will either be delayed, missed or inadequate as the few

staff available cannot attend to the large number of patients. Shortage of staff through inadequate number of nurses and doctors as one respondent reported below.

"*Shortages are the main barrier like in clinics for instance we have few doctors and long queues. We have few doctors and nurses taking care of them hence they stay long in the hospital*". [P2]

4.2.2.4.2: Resource shortage for patients

Some of the costs that are not covered by insurance can impede delivery of pre-dialysis care. In the case of KNH, nutritional counseling is not covered by the National Health Insurance Fund and patients are therefore supposed to pay from their pockets. This can be challenging bearing in mind that these are patients with chronic diseases and may have exhausted their finances through purchase of medications. Below is a response given by one of the respondents who said cost of pre-dialysis care is a barrier;

"*Also, the cost in that most of the patients who require pre-dialysis care are the CKD patients who we get as referrals from renal clinic 24 and when they come, they are supposed to pay a fee and now that the NHIF does not cover, you find that is a missed opportunity because they do not have money. They normally say they do not have money for nutritional counseling because they have already paid for consultation fee which would have taken care of everything and that result in them going home without being attended to*" [P4]

4.2.3: Enablers of pre-dialysis care

Despite the challenges facing pre-dialysis care at KNH as outlined above, there is a good support system for pre-dialysis care. The main theme that emerged as an enabler of pre-

dialysis care is a supportive environment. Under this theme, two main sub themes emerged; multidisciplinary teamwork and infrastructural support.

4.2.2.3.1: Multidisciplinary teamwork

For effective running of any clinical set-up, the various teams of health service providers have to work together. The respondents reported that the renal services in the hospital were running smoothly because the nutritionists, nurses and the doctors were working closely together. They also reported that the clinics e.g., diabetic and hypertension clinics that handle pre-dialysis patients were working in-coordination.

"*In KNH all I can say is a supportive environment because everyone plays their role. For instance, nutritionists, when we refer patients for nutrition counseling, they normally advise patients on which food to avoid. Secondly, nurses are the backbone of pre-dialysis care at KNH. When we are seeing patients at the renal clinic, they ensure the patients' files are ready, their vital signs are taken, all the drugs, guidance of patients when going home on lab work. Other colleagues also participate*". [P1]

"*In Kenyatta National Hospital we have some clinics like diabetes clinic and renal clinic. Secondly, a multi-disciplinary team made up of doctors, nurses and nutritionists*". [P4]

4.2.2.3.2: Infrastructural support

Infrastructural support was also cited as one of the pillars for pre-dialysis care. One respondent said that the hospital has provided a good environment where health services are provided. The infrastructure here referred to consultation clinics, vital observation rooms and counseling rooms.

"*One important thing is infrastructure, here we have an ample environment where we are able to counsel our patients and that is very important. Additionally, the multidisciplinary approach is well coordinated; we do get referrals from clinic 24*". [P2]

CHAPTER 5: DISCUSSION, CONCLUSION AND RECOMMENDATIONS

5.1 Discussion

Introduction

Pre-dialysis care is very essential in delaying the progression of CKD to ESKD. This study sought to assess the knowledge, practice and barriers of pre-dialysis care among health service providers at KNH. In this chapter both quantitative and qualitative findings of the study were discussed in the order of the objectives: knowledge of pre-dialysis, practice, barriers and enablers of pre-dialysis.

Knowledge of pre-dialysis care

The participants comprised different cadres working with CKD patients that comprised of doctors, nurses, nutritionists and counselors. Approximately 49 % of the participants had a higher diploma education and only 18.6% had a postgraduate qualification. Most of the participants (53.6%) had received pre-dialysis training mainly in their basic training.

Overall, majority of the respondents had a fair pre-dialysis care knowledge at 52.6%. Only 37.1% had a good knowledge of pre-dialysis care with a maximum score of 95.7%. The median knowledge score was 73.9% with an interquartile range of 65.2% to 82.6%. The mean score of knowledge was 74.0%. However, 10.3% of the respondents got a poor score with a minimum score of 30.4%. The distribution of overall knowledge was skewed to the left as the majority of the respondents scored less than 70%. These findings are consistent with a study done by Haddiya et al., 2020 which found out that 70% of HSP did not know various stages of CKD thus contributing to late referral of patients for pre-dialysis care. In a different study in Cameroon by Marie Patrice et al., 2019 on factors contributing to late referrals of CKD patients for pre-dialysis care, more than 70% of those factors were

contributed by physicians' knowledge. Emmanuel Gapira et al., 2020 in Rwanda also found out that 84 % of nurses had moderate knowledge on CKD.

Two factors were associated with the knowledge of pre-dialysis care before adjustment i.e., age of the health worker and years of experience ($P<0.05$). Health workers aged between 29 and 38 years were 7 times more likely to have poor or fair knowledge as opposed to having good knowledge compared to those aged between 18 to 19 years, OR 7.00 (95% CI 1.27, 38.48). Health workers between the ages 39 to 48 years were 13.72 times more likely to have poor or fair knowledge of pre-dialysis care as opposed to having good knowledge compared to those aged between 18 and 28 years, OR 13.72 (95% CI 2.35, 80.0). Those aged between 49 and 58 years were 6.22 times more likely to have poor or fair knowledge of pre-dialysis care as opposed to having good knowledge compared to those aged between 18 to 28 years, OR 6.22 (95% CI 1.07, 36.23).

In terms of experience, health workers with five years and below of clinical experience were 68% less likely to have poor or fair knowledge of pre-dialysis care as opposed to having good knowledge compared to those with more than five years of clinical experience, OR 0.32 (95% CI 0.10, 0.99). Females were found to be more knowledgeable than their male colleagues with a mean score of 74.2 (±12.6) and 73.7 (±14.8) respectively. There was a varying level of knowledge among the different cadres with doctors ranked highest with a mean score of 81.4% ±7.73 (n=24) and nurses ranked lowest with a mean score of 71.2% ±13.8 (n=67). Only 42.3% of the respondents accepted CKD stage 3-4 as the right stage to start the patient on pre-dialysis care. Additionally, 20% of the participants concurred with KDIGO guidelines on the 12 months period that pre-dialysis care should last before initiation of dialysis (Rossing et al., 2022).

Factors that had p-values of less than 0.25 under bivariable analysis (Hosmer, Lemeshow and Sturdivant, 2013) were selected for multivariable analysis. None of the two factors were associated with knowledge of pre-dialysis care after adjustment ($p>0.05$) at 5% significance level.

Participants in FGD also stated that pre-dialysis care is mainly care offered to CKD patients to delay the progression to ESKD. They further added that during the care, patients are usually prepared for dialysis by creating a vascular access which could be a tunneled catheter or arteriovenous fistula. This is in agreement with Rossing et al., 2022 on aims of pre-dialysis care.

Practice of pre-dialysis care among health service providers at KNH

Overall, the practice for pre-dialysis was good with a 66% score. Unfortunately, this score is not consistent with a high number of patients started on dialysis as an urgent measure. Furthermore, only approximately 15 % of dialysis were planned and temporary vascular access was at 80 % of all dialysis started. This could be explained by low level of pre-dialysis care knowledge among the respondent as highlighted in the knowledge section. Majority of the respondents 82.5% participated in the initiation of patients on dialysis. The findings were consistent with Kabinga et al., 2019 which noted that more than 70% of patients were started on dialysis on temporally catheter. The findings also concur with another research in Singapore where 85% of patients were started on KRT without a plan even though there was a well-defined pre-dialysis care trajectory (Griva et al., 2020).

Most of the respondents 84.5% were found to discuss the importance of medication adherence with CKD patients in order to prevent progression to ESKD. More than 80% of the participants also discussed with their patients the risk factors of CKD progression. Majority of the respondents 69 % educated their patients on symptoms of worsening CKD which

would warrant them to seek medical attention. The results were consistent with Raffray et al., 2020 on pre-dialysis care trajectory which found out that CKD patients received a lot of information from the HSP. However, Kabinga et al., 2019 on pre-dialysis care experience among CKD patients at KNH found out that, close to half of respondent's patients had not received education from their attending HSP on their current health status and the predisposing factors to CKD.

Overall, none of the factors assessed was fully significantly associated with the practice of pre-dialysis care at 5% significance level (P>0.05). The third level of age (39-48) years was significantly associated with practice of pre-dialysis care before adjusting for potential confounders (p<0.05). Health workers between ages 29 to 38 years were 67% less likely to score poor/fair in practice of pre-dialysis compared to those aged between 18 to 28 years, OR 0.33 (95% CI 0.08, 1.43). Health workers between the ages 39 to 48 years were 81% less likely to score poor or fair in the practice of pre-dialysis care compared to those aged between 18 to 28 years, OR 0.19 (95% CI 0.04, 0.89).

Being a doctor reduced the odds of poor/fair score on practice of pre-dialysis care by 22% compared to other health workers (counselors and nutritionists), OR 0.78 (95% CI 0.14, 4.21). Nurses had 13% lower odds of poor/fair score on practice of pre-dialysis care compared to others (counselors and nutritionists) OR 0.87 (0.19, 3.97) Table 4.11

Barriers to pre-dialysis care

More than half of the respondents, 55.7%, reported poor communication among health service providers as one of the barriers in pre-dialysis care. This finding concurs with a qualitative study done in Singapore which reported poor communication among HSP resulted in late referral of CKD patients for timely pre-dialysis care (Griva et al., 2020). Among the

respondents; 75.3%, 64.9% and 72.2 % reported shortages of HSP, lack of pre-dialysis guideline and non-adherence to medical education respectively as the other barriers to pre-dialysis care. This was supported during the FGD where participants highlighted inadequate knowledge secondary to lack of continuous medical education on pre-dialysis care, shortages of HSP and lack of resources, especially money to pay for nutrition sessions, as the main barriers of pre-dialysis care at KNH. The findings were similar with Marie Patrice et al., 2019 who found out that few specialized renal service providers challenged the practicability of multidisciplinary team approach required in pre-dialysis care.

Enablers of pre-dialysis care

Availability of pre-dialysis care guideline was ranked as the highest enabler to pre-dialysis care at 86.6% followed by employment of more renal specialized HSP with 85.6%. Training of HSP and teamwork was supported by 84.5% and 77% of respondents respectively. This was supported in the FGD whereby multidisciplinary teamwork and availability of infrastructure like consultation rooms and counseling rooms were cited as some of the enablers of pre-dialysis care. The findings were consistent with Neale et al., 2020 on a study of barriers and enablers of pre-dialysis care, support to HSP was found to be essential in early referral and initiation of CKD patients on pre-dialysis care.

5.2 Conclusion

1. The knowledge level was found to be below average at 37 % while approximately 53% had fair knowledge.

2. The pre-dialysis care knowledge is not standardized at KNH thus difference in opinion especially on when to recruit patients for pre-dialysis care with only 42% agreeing with KDIGO guidelines stage eGFR 3-4.

3. Most of patients at KNH 70% are started on dialysis as an urgent/ unplanned intervention to save their live.

4. Temporally catheter is the main vascular access during the initiation of dialysis at KNH

5. Lack of pre-dialysis guidelines, shortages of specialized renal HSP, poor communication, patients' financial constraints, lack of continuous medical education on pre-dialysis care are the main hindrances of pre-dialysis care at KNH.

6. Teamwork among different cadres is the main enabler pre-dialysis care at KNH.

5.3 Recommendations

1. There should be continuous medical education on pre-dialysis care among HSP especially those taking care of patients with CKD.

2. A pre-dialysis care guideline should be developed to guide and standardize knowledge and practice among all the HSP in respect to diagnosis, treatment and management of CKD patients.

3. National health insurance fund should have a comprehensive pre-dialysis care package accessible to all CKD patients in order to reduce barriers to pre-dialysis care.

4. Renal nurses should be deployed in CKD clinics and wards to actively participate in pre-dialysis care.

5. A committee should be formulated consisting of a Nephrologist, resident medical doctor, renal nurse, nutritionist, counselor and vascular surgeon to spearhead pre-dialysis care at KNH.

6. That Kenyatta national hospital should address the challenges hampering pre-dialysis care in-order to achieve better patients' outcome.

Recommendation future research

1) Effectiveness of pre-dialysis care in maintaining residual kidney function using experimental design.

REFERENCES

BUJPH, n.d. Insight into Health Systems: A Cross-National Study of Kidney Disease in the United States and Taiwan [WWW Document]. Brown Undergrad. J. Public Health. URL https://sites.brown.edu/publichealthjournal/2021/12/13/kidneys/ (accessed 1.6.23a).

Alligood, M.R., 2021. Nursing Theorists and Their Work EBook. Elsevier Health Sciences

Bonenkamp, A.A., Reijnders, T.D.Y., der Sluijs, A. van E. van, Hagen, E.C., Abrahams, A.C., van Ittersum, F.J., van Jaarsveld, B.C., 2021. Key elements in selection of pre-dialysis patients for home dialysis. Perit. Dial. Int. J. Int. Soc. Perit. Dial. 41, 494–501. https://doi.org/10.1177/08968608211023263

Canaud, B., Couchoud, C., 2021. Global Dialysis Perspective: France. Kidney360 3, 168–175. https://doi.org/10.34067/KID.0003722021

Chan, C.T., Blankestijn, P.J., Dember, L.M., Gallieni, M., Harris, D.C.H., Lok, C.E., Mehrotra, R., Stevens, P.E., Wang, A.Y.-M., Cheung, M., Wheeler, D.C., Winkelmayer, W.C., Pollock, C.A., Conference Participants, 2019. Dialysis initiation, modality choice, access, and prescription: conclusions from a Kidney Disease: Improving Global Outcomes (KDIGO) Controversies Conference. Kidney Int. 96, 37–47. https://doi.org/10.1016/j.kint.2019.01.017

Chinese Clinical Practice Guideline for the Management of "CKD-PeriDialysis"-the Periods Prior to and in the Early-Stage of Initial Dialysis, 2022. . Kidney Int. Rep., Chinese Clinical Practice Guideline for the Management of "CKD-PeriDialysis"—the Periods Prior to and in the Early-Stage of Initial Dialysis 7, S531–S558. https://doi.org/10.1016/j.ekir.2022.10.001

Dhanorkar, M., Prasad, N., Kushwaha, R., Behera, M., Bhadauria, D., Yaccha, M., Patel, M., Kaul, A., 2022. Impact of Early versus Late Referral to Nephrologists on Outcomes of Chronic

Kidney Disease Patients in Northern India. Int. J. Nephrol. 2022, 1–10. https://doi.org/10.1155/2022/4768540

Marie Patrice, H., Joiven, N., Hermine, F., Jean Yves, B., Folefack François, K., Enow Gloria, A., 2019. Factors associated with late presentation of patients with chronic kidney disease in nephrology consultation in Cameroon-a descriptive cross-sectional study. Ren. Fail. 41, 384–392. https://doi.org/10.1080/0886022X.2019.1595644Alligood, M.R., 2021. Nursing Theorists and Their Work EBook. Elsevier Health Sciences.

Flanagin, E.P., Chivate, Y., Weiner, D.E., 2020. Home Dialysis in the United States: A Roadmap for Increasing PD Utilization. Am. J. Kidney Dis. Off. J. Natl. Kidney Found. 75, 413–416. https://doi.org/10.1053/j.ajkd.2019.10.013

Idowu, O.A., Oyekunle, A.A., Fajemilehin, B.R., Idowu-Olutola, O.M., 2022. Applying the Betty Neuman Model to Explain the Relationship between Workload as Stressors and Shift Work Disorder among Nurses; a Conceptual Model. South Asian Res. J. Nurs. Healthc. 4, 41–44. https://doi.org/10.36346/sarjnhc.2022.v04i03.003

Janmaat, C.J., van Diepen, M., van Hagen, C.C., Rotmans, J.I., Dekker, F.W., Dekkers, O.M., 2018. Decline of kidney function during the pre-dialysis period in chronic kidney disease patients: a systematic review and meta-analysis. Clin. Epidemiol. 10, 613–622. https://doi.org/10.2147/CLEP.S153367

Kabinga, S.K., Ngigi, J.N., Kayima, J.K., McLigeyo, S.O., 2019. Predialysis Care Experience Among Patients With CKD at a Teaching Hospital in Kenya. Kidney Int. Rep. 4, 1638–1641. https://doi.org/10.1016/j.ekir.2019.08.011

Knowledge, attitude, and practices toward chronic kidney disease among care providers in Jimma town:cross-sectional study | BMC Public Health | Full Text [WWW Document], n.d. URL

https://bmcpublichealth.biomedcentral.com/articles/10.1186/s12889-020-09192-5 (accessed 12.27.22).

Kovesdy, C.P., 2022. Epidemiology of chronic kidney disease: an update 2022. Kidney Int. Suppl. 12, 7–11. https://doi.org/10.1016/j.kisu.2021.11.003

Maritim, P., Twahir, A., Davids, M.R., 2022. Global Dialysis Perspective: Kenya. Kidney360 10.34067/KID.0006662021. https://doi.org/10.34067/KID.0006662021

Morrison, S., 2022. End-Stage Renal Disease: An Issue of Nephrology Clinics. American Medical Publishers.

Mwenda, V., Githuku, J., Gathecha, G., Wambugu, B.M., Roka, Z.G., Ong'or, W.O., 2019. Prevalence and factors associated with chronic kidney disease among medical inpatients at the Kenyatta National Hospital, Kenya, 2018: a cross-sectional study. Pan Afr. Med. J. 33, 321. https://doi.org/10.11604/pamj.2019.33.321.18114

Nerbass, F., Lima, H., Neto, O., Sesso, R., Lugon, J., 2022. Prevalence and Determinants of Predialysis Dietitian Follow-Up: Results From the Brazilian Dialysis Registry. J. Ren. Nutr. https://doi.org/10.1053/j.jrn.2022.04.005

Ngaruiya, G., 2022. Barriers to Peritoneal Dialysis Utilization among End Stage Kidney Disease Patients in Kenya. Nurs. Prim. Care 6. https://doi.org/10.33425/2639-9474.1208

Purnell, T.S., Bae, S., Luo, X., Johnson, M., Crews, D.C., Cooper, L.A., Henderson, M.L., Greer, R.C., Rosas, S.E., Boulware, L.E., Segev, D.L., 2020. National Trends in the Association of Race and Ethnicity With Predialysis Nephrology Care in the United States From 2005 to 2015. JAMA Network. Open 3, e2015003. https://doi.org/10.1001/jamanetworkopen.2020.15003

Raffray, M., Vigneau, C., Couchoud, C., Bayat, S., 2020. Pre-dialysis care trajectories of patients with end-stage kidney disease starting dialysis in emergency in France. Kidney Int. Rep. 6. https://doi.org/10.1016/j.ekir.2020.10.026

Revealed: Kenya's top killer diseases [WWW Document], 2022. . Nation. URL https://nation.africa/kenya/health/revealed-kenya-s-top-killer-diseases-4058722 (accessed 12.28.22).

RN, A.G., BSN, 2019. Betty Neuman: Neuman Systems Model (Nursing Theory Guide) [WWW Document]. Nurseslabs. URL https://nurseslabs.com/betty-neuman-systems-model-nursing-theory/ (accessed 1.2.23).

Rossing, P., Caramori, M.L., Chan, J.C.N., Heerspink, H.J.L., Hurst, C., Khunti, K., Liew, A., Michos, E.D., Navaneethan, S.D., Olowu, W.A., Sadusky, T., Tandon, N., Tuttle, K.R., Wanner, C., Wilkens, K.G., Zoungas, S., Craig, J.C., Tunnicliffe, D.J., Tonelli, M.A., Cheung, M., Earley, A., Boer, I.H. de, 2022. Executive summary of the KDIGO 2022 Clinical Practice Guideline for Diabetes Management in Chronic Kidney Disease: an update based on rapidly emerging new evidence. Kidney Int. 102, 990–999. https://doi.org/10.1016/j.kint.2022.06.013

Sokwala, S.A.K., Odhiambo, J.O., Sokwala, A.P., 2022. Perceived Barriers to Peritoneal Dialysis Among Kenyan Nephrologists: A Cross-Sectional Descriptive Study. Can. J. Kidney Health Dis. 9, 20543581221107756. https://doi.org/10.1177/20543581221107756

Singh, A. K. (2008). Chapter 116—Chronic Kidney Disease. In W. R. Frontera, J. K. Silver, & T. D. Rizzo (Eds.), *Essentials of Physical Medicine and Rehabilitation (Second Edition)* (pp. 643–649). W.B. Saunders. https://doi.org/10.1016/B978-1-4160-4007-1.50118-8

Wang, I.-K., Yu, T.-M., Yen, T.-H., Yip, H.-T., Lai, P.-C., Li, C.-Y., Sun, K.-T., Sung, F.-C., 2022. The impact of multidisciplinary pre-dialysis care on the outcomes of incident peritoneal dialysis patients. BMC Nephrol. 23, 173. https://doi.org/10.1186/s12882-022-02800-z

Wolide, A.D., Kumela, K., Kerga, F., Debalke, S., Seboka, M., Edilu, B., Gashe, F., Bobassa, E.M., 2020. Knowledge, attitude, and practices toward chronic kidney disease among care

providers in Jimma town:cross-sectional study. BMC Public Health 20, 1079. https://doi.org/10.1186/s12889-020-09192-5

Yonga, M.A., Githemo, G.K., Wala, J., 2022. Patient factors influencing the use of peritoneal dialysis for management of end stage renal disease at a national hospital Kenya.Kenyan J. Nurs. Midwifery 7, 14–25.

Zimmerman, A.M., n.d. Peritoneal dialysis: increasing global utilization as an option for renal replacement therapy. J. Glob. Health 9, 020316. https://doi.org/10.7189/jogh.09.020316

APPENDICES

APPENDIX I: Participants information sheet and consent form

Title of the study: Knowledge, Practice and Barriers of Pre-dialysis care among health service providers at Kenyatta National Hospital.

Investigator: Lucas Kinuthia Nyarara

School of Nursing sciences

University of Nairobi

Tel. 0713018426

Introduction: I am a student at The University of Nairobi pursuing a Master's of Science Degree in Nursing (Renal Nursing). I am conducting a study titled: "Knowledge, practice and barriers of pre-dialysis care among health service providers at Kenyatta National Hospital." This information aims to give you details about the study that you may make an informed decision regarding your participation in the study. You are free to ask any question before signing the consent form.

The Purpose of the study: The study aims to determine the practice of pre-dialysis care and its barriers at Kenyatta National Hospital. Pre-dialysis care helps in improving the quality of life of patients with CKD stage 3-5 and moreover, it reduces mortality rate especially after initiation of KRT.

Risks: There are no potential risks to participants in this research since the information will not be used against the participant in any way whatsoever. All the regulations by the

University of Nairobi- Kenyatta National Hospital Ethics and Research Committee regarding participant safety will be adhered to in ensuring that participants are protected from harm. Any participant who will be uncomfortable during the data collection procedure and want to withdraw will be allowed.

Confidentiality: The principle of participant's anonymity will be maintained by ensuring that data collected are safe by storing the questionnaire in a cupboard under lock and the key. Besides, any soft data entered in the computer will be password protected and only accessed by the principal researcher.

Voluntary Participation: Participation in this study is voluntary and you will not be victimized by refusing to participate. You have the right to withdraw from the study without any consequences. You are free to decline in answering any question during the interview.

Compensation: There is no compensation for participating in the study..

Conflict of interest:

The research and the supervisors confirm that there is no conflict of interest.

Consent form I hereby consent to participate in this study. I have been informed of the nature of the study being undertaken and there are no potential risks associated. I may also choose to discontinue my involvement in the study at any stage without any explanation or consequences. I have also been reassured that my details and the information I will relay will be kept confidential. I ensured that all my concerns about my participation in the study have been adequately addressed by the investigator.

Participant's Signature……..……. Date……

I confirm that I have explained to the participant the nature of the study and the contents of this consent form in detail and the participant has agreed to participate voluntarily without any coercion or undue pressure.

Investigator's

Signature……. Date …….

For any Clarification, please contact

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3. **The Chairman**

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APPENDIX II- QUESTIONNAIRE

IDENTIFICATION CODE: H2019

TOPIC: KNOWLEDGE, PRACTICE AND BARRIERS OF PRE-DIALYSIS CARE AMONG HEALTH SERVICE PROVIDER AT KENYATTA NATIONAL HOSPITAL-KENYA

INSTRUCTIONS:

Please circle or tick the appropriate option(s).

Do not write your name on the questionnaire.

PART A: SOCIO-DEMOGRAPHIC CHARACTERISTICS

1. Age (completed years)

A. 18-28 years
B. 29-38 years
C. 39-48 years
D. 49-58 years
E. > 59 years

2. Gender

A. Male
B. Female
C. Others specify……..

3. Job designation in your Profession

A. Physicians (Nephrologist)
B. Resident medical doctor
C. Renal nurse
D. Nurse
E. Nutritionists
F. Counsellor
G. Others specify ……..

4. Years of experience in your current position ……

PART B: RELEVANT EDUCATIONAL BACKGROUND

5. Highest level of education attained

A. Diploma
B. Higher diploma
C. Undergraduate
D. Postgraduate
E. Others specify……

6. Have you ever obtained any education on pre-dialysis apart from basic professional training?

A. Yes
B. No

7. If yes to question 6 above, when did you obtain such education or training Month /Year……

8. Do you often carry out pre-dialysis care before initiation of dialysis?

A. Yes
B. No

9.Where do your facts about pre-dialysis care mainly originate? (Select all that apply)

A. Basic professional training
B. In service training
C. Scientific conference
D. Print and electronic media
E. Colleagues
F. Others (specify)……..

PART C: KNOWLEDGE OF PRE-DIALYSIS CARE

10. Write true or false to each of the following statements?

Please select one answer per row

Statement	True	False
1.Pre-dialysis care should be offered by a multidisciplinary team		
2. Nephrologists, Medical Doctors, Renal Nurses, Vascular Surgeons, Nutritionists, and Counselors should be included in the Multidisciplinary Team?		
3.Pre-dialysis care entails kidney restorative care services, supportive care and palliative care services.		
4.Lack of patient preparedness and an urgent start to dialysis are associated with lower survival and higher morbidity:		
5. Pre-dialysis care saves the health care cost of CKD management, delays progression of CKD to ESKD, and is associated with better patient outcome after initiation of dialysis?		
6. Patients with progressive CKD and who are at high risk of kidney failure, should have a Vascular access created to mature before the initiation of dialysis:		

11.What are the signs and symptoms that a person might have if they have advanced chronic kidney disease requiring KRT? (select all that apply)

A. Water retention (excess water in the body).
B. Fever.
C. Nausea/vomiting.
D. Loss of appetite.
E. Increased fatigue (tiredness).

12. At what stage of CKD should pre-dialysis care be initiated?
A. Stage 1-2
B. Stage 2-3
C. Stage 3-4
D. Stage 4-5
E. Not sure
13. CKD progression factors include? (Select all that apply)
A. Hypertension
B. Obesity
C. Hyperlipidemia
D. Hyperglycemia
E. Others specify …….
14. CKD metabolic complications include? (Select all that apply)
A. Hypovitaminosis D
B. Anemia
C. Cardiovascular diseases
D. Hyperparathyroidism
E. Hyperphosphatemia
F. Metabolic acidosis
G. Others specify……
15.Pre-dialysis care should be started when eGFR ranges between 5 and 10 ml/min/1.73 m2 with symptoms or signs attributable to kidney failure?
A. True
B. False
16. When should CKD patients be enrolled in a pre-dialysis care program?
A. < 1 month before initiation of dialysis
B. < 12 months before initiation of dialysis
C. > 12 months before initiation of dialysis
D. Others specify…….

PART D: PRACTICE OF PRE-DIALYSIS CARE
17. For the last three months, how many sessions of pre-dialysis care have you participated in? Specify……..
18. At what eGFR do you normally enroll patients for pre-dialysis care?
A. >90 mL/min/1.73 m2
B. 60-89 mL/min/1.73 m2
C. 45-59 mL/min/1.73 m2
D. 30-44 mL/min/1.73 m2
E. 15-29 mL/min/1.73 m2
F. <15 mL/min/1.73 m2
19. For the last three months have you participated in the initiation of a patient on dialysis?
A. Yes
B. No
20. If yes to question 20 above, which approach of dialysis initiation was used?
A. Urgent start
B. Non-urgent start
C. Planned start

D. Unplanned start

21. If yes to question 20 above, what vascular access was used?

A. AV Fistula
B. Tunneled permanent catheters
C. Temporally catheters
D. AV Graft
E. Others specify…….

22. Tick the most appropriate answer to the following statements?

Please select one answer per row

Statement	Yes regularly	Occasionally	Not at all
1.I discuss with my patients on importance of taking medication as directed			
2.I discuss dietary restrictions with my patients on dietary restrictions to include salt restriction, protein, alcohol, smoking and cholesterol intake.			
3.I encourage my patient to have a record of BP monitoring at home.			
4.I usually teach my patients on various symptoms requiring medical attention like unexplained headache, chest pain, and shortness of breath, nausea & vomiting and RBS out of range.			
5.I usually encourage my CKD patients to exercise.			
6.I usually teach and remind my patients on the things to avoid like NSAIDS, tobacco products, alcohol and salt substituents.			

PART E: BARRIERS OF PRE-DIALYSIS CARE

23. What challenges do you encounter when offering pre-dialysis care? (select all that apply)

A. Poor communication among health service providers.
B. Shortage of health service providers
C. Lack of standardized guideline
D. Patients non adherence to health education
E. Lack of necessary expertise on all modality of KRT
F Others specify……

24. How can these challenges be addressed? (select all that apply)

A. Development of Pre-Dialysis Guidelines
B. Training of Health Service Providers
C. Enforcing teamwork among Health Service Providers
D. Employing more Health Service Providers
E. Others Specify……..

PART F: ENABLERS OF PRE-DIALYSIS CARE

25.To what extent do you agree or disagree with each of the following statements?

Please select one answer per row

Statement	Strongly Agree	Agree	Disagree	Strongly Disagree
1.KNH has provided us with a CKD action plan that helps us in pre-dialysis care.				
2.Teamwork in a multidisciplinary committee enables me to carry out pre-dialysis care.				
3.Continuous medical education on pre-dialysis care at KNH enables us to carry out pre-dialysis care.				
4.Early referral of CKD patients by general practitioner enables us to carry out pre-dialysis care.				

Thank you for taking part in this study

APPENDIX III: FOCUSED GROUP DISCUSSION INTERVIEW GUIDE

Topic: Knowledge, Practice and Barriers of Pre-dialysis Care Among Health Service Provider at Kenyatta National Hospital-Kenya

Introduction Welcome to this session and thanks a lot for volunteering to participate in the discussion. The purpose of this discussion is to explore your experiences, practice, barriers that you encounter while offering pre-dialysis care. You have been selected to participate for your experience and practice and views are important to us. The findings of this study will help in improvement of pre-dialysis care which will eventually delay the initiation of KRT modalities and also in improvement of the patient quality of life. The session will last at most one hour.

Anonymity The voice recorder will be kept safely in a locked place and after transcribing word by word they will be destroyed. The notes taken during the FGD will not bear names. Kindly answer the questions asked correctly and truthfully as possible. You are free to answer any question asked and also free to decline to answer a question or withdraw from the discussion at any given time.

Ground rules

1. Only one person will be allowed to speak at a time.

2. No correct or wrong answer.

3. Respect the other person's opinion.

Any questions?

Questions

1. In your own terms what does pre-dialysis care entails?

2. In your practice have you ever participated in pre-dialysis care?

3. What enables you to carry out pre-dialysis care at KNH?

4. What do you think are some of the barriers to predialysis care at KNH?

5. In your own opinion, what do you think should be done to improve predialysis care at KNH?

6. Any other comments or concerns?

Thank you very much for your time and accepting to participate in this discussion.

APPENDIX IV: ERC APPROVAL LETTER

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Ref: KNH-ERC/A/453

23rd August, 2023

Lucas Kinuthia Nyarara
Reg. No. H56/33753/2019
Dept. of Nursing Sciences
Faculty of Health Sciences
University of Nairobi

Dear Lucas,

ETHICAL APPROVAL-RESEARCH PROPOSAL: KNOWLEDGE, PRACTICE AND BARRIERS OF PRE-DIALYSIS CARE AMONG HEALTH SERVICE PROVIDERS AT THE KENYATTA NATIONAL HOSPITAL (P339/04/2023)

This is to inform you that KNH-UoN ERC has reviewed and approved your above research proposal. Your application approval number is **P339/04/2023**. The approval period is 23rd August 2023 –22nd August 2024.

This approval is subject to compliance with the following requirements;

i. Only approved documents including (informed consents, study instruments, MTA) will be used.
ii. All changes including (amendments, deviations, and violations) are submitted for review and approval by KNH-UoN ERC.
iii. Death and life threatening problems and serious adverse events or unexpected adverse events whether related or unrelated to the study must be reported to KNH-UoN ERC 72 hours of notification.
iv. Any changes, anticipated or otherwise that may increase the risks or affected safety or welfare of study participants and others or affect the integrity of the research must be reported to KNH-UoN ERC within 72 hours.
v. Clearance for export of biological specimens must be obtained from relevant institutions.
vi. Submission of a request for renewal of approval at least 60 days prior to expiry of the approval period. Attach a comprehensive progress report to support the renewal.
vii. Submission of an executive summary report within 90 days upon completion of the study to KNH-UoN ERC.

APPENDIX V: ERC APPROVAL LETTER

KNH/R&P/FORM/01

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

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

Study Registration Certificate

1. Name of the Principal Investigator/Researcher
LUCAS KINUTHIA NYARARA
2. Email address: lucaskinuthia07@gmail.com Tel No. 0713018426
3. Contact person (if different from PI) —
4. Email address: — Tel No. —
5. Study Title
KNOWLEDGE, PRACTICE AND BARRIERS OF PRE-DIALYSIS CARE AMONG HEALTH SERVICE PROVIDERS AT THE KENYATTA NATIONAL HOSPITAL
6. Department where the study will be conducted RENAL
(Please attach copy of Abstract)
7. Endorsed by Research Cordinator of Department where study will be conducted.

Name: Nancy Hegoale Signature [signature] Date 29-8-23

8. Endorsed by KNH Head of Department where study will be conducted.

Name: Mr R Mbugua Signature [signature] Date 29/8/2023

9. KNH UoN Ethics Research Committee approved study number P339/04/2023
(Please attach copy of ERC approval)
10. I LUCAS KINUTHIA NYARARA commit to submit a report of my study findings to the Department where the study will be conducted and to the Department of Medical Research.

Signature [signature] Date 29/08/2023

11. Study Registration number (Dept/Number/Year) RENAL/209/2023
(To be completed by Medical Research Department)
12. Research and Program Stamp [stamp: KENYATTA NATIONAL HOSPITAL, 30 AUG 2023, P.O. Box 20723-00202, Research]

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

REPUBLIC OF KENYA

NATIONAL COMMISSION FOR
SCIENCE,TECHNOLOGY & INNOVATION

Ref No: **426768**

Date of Issue: **11/September/2023**

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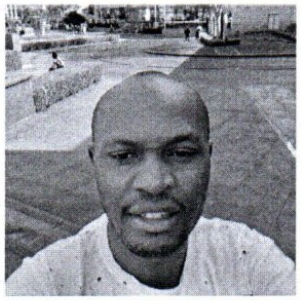

This is to Certify that Mr.. Lucas Kinuthia Nyarara of University of Nairobi, has been licensed to conduct research as per the provision of the Science, Technology and Innovation Act, 2013 (Rev.2014) in Nairobi on the topic: KNOWLEDGE, PRACTICE, AND BARRIERS OF PREDIALYSIS CARE AMONG HEALTH SERVICE PROVIDERS AT KENYATTA NATIONAL HOSPITAL for the period ending : 11/September/2024.

License No: **NACOSTI/P/23/29396**

426768

Applicant Identification Number

Director General
NATIONAL COMMISSION FOR
SCIENCE,TECHNOLOGY &
INNOVATION

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See overleaf for conditions

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DEPARTMENT OF ... CHAIRMAN 10 NOV 2023 UNIVERSITY OF NAIROBI P.O. Box 30197, NAIROBI

DR. GRACE MURUNGA 9/11/2023

10/11/2023
Dr. E. Mutuku
2:00