BARRIERS AND FACILITATORS TO HEMODIALYSIS ACCESS AND UTILIZATION AMONG PATIENTS WITH END-STAGE KIDNEY DISEASE IN GHANA: A MIXED-METHODS STUDY FROM THE PERSPECTIVES OF PATIENTS, PROVIDERS, AND ADMINISTRATORS.

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ABSTRACT

Background: Chronic kidney disease (CKD) is a major and growing public health issue in Ghana, with a prevalence of 13.3%. Many individuals with CKD progress to end-stage kidney disease (ESKD), for which hemodialysis is the principal lifesaving treatment. However, access to and utilization of hemodialysis remain severely limited by financial, geographic, and systemic barriers, including high out-of-pocket costs, inadequate insurance coverage, and the uneven distribution of dialysis centers. Despite the increasing burden of ESKD, limited evidence explores the multifaceted barriers to hemodialysis in Ghana from the perspectives of patients, healthcare providers, and hospital administrators.

Purpose: This dissertation aims to explore and identify the barriers and facilitators to delivering quality care for individuals with ESKD, with a focus on access to and utilization of hemodialysis in Ghana.

Methods: A sequential explanatory mixed-methods design was employed. The quantitative phase involved a cross-sectional study of 264 patients with ESKD, using structured questionnaires. Predictors of hemodialysis access and utilization were identified through bivariate and multivariate logistic regression analyses using SPSS version 27. The qualitative phase employed maximum variation purposive sampling to recruit 16 adults with ESKD (receiving or in need of hemodialysis) and 16 healthcare providers/administrators from two teaching hospitals. Data from semi-structured interviews were analyzed thematically using Braun and Clarke's framework with NVivo 14.

Results: Among the 264 patients, 74.2% had hemodialysis access, but only 38.8% regularly adhered to all prescribed sessions. Greater access and utilization were associated with higher income, urban residence, longer duration since diagnosis, and distance to dialysis centers. Qualitative findings revealed shared perspectives across stakeholder groups: individual factors (resilience, family support) facilitated care, while systemic challenges high treatment costs, facility shortages, workforce constraints, limited insurance coverage, and geographic disparities, impeded consistent hemodialysis access. Participants emphasized the need for coordinated multi-level interventions to address these interlinked barriers.

Conclusion: Access to and utilization of hemodialysis in Ghana are shaped by intersecting financial, geographic, systemic, and sociocultural challenges. Addressing these issues requires comprehensive reforms, including increased public investment, infrastructure expansion, targeted health education, and equity-focused health policies to ensure sustainable and equitable dialysis care for patients with ESKD.

Keywords: Hemodialysis; access; utilization; barriers; Ghana; chronic kidney disease; mixed methods; equity; health services.

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CKD	Chronic Kidney Disease
ESKD	End Stage Kidney Disease
NHIS	National Health Insurance Scheme

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CHAPTER ONE: INTRODUCTION AND LITERATURE REVIEW

1.0 Dissertation Overview/Structure

This manuscript-based dissertation is presented in five chapters. In Chapter I provide an introduction and overview of the dissertation. Chapter 2 presents my first study manuscript focused on addressing the predictors of hemodialysis access and utilization among patients with ESKD in Ghana. Chapter 3 presents my second study manuscript, presenting my qualitative descriptive study that explored patients' experiences of barriers and facilitators to hemodialysis care in Ghana among patients with ESKD. Chapter 4 presents the third manuscript of my qualitative study examining the barriers to and facilitators of hemodialysis care in Ghana from the perspectives of healthcare providers and administrators. The final chapter, Chapter 5, constitutes the summary, discussion, implications, and recommendations of this mixed methods dissertation.

1.1 Introduction

Chronic kidney disease is a growing public health challenge, especially in low- and middle-income countries where access to renal replacement therapy is limited (Bello et al., 2019; Bikbov et al., 2020; Crews et al., 2019; GBD 2017, 2020). Resource limitations in these regions prevent timely and effective treatment (Luyckx et al., 2018). Renal replacement therapy, such as hemodialysis, is necessary for the survival of end-stage kidney disease (ESKD), the most severe stage of chronic kidney disease. However, economic barriers, insufficient infrastructure, and systemic healthcare challenges often limit access to this care in low- and middle-income countries (Japiong et al., 2023; Liyanage et al., 2015). Identifying these barriers and facilitators is essential to improving hemodialysis access and adherence in countries like Ghana.

1.2 Background

Chronic illnesses are the leading cause of mortality and morbidity worldwide, with rates rising across all regions and socioeconomic classes (Hajat & Stein, 2018). In the absence of a cure, chronic conditions are medically managed through treatment regimens to slow or stop disease progression and prevent related complications. Chronic kidney disease (CKD), in particular, is a major public health problem with a global prevalence between 10 to 13% (Adu & Ojo, 2020; Duff et al., 2024). According to a Global Burden of Disease report, chronic kidney disease and subsequent kidney failure or end-stage kidney disease (ESKD) are rising causes of death globally (Xie et al., 2025). Moreover, over 70% of kidney failure patients will reside in low-income regions like Sub-Saharan Africa by 2030 (Okorie et al., 2018). In Ghana, approximately 92% of patients with kidney failure have no access to kidney replacement therapy, reflecting a critical gap in care consistent with similar disparities across low- and middle-income countries (Tannor et al., 2023).

As in many countries in the region, the prevalence of ESKD in Ghana is on the rise, mostly due to increasing rates of diabetes mellitus and hypertension, the two leading causes of kidney failure, as well as other contributing factors such as chronic inflammatory diseases, genetic disorders, herbal medicine use, and, more recently, environmental exposures linked to illegal small-scale mining activities known as galamsey ("A Review of Health Hazards Associated with Exposure to Galamsey-Related Pollutants," 2024; Adu & Ojo, 2020; Ashuntantang et al., 2017).

According to Adjei et al. (2019), Boima et al. (2019), and Tannor et al. (2023), the estimated prevalence of chronic renal disease in Ghana is 13.3%, which accounts for almost 5% of all hospital admissions. However, access to early diagnosis and treatment is often limited. A significant number of patients present at an advanced stage, with over 75% requiring urgent dialysis at the time of diagnosis (Tannor et al., 2018, 2019).

A patient is said to reach ESKD when there is irreversible damage to the kidney(s) and loss of renal function with a glomerular filtration rate (GFR) of less than 15mL/minute/1.73m2 (Long et al., 2017). ESKD significantly undermines patients' day-to-day activities. To improve bodily functions and prolong life, patients with ESKD require conservative (palliative) management or renal replacement therapy in the form of either hemodialysis (the focus of this study), peritoneal dialysis, or kidney transplantation. Globally, around three million patients are currently receiving renal replacement therapy, and this number is expected to increase to between 5 and 10 million by 2030 (Ashuntantang et al., 2017; Liyanage et al., 2015; Luyckx et al., 2021). Dialysis is a life-saving treatment, yet requires compliance with a therapy that influences one's entire life, including adhering to restrictions in food and fluid intake, medication, management of health technology devices, and adaption to the bodily and psychological manifestations of kidney failure, such as fatigue (Daugirdas et al., 2015; Theofilou, 2013; Watanabe et al., 2015).

Hemodialysis is the main form of renal replacement therapy in Ghana (Okyere et al., 2021; Tannor et al., 2023), a process that uses a machine to filter waste and excess fluids from the blood. Yet the majority of the patients with ESKD do not have access to hemodialysis (Tannor et al., 2023). According to the World Health Organization (WHO), access refers to the ability to reach and obtain appropriate healthcare services when there is an apparent need for care and encompasses the right to seek, receive, and share information about health issues. This definition (Evans et al., 2013) serves as the foundation for the description and scope of access in this dissertation, which posits that access to and utilization of hemodialysis are constrained by a complex interplay of systemic, institutional, sociocultural, and economic barriers. However, access to and utilization of hemodialysis remain critically limited; for example, only about 8% of patients with ESKD in Ghana receive the hemodialysis they need (Tannor et al., 2023). Challenges accessing

hemodialysis lead to recurrent hospitalization, poor health outcomes, a reduced quality of life, and high in-hospital death rates of up to 50% (Erickson et al., 2024; Murali & Lonergan, 2020).

Ghana currently has 51 hemodialysis centers, of which only 40 are operational, and these are unevenly distributed across the country, with the majority concentrated in urban areas (Tannor et al., 2023). Nine out of the country's 16 regions have no dialysis centers, leaving rural populations particularly underserved (Tannor et al., 2023). Even where services are available, treatment costs are unaffordable for many patients. Hemodialysis is not covered under Ghana's National Health Insurance Scheme, resulting in high out-of-pocket costs and substantial financial burdens on patients, families, and communities (Tannor & Antwi, 2023; Osafo et al., 2018). A single session of hemodialysis costs about US$53.90, almost equivalent to the national monthly minimum wage of US$55.70 (Tannor & Antwi, 2023). In addition to these structural and economic constraints, various social and cultural factors influence hemodialysis access. Patients' decisions to seek or continue dialysis are frequently influenced by their beliefs, religious practices, traditional healing preferences, and family dynamics, which all influence how they view sickness and medical treatment (Albreiki et al., 2023; Obichi & Dee, 2022; Kumi-Kyereme et al., 2017). Also, social support networks are essential for patients to start and continue therapy (Cukor et al., 2014; Senteio & Callahan, 2020).

Despite the essentialness of hemodialysis, little research in Ghana has been done to examine the facilitators and barriers patients experience in accessing and using hemodialysis. Most existing research has focused on clinical outcomes, quality of life (Tannor et al., 2019), or psychological well-being (Amoako & Owusu-Ansah, 2021). Limited attention has been given to the systemic, institutional, interpersonal, and social factors that influence hemodialysis access and adherence from both the patient and healthcare provider perspectives. While studies in countries such as the

United States (Chenitz et al., 2014), Singapore (Griva et al., 2013), Rwanda (Mukakarangwa et al., 2018), and Tanzania (Pancras et al., 2018) have examined these issues, findings specific to Ghana remain sparse.

This sequential mixed-method study aims to explore and identify the barriers and facilitators to hemodialysis care in Ghana, using Andersen's Health Services Utilization Model as a guide. By examining the perspectives of patients with ESKD and healthcare workers across diverse regions, this study aims to provide new knowledge that can inform health policy and strategies/interventions to improve patient access and uptake of needed ESKD care in Ghana.

1.3 Problem Statement

Hemodialysis remains the predominant mode of renal replacement therapy for patients with ESKD in Ghana. Despite its primacy, many patients with kidney failure face barriers to accessing and using hemodialysis. Many patients drop out or are unable to go for hemodialysis. Addressing the current inequalities in hemodialysis treatment requires an understanding of the various barriers, such as those that are financial, institutional, geographic, and informational, as well as the possible facilitators of hemodialysis access and adherence. Finding systemic gaps and context-specific facilitators requires generating insights into patient experiences and healthcare workers' perspectives. Within the Ghanaian healthcare system, these insights can guide focused, evidence-based policy and practice initiatives to enhance treatment adherence and hemodialysis access.

1.4 Purpose of the study

The purpose of this study is to develop a comprehensive understanding of the barriers and facilitators of hemodialysis access and utilization among patients with end-stage kidney disease in Ghana. Guided by Andersen's Health Services Utilization Model, the study focuses on how individual, health system, and contextual factors influence patients' ability to initiate and sustain

treatment. The research assumes the availability of dialysis services and does not aim to assess the broader concept of quality of care, but rather the specific drivers that enable or constrain utilization.

1.4.1 Study Objectives

1. To assess the predictors of hemodialysis access and utilization among patients with ESKD in Ghana.
2. To explore the perspectives of patients with ESKD on barriers to and facilitators of accessing and using hemodialysis
3. To examine healthcare providers' and health service administrators' perspectives on the barriers and facilitators to accessing and using hemodialysis for patients with ESKD in Ghana.

1.5 Research Questions.

1. What are the predictors of hemodialysis access and utilization among patients with ESKD in Ghana?
2. What are the perspectives of patients with ESKD regarding the barriers and facilitators they experience accessing and using hemodialysis?
3. From the perspective of health care providers and health service administrators, what are the barriers and facilitators to the provision and delivery of hemodialysis to patients with ESRD?

1.6 Significance of the Study

This study explored the real-life challenges faced by individuals living with ESKD in Ghana, focusing on the barriers and facilitators that affect their access to and utilization of hemodialysis. Because most hemodialysis centers in Ghana are located in teaching hospitals, patients from rural areas or low-income households often encounter difficulties reaching or

affording treatment. These disparities contribute to avoidable morbidity and premature mortality, while placing heavy physical, emotional, and financial burdens on affected families.

Beyond these structural and financial obstacles, relatively little is known about the specific healthcare and social support needs of Ghanaian patients on dialysis. A particularly concerning phenomenon is the discharge of patients against medical advice when they are unable to pay for continued treatment. Such instances highlight how systemic and socioeconomic factors, not only clinical ones, critically shape whether patients can access or use dialysis.

By generating detailed, context-sensitive evidence on patients' needs, lived experiences, and patterns of service uptake, together with insights from providers, this study addresses an important knowledge gap. The findings will enable more targeted, evidence-informed interventions. Specifically, they can support policymakers and practitioners in developing financing mechanisms, patient support services, and health system responses tailored to improve access and utilization of dialysis in Ghana. Ultimately, this will contribute to reducing inequities in kidney care and improving clinical and social outcomes for patients with ESKD.

1.7 Rationale for the Dissertation

Despite the increasing burden of ESKD in Ghana, research is still limited in both scope and depth. Most studies concentrate on clinical aspects, with few using mixed methods that combine views from patients, providers, and administrators. Even fewer employ theoretical models like Andersen's behavioral model for the utilization of health services. The dissertation fills these gaps with three related papers that examined the barriers and facilitators to hemodialysis access and utilization in a multifaceted, multi-level manner.

1.8 Researcher Reflexivity and Positionality

Reflexivity was central to this study to enhance its credibility, dependability, and transferability (Lincoln & Guba, 1985). In qualitative research, the researcher serves as the main instrument of data collection and interpretation. Therefore, it was critical to regularly question how my background, assumptions, and professional experiences might shape the process of the research and understanding of the data.

As a nurse, working in the emergency and medical wards of the Tamale Teaching Hospital in Northern Ghana, I have seen firsthand the systemic inequalities faced by patients with kidney failure, particularly those from low-income backgrounds who are unable to afford or sustain hemodialysis treatment. These experiences influenced my decision to undertake this PhD research, which examined patients' and healthcare providers' perspectives and narratives of accessing and utilizing hemodialysis in Ghana.

At present working as a nurse educator and doctoral student, and I bring both academic and clinical perspectives to this inquiry. As someone deeply emotional about dialysis care, however, I was aware of the importance of bracketing my emotions and not steering the data toward any of these prior narratives. In the study, I adhered closely to interview guides, applied neutral probing, and reflexively recorded thoughts, decisions, and observations in a reflexive journal to minimize possible bias. This journal served as both an audit trail and a tool for deeper reflection during analysis.

While this is a single-author dissertation, I received invaluable support and guidance from my supervisory committee, senior investigators/mentors, peer researchers, and clinical collaborators. I had regular discussions with them to critically discuss my position in the research

and alternative interpretations of the data, to promote transparency and methodological rigor. These interactive, reflexive discussions added depth and coherence to the findings.

As an early career researcher, I began this project with humility and commitment to ethics, and a resolve to center the voices of those most marginalized within Ghana's fledgling healthcare system. This study reflects both a scholarly inquiry and a personal commitment to creating meaningful change in the health system for those living with ESKD. It was important to remain reflexively engaged during data analysis, to critically examine emerging patterns, to remain open to participants' meanings, and to ensure that developed themes were grounded in their experiences of life, rather than an imposition of my prior assumptions.

1.9 Theoretical Framework

Theories guide the conduct of research, and researchers can build scientific knowledge more efficiently than if they were not theory-guided (Bartholomew & Mullen, 2011; Lor et al., 2017). Though several studies have investigated the barriers to and facilitators of hemodialysis care among patients with ESKD and health care providers, most are not theory-driven (Årestedt et al., 2020; Bates et al., 2017; Griva et al., 2013; Meremo et al., 2017; Odette Dorcas et al., 2018; Pancras et al., 2018; Sciberras & Scerri, 2017). Nevertheless, the few identified studies that were driven by theory were not conducted to examine the barriers to and facilitators of hemodialysis care among patients with ESKD and health care providers (Aneshensel et al.,1995; Combes et al., 2015; Mbeje & Mtshali, 2021; Mukakarangwa et al., 2018; Oyegbile & Brysiewicz, 2017).

This study is guided by the Behavioral Model of Health service use (Anderson, 1995) and has been previously used in studying dialysis adherence (Chenitz et al., 2014). In addition, this model has been successfully used in the Ghanaian context in other health-related studies (Awoke et al., 2017; Dankwah et al., 2019; Kuuire et al., 2015, Saah et al., 2021).

For example, Braimah et al. (2023) used the model to examine the association between food security status and healthcare-seeking behaviors among older adults in the Greater Accra, Bono East, and Upper West Regions of Ghana. Seidu (2020) also used Anderson's model of health service utilization to assess the uptake of HIV testing services by sexually active men in Ghana. He argued that the model is considered appropriate for his study because it is a multilevel theory and has been applied in various settings and disciplines.

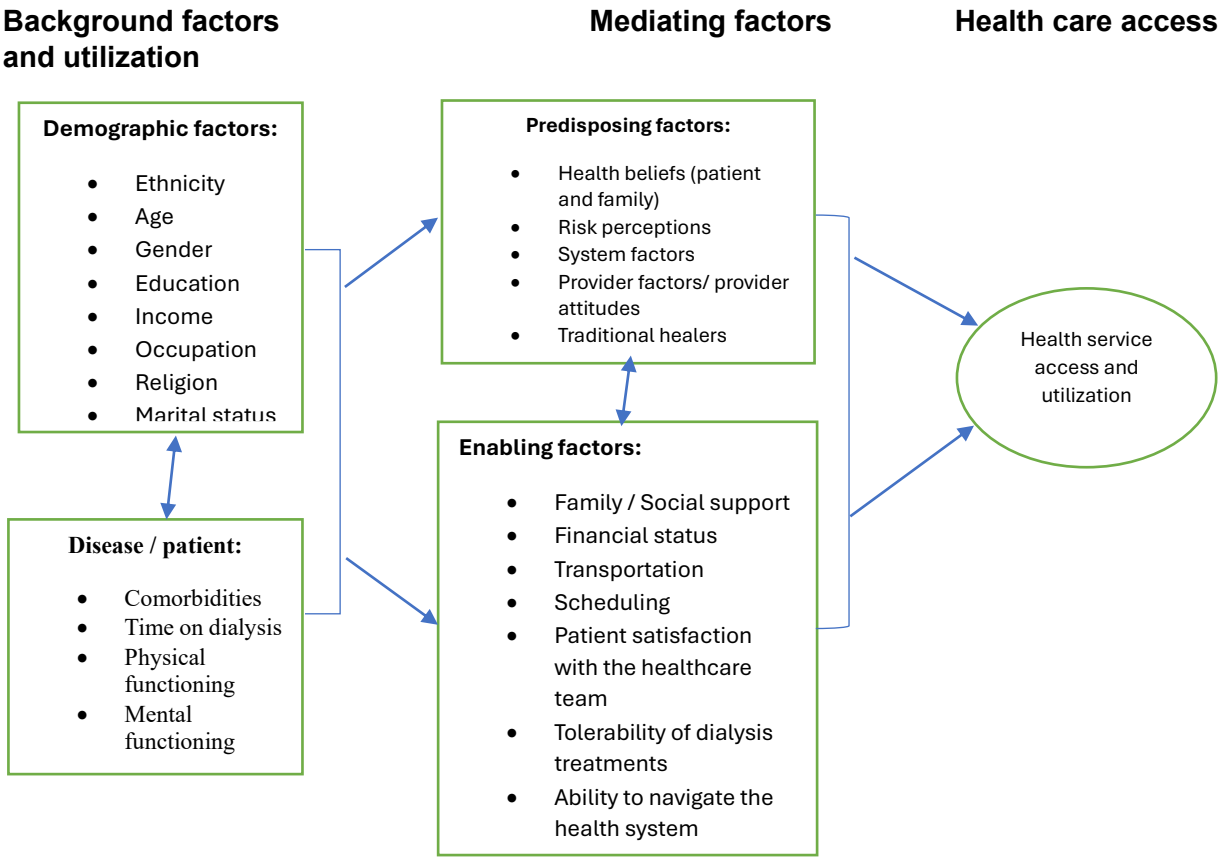
1.9.1 Behavioral Model of Health Services Use (Andersen, 1995)

This study was guided by Andersen's Behavioral Model of Health Services Use (1995), as illustrated in Figure 1, which posits that healthcare utilization is shaped by the interaction of three domains: predisposing characteristics (e.g., demographics, social structure, health beliefs), enabling resources (e.g., income, transportation, social support, service availability), and need factors (e.g., symptoms, disease severity, clinical assessment). The core assumption of the model is that these domains are interrelated and together determine whether individuals access and sustain healthcare services. This framework was selected over alternatives such as the Health Belief Model or Theory of Planned Behavior because it incorporates both individual-level and system-level factors, making it particularly suited to the Ghanaian context, where financial, structural, and social barriers strongly shape dialysis access and utilization.

The model informed multiple stages of this research. Survey instruments were developed to capture predisposing (e.g., sociodemographics, beliefs), enabling (e.g., costs, family support, service availability), and need-related factors (e.g., symptoms, comorbidities). Semi-structured interview guides for patients, providers, and administrators were organized around these domains, probing how financial, geographic, and social conditions influenced treatment decisions. During analysis, barriers and facilitators emerging from both quantitative and qualitative data provided a

systematic lens through which to identify key drivers of hemodialysis access and utilization in Ghana.

Figure 1: Behavioral Model of Health Services Use based on a model adapted from Andersen and Adday, 1995



1.10 Review of Relevant Literature

1.10.1 Introduction

This review identified existing evidence on the barriers to and facilitators of hemodialysis care from the perspectives of Patients with ESKD and health care workers. The review critically analyzes patient experiences, the limitations of the health system, and the methodological strategies employed in earlier research, drawing on both Ghanaian and international literature, as well as the Andersen Behavioral Model of Health Services Use.

1.10.2 Search Strategy

The researcher searched for peer-reviewed publications published in nursing and healthcare journals through search engines: Medline, Cumulative Index to Nursing and Allied Health Literature (CINAHL), Embase, Global Health, and Google Scholar. Inclusion criteria were as follows: primary studies (qualitative, quantitative, mixed methods, review articles); and published between January 2011 to 2025 in the English language. This time period was chosen to identify the contemporary trends and practices on dialysis and focus on the current barriers to and facilitators of hemodialysis care from the perspectives of patients with ESKD and health care providers. After identifying relevant articles, a snowball search of the reference list of these articles was conducted for other potentially eligible papers. Other websites like the World Health Organization and the H3Africa Kidney Disease Network were searched manually. The literature search for MEDLINE (Appendix A) used a combination of Medical Sub-Headings (MeSH) and keywords. Search terms, phrases, and MESH terms consisted of end-stage kidney disease, healthcare providers, hemodialysis, renal dialysis, and Sub-Saharan Africa. It was modified as necessary for other databases. These databases were used because they are the commonly recommended premier databases for literature searches in nursing and medicine (Snyder, 2019). An experienced librarian and information specialist developed the search strategy and searched the databases.

1.10.3 Epidemiology and Burden of ESKD in Ghana

The rising prevalence of ESKD is mainly due to increasing rates of hypertension and diabetes in Ghana. While specific prevalence data for ESKD in Ghana are limited, chronic kidney disease, a precursor to ESKD, has an estimated prevalence of approximately 13.3% (Adjei et al.,

2019). Studies show that 42.5% of ESKD patients have diabetes, while 57% have hypertension (Adu & Ojo, 2020; Boateng et al., 2018; Tannor et al., 2019). Poor management of these conditions, along with the common use of over-the-counter medications that harm the kidneys and late diagnosis, especially in underserved regions, adds to the progression of the disease (Tannor & Antwi, 2023). These issues, along with low public awareness and limited preventive measures, underscore the growing burden of ESKD. There is an urgent need for better management of chronic diseases and improved access to renal replacement therapies in Ghana.

1.10.4 Barriers to Hemodialysis Access

The literature review revealed five major barriers to accessing and using hemodialysis services among patients with ESKD, including health system-related, provider-related, financial, geographic, and patient or sociocultural-related barriers.

1.10.4.1 Studies on health care providers and hospital administrators' perspectives on hemodialysis service and access in Ghana

No studies were identified that examined hospital administrators' or dialysis program administrators' perspectives on the delivery of hemodialysis care in Ghana. This is an important gap in the literature as administrators are intricately involved in planning, implementation, and sustaining dialysis services.

Four Ghanaian studies (Iddrisu & Boateng, 2025; Tannor et al., 2018, 2023; Tannor & Antwi, 2023) were identified that examined health care provider perspectives on hemodialysis services in Ghana. At least two Ghana-specific studies directly report provider perspectives. For instance, Iddrisu and Boateng (2025) did a qualitative study with a purposive sample of 13 healthcare providers from three hospitals in northern Ghana to explore the challenges in managing

kidney failure. These participants reported structural issues like limited dialysis facilities and the lack of integration of dialysis services into broader health system frameworks. In addition, their participants reported staff shortages, high workloads, employee exhaustion, and psychological discomfort. They also emphasized the scarcity of nephrology-specific training and professional development opportunities, particularly in non-teaching and rural hospitals.

Tannor et al. (2023) undertook a national situational assessment of hemodialysis services in Ghana and distributed structured questionnaires to nephrologists, doctors, nurses, and other health care professionals working in all 51 identified dialysis centers across the country. Respondents were asked to report on the quantity of operational and available hemodialysis machines at their facilities as part of this facility-level assessment. Based on these facility-reported data, the study estimated a total of 299 hemodialysis machines across the country. Only 40 of the 51 hemodialysis facilities were operational, which were mostly located in nine of the sixteen regions of the country, and there were only 0.44 nephrologists for every million people. There were no dialysis centres in seven Ghanaian regions with a population of 5.7 million people (Tannor et al., 2023).

Several studies have identified workforce shortages, including insufficient numbers of nephrologists, dialysis nurses, and technicians, as a major barrier to meeting the rising demand for renal care in sub-Saharan Africa. It is important to note, however, that not all of these findings are based exclusively on Ghanaian health care provider reports. For example, Ajayi et al. (2020); Bello et al. (2019, 2022, 2024); Kim & Lee (2022), and Osman et al. (2018) consider Ghana as one of the countries covered in their multi-country or regional studies. These international reports draw upon provider surveys, facility data, and expert opinion from the region, and consistently highlight workforce shortages, high workloads, limited training opportunities in nephrology, and inadequate

access to hemodialysis services as key hindering factors to hemodialysis access. The majority of available evidence is not specific to Ghana, and no studies were found that capture administrator perspectives, underlining the need for further research in this area.

Japiong and colleagues' (2023) recent scoping review on patient access to dialysis in Sub-Saharan Africa compiled data from 30 studies, of which two were conducted in Ghana. The majority of the studies were cross-sectional and observational, lacking in methodological rigor and diversity of stakeholder perspectives; that is, most studies collected data from only one group, typically patients, and did not include the views of healthcare providers, hospital administrators. This limited stakeholder inclusion means that important system-level and operational barriers, as well as provider and administrator experiences, are often overlooked. By including three groups of participants, patients, healthcare providers, and administrators in the current study, a more comprehensive and nuanced understanding of the barriers to hemodialysis access can be achieved. This approach addresses the methodological limitations of previous research and strengthens the evidence base for policy and practice improvements.

The review (Japiong et al., 2023) identified multiple health care provider identified barriers, such as low training capacity, low provider-to-patient ratios, and insufficient staffing. However, the two Ghanaian studies did not examine health care providers' perspectives regarding hemodialysis services.

Bosu and Bosu (2021), in their systematic review on hypertension and chronic kidney disease care in Ghana, reported that clinicians faced difficulties in deciding whom to exclude or prioritize for the limited dialysis slots available, especially when demand exceeded supply. This result highlights the resource limitations and ethical concerns confronting the direct providers of care and supports the utility of delving into their views further in the planning of dialysis services.

These studies provide valuable insights into the perspectives of healthcare providers, but the evidence base is weakened by their narrow focus on a single stakeholder, insufficient methodological depth, and regional restriction.

1.10.4.2 Studies on patient access to hemodialysis

Financial constraints are one of the biggest barriers to patients with ESKD initiation and continued hemodialysis care in Ghana. The average cost of a single session ranges from GHS 300 to 400, which is about USD 25 to 35, though some reports list it as high as USD 53.90 (Tannor et al., 2023). Since patients usually need three sessions each week, the total monthly cost is far greater than Ghana's national minimum wage of around USD 55.70. To make matters worse, dialysis services are not covered by the National Health Insurance Scheme (NHIS), forcing patients to pay everything out of pocket (Tannor & Antwi, 2023).

Few studies have directly and thoroughly examined financial barriers from the perspective of Ghanaian patients requiring hemodialysis. Most available evidence is based on provider or facility-level reports rather than patient-centered research (Iddrisu & Boateng, 2025; Manookian et al., 2022; Tannor et al., 2023). However, research from other countries in Sub-Saharan Africa reports that cost is a huge challenge for patients who need life-saving dialysis treatment and highlights the inequities patients experience based on their socioeconomic status. A recent Ethiopian institution-based cross-sectional study by Bate et al. (2024) was done using a simple random sampling of 128 participants to evaluate the direct and indirect costs of hemodialysis with ESKD in four selected governmental and private institutions (St. Paul's Hospital Millennium Medical College, Zewditu Memorial Hospital, Menelik Hospital, Hayat Hospital, and Ethio-Tebib Hospital) in Addis Ababa. They reported that the mean cost of hemodialysis in a representative sample of selected hospitals was 7,739.17 $ ±2,833.51 $. This cost is comparable or slightly lower

than estimates in Ghana, where annual out-of-pocket expenses for recommended hemodialysis can exceed $8,000, an amount far beyond the reach of most patients in either country (Tannor et al., 2023). In Bate et al.'s (2024) study, 61.7% of participants reported reducing the frequency of their hemodialysis sessions due to financial limitations, 46.1% cut back on prescribed medications, and 27.3% discontinued dialysis altogether because they could not afford ongoing treatment.

Similar financial barriers to dialysis have been reported in other sub-Saharan African countries. A study by Pancras et al. (2018) did a phenomenological study to explore non-medical facilitators, barriers, and associated ethical challenges during access to chronic hemodialysis services at Muhimbili National Hospital in Tanzania among 8 healthcare workers and 6 patients with ESKD. They found that the non-medical barriers to accessing chronic hemodialysis services were affordability of treatment costs, geographical accessibility, and availability of chronic hemodialysis resources. Similar to the study by Bate et al. (2024), they found that the high cost of dialysis led to missed appointments, unfilled prescriptions, and worsening health outcomes. Those participants who had health insurance experienced lower financial burden than those without health insurance (Pancras et al., 2018). Several recent qualitative and descriptive studies in sub-Saharan Africa and beyond have explored barriers to accessing dialysis care. For instance, studies conducted in Cameroon, South Africa, and Ethiopia (Ashuntantang et al., 2017; Mbeje & Mtshali, 2021; Tadesse et al., 2021) reported findings consistent with those from West Africa and other regions. In particular, studies from Nigeria, Sweden, and Rwanda (Akpan et al., 2020; Årestedt et al., 2020; Ekuma, 2020; Mukakarangwa et al., 2018) examined multiple dimensions of dialysis access**.** They investigated how socioeconomic status, insurance coverage, and health system factors intersect with geographical barriers to influence access to dialysis services.

For example, Akpan et al. (2020) and Årestedt et al. (2020) particularly analyzed how low income and lack of health insurance, in addition to distance from dialysis centers, affected patients' ability to initiate and maintain hemodialysis. These findings underline the disproportionate impact of high dialysis costs on patients with lower socioeconomic status across different settings. However, more research is needed to examine how the cost of dialysis care particularly impacts access and uptake of hemodialysis among patients in Ghana.

1.10.4.3 Patient and Sociocultural Barriers

Sociocultural barriers to accessing hemodialysis in Ghana have not been extensively studied in Ghanaian research. For example, Iddrisu and Boateng (2025) interviewed 13 participants in-depth in three facilities in Ghana's north and discovered that reliance on traditional medicine and a lack of knowledge of chronic kidney disease were important barriers.

Current international research has deepened our knowledge of how practical, psychological, and societal factors influence dialysis adherence and access. Elias et al. (2025), in a systematic review and thematic synthesis of 59 qualitative studies, examined the lived experiences of maintenance dialysis patients across diverse settings. They found major challenges such as functional limitations, psychological distress, identity disruption, and socio-occupational impairment. The review also outlined key coping strategies (e.g., biographical repair) and mapped both internal factors (e.g., personal beliefs, spirituality, and financial stress) and external influences (e.g., stigma, family and social support, healthcare provider communication, and access to services). These findings emphasize the need for a holistic, person-centered approach to dialysis care that accounts for patients' complex lived realities, particularly in under-resourced contexts like Ghana.

Additional qualitative studies conducted in other low- and middle-income countries further confirm the sociocultural nature of dialysis access challenges. A qualitative study by Griva et al. (2020), conducted in 2 government-funded hospitals (Singapore General Hospital and Khoo Teck Puat Hospital) in Singapore involving 96 patients with chronic kidney disease, family members, and health professionals, identified that avoidance, fear, stigma, social influence, mistrust, and low health literacy lead to delayed initiation of hemodialysis.

Several other studies conducted around the world have found that barriers to early and ongoing dialysis treatment provision include low health literacy, stigma, low socioeconomic status, religious beliefs, and traditional healing preferences (Albreiki et al., 2023; Ekuma, 2018; Elias et al., 2025; Mohamedi & Mosha, 2022; Pancras et al., 2018; Griva et al., 2013, 2020). Though these findings are relevant, there is a need for a Ghanaian-specific study involving patients, providers, and administrators' perspectives on how sociocultural factors impact on uptake and retention of hemodialysis in Ghana, filling an important gap in the current evidence base.

1.10.4.4 Distance to Centres providing hemodialysis

Few Ghanaian studies have examined the distance patients must travel to access hemodialysis care. Boateng et al. (2024) interviewed 12 patients and found patients experienced significant travel burdens and costs. Tannor et al. (2023), as part of a thorough nationwide situational analysis, collected administrative data from all 51 dialysis centers in Ghana. Their results revealed significant regional disparities in the distribution of dialysis centers, including whole regions without dialysis treatment, which forces many patients to travel great distances. Smaller-scale studies from several African nations (Mukakarangwa et al., 2020; Tadesse et al., 2021) have documented similar patterns of travel-related difficulties with fewer than 13

participants. While qualitative studies provide valuable patient-level insights, the national scope of Tannor et al. (2023) offers robust evidence of geographic disparities and emphasizes the need for both patient-centered and large-scale, multi-center research on access to hemodialysis in Ghana.

1.10.5 Facilitators of Hemodialysis Access and Use

In the face of significant barriers, several factors support and enhance access to and ongoing use of hemodialysis care in Ghana and other low-resource settings. Key facilitators include social and family support, positive provider–patient relationships, and peer support.

1.10.5.1 Social and Family Support

The literature consistently affirms the importance of social support: emotional, instrumental, and informational for patients with chronic kidney disease on hemodialysis, yet few Ghanaian studies have examined social and family support for hemodialysis access and adherence in Ghana.

Emotional support**,** typically provided by family members, close friends, and religious networks, is important for buffering the psychological burdens associated with chronic kidney disease and ongoing dialysis treatment. In Ghana, studies have reported a significant burden of mental health challenges among patients with ESKD. For instance, Sarfo-Walters and Boateng (2020) conducted qualitative interviews with ESKD patients and six informal caregivers (N=15) at two renal centers in Kumasi, Ghana, primarily exploring perceptions of palliative care. They found that both family and religious support systems offer crucial emotional and spiritual comfort, which aids patient resilience. Expanding from the Ghanaian context, Martire and Helgeson (2017),

in a narrative review of correlational and intervention studies covering several chronic illnesses, found hearty evidence that emotional support from spouses and family is associated with lower depressive symptoms and better psychological adjustment, including among chronic kidney disease populations. However, a global thematic synthesis by Elias et al. (2025), a systematic review of 59 qualitative studies examining people on maintenance hemodialysis across varied clinical and community settings, identified deficits in emotional support, particularly in environments shaped by stigma or misunderstanding of chronic kidney disease, as a persistent barrier to treatment adherence and well-being.

Instrumental support**,** such as transportation, practical help with daily tasks, and financial assistance, is likewise important; however, its availability is highly context dependent. Boateng et al. (2024) conducted qualitative interviews with 12 participants in northern Ghana to explore the daily lives of persons living with ESKD. They found that limited social support and high treatment costs were major barriers to complementary dialysis; however, the small, context-specific sample limits the generalizability of these findings. These findings highlight the immediate impact of practical barriers on patient care in resource-limited settings. In Saudi Arabia, Alatawi et al. (2024) performed a cross-sectional survey to evaluate the association between perceived social support and adherence to treatment regimens in 121 Saudi patients with hemodialysis, and results showed that perceived social support, in particular from family, was positively correlated with treatment adherence.

Informational support**,** the sharing of advice, education, or health-related knowledge to assist decision-making and encourage self-management, is less emphasized in Ghana-specific research, yet evidence elsewhere highlights its role as a facilitator of optimal care. Griva et al.

(2020) used focus groups and interviews with 96 participants, including patients, family members, and healthcare professionals, across two Singaporean public hospitals, demonstrating that a lack of informational support from providers (exacerbated by low health literacy and poor communication) was linked to delays in dialysis initiation and suboptimal ongoing management. In their systematic study, Elias et al. (2025) also discovered that reliable information from social network members and health professionals was important for patient empowerment and efficient self-care in a variety of contexts. However, the systematic research and formal provision of informational support, particularly from qualified health professionals, are still scarce in Ghana and much of sub-Saharan Africa.

1.10.5.2 Patient-provider relationships.

Effective patient-provider relationships are widely recognized as critical to improving access, uptake, continuity, and quality of care, particularly in the management of chronic conditions such as dialysis (Elias et al., 2025; Kelley et al., 2014; Tong et al., 2013). A systematic review and meta-analysis of Randomized Controlled Trials by Kelley et al. (2014) concluded that a positive patient-clinician relationship has a small, but statistically significant effect on healthcare outcomes, including treatment adherence. These findings underscore the importance of interpersonal dynamics in facilitating patient engagement with therapy.

Only one Ghanaian study was identified on patient-provider relationships in relation to patient access to and adherence to hemodialysis care. Osei Appiah et al. (2022) used a qualitative phenomenological approach to conduct face-to-face in-depth interviews with 16 hemodialysis participants in Accra. They found that patients' perceived good provider communication and

compassion were significantly associated with higher adherence to dialysis and satisfaction with care.

Research in other countries, such as Olaisen et al. (2020) in Norway (mixed methods, 40 dialysis patients), has shown that trust and respect in patient-provider interactions predicted satisfaction and continuation of dialysis treatment, although this finding may have limited applicability to Ghana because of differences in culture and publicly funded health services.

Although much of the global literature is observational and varies in quality, reviews such as Martire and Helgeson (2017), Moudatsou et al. (2020), Kelley et al. (2014), and Tong et al. (2013) consistently emphasize that supportive communication between providers and patients enhances adherence and clinical outcomes in chronic disease care.

Given the limited Ghana-specific evidence and the global significance of these relationships, this dissertation will explore how patient-provider interactions influence access to and adherence to hemodialysis treatment in Ghana, drawing on the perspectives of patients, providers, and hospital administrators.

1.10.5.3 Peer Support

In Ghana, formal peer support systems for hemodialysis patients are largely absent, and available research addresses broader psychosocial or informal social support. For instance, Thomas Nti & Frances Emily (2021) conducted a qualitative study on Psychosocial factors among 30 patients with ESKD receiving hemodialysis treatment at two dialysis units of the Komfo Anokye Teaching Hospital (KATH) and Naghe Dialysis Clinic in Kumasi, Ghana, and found that family and friend support aided patients' emotional and psychosocial adjustment. Using semi-

structured interviews and thematic analysis, Griva et al. (2020) found that among 96 participants in Singapore, support from family, friends, peers (other patients), and health care providers promoted shared decision-making, emotional comfort, and coping. Also, Sciberras and Scerri (2017) conducted an interpretative phenomenological analysis using focus groups with 18 mid-adulthood hemodialysis patients in Malta to explore their perceived barriers and facilitators to the hemodialysis experience. They found that peer mentorship, patients supporting one another, helped promote feelings of calmness, unity, and psychological comfort, highlighting the value patients placed on open discussion with peers and the need for individualized support from healthcare professionals. These studies underline the psychological benefits of peer and social support, but they also highlight the dearth of studies conducted in low-resource countries like Ghana.

1.10.6 Summary and Gaps in the Research

There is a paucity of research done on patient hemodialysis access and uptake in Sub-Saharan Africa, and specifically in Ghana. Recent research on hemodialysis in Ghana and sub-Saharan Africa demonstrates a predominance of qualitative studies, particularly phenomenological and exploratory designs, focusing on psychological states and lived experiences of patients with ESKD (Boateng et al., 2024; Hall et al., 2020; Manookian et al., 2022; Mukakarangwa et al., 2018; Nobahar & Tamadon, 2016; Zhang et al., 2025). These qualitative studies often employ semi-structured interviews and focus groups with small samples to explore patient perspectives, with few studies addressing provider or administrator-level challenges in providing hemodialysis care (Årestedt et al., 2020; Bates et al., 2017; Boateng et al., 2024; Griva et al., 2013; Pancras et al., 2018).

Even among these studies, the majority are single-site investigations with limited sample sizes, which frequently neglect the viewpoints of administrators and healthcare personnel (Boateng

et al., 2024; Elias et al., 2025; Trần et al., 2024; Zhang et al., 2025). Although mixed methods designs and theoretical frameworks such as Andersen's Behavioral Model have been applied, they are rarely used in a fully integrated manner (Bailey et al., 2022; Boateng et al., 2024; Catapan et al., 2025; Pancras et al., 2018; Solanke et al., 2023; Zhang et al., 2025). To the best of my knowledge, only a small number of studies, such as Elias et al. (2025), have systematically integrated patient, provider, and administrator-level data to produce a comprehensive analysis, and even these are limited in scope. Moreover, quantitative studies remain underrepresented in the literature.

Critical gaps also remain in our understanding of regional disparities and the full spectrum of barriers to dialysis access and utilization. For instance, underserved areas such as northern Ghana have received little scholarly attention (Boateng et al., 2024; Iddrisu & Boateng, 2025). Studies have reported that patients often miss dialysis sessions due to financial constraints, travel burdens, and systemic resource shortages, which in turn are linked to higher morbidity and mortality (Boateng et al., 2024; Elias et al., 2025).

These gaps demonstrate the necessity for comprehensive research that includes multiple perspectives. Sequential mixed methods and rigorous theoretical models will help better understand and address the complex, context-specific barriers and facilitators to hemodialysis access and use in Ghana. This dissertation aims to redress some of these issues by incorporating perspectives from patients, providers, and administrators through a mixed-methods approach.

In summary, this literature review highlights some major gaps in the literature between the rising burden of ESKD, the growing number of individuals affected by ESKD in Ghana, and the health system's limited ability to provide equitable, affordable, and quality hemodialysis care. Patients often miss dialysis sessions, which is linked to higher rates of morbidity and mortality.

This places a heavy and often overwhelming load on patients, caregivers, families, and healthcare systems.

While existing studies provide some useful insights, they tend to focus on qualitative, patient-centered studies and seldom include viewpoints from providers or administrators. Additionally, few studies thoroughly explore how contextual factors like infrastructure problems, insufficient staffing, and lack of essential resources influence access to and use of dialysis, especially in underserved areas like northern Ghana. Barriers often stem from monetary difficulties, social influences, structural problems, and workforce shortages.

While limited research has identified some facilitators of and barriers to patient access and uptake of hemodialysis, they remain poorly understood and underexplored in Ghana.

To fill these gaps, this dissertation uses a theory-based, sequential mixed-methods approach guided by Andersen's Behavioral Model of Health Services Use. The research for this dissertation explored the barriers and facilitators to hemodialysis access and utilization from the viewpoints of patients, healthcare providers, and health service administrators. By providing context-specific evidence-based insights, this study aim to help inform the development of targeted interventions and equitable health policy solutions to improve outcomes for individuals with ESKD in Ghana and enhance dialysis access.

1.11 World View (Philosophical Stance)

The philosophical stance adopted is pragmatism. Pragmatism, as a research paradigm, is characterized by its flexibility and practical approach. It is often described as a deconstructive paradigm that promotes the use of mixed methods in research. This approach is particularly valuable because it "sidesteps the contentious issues of truth and reality." (Feilzer, 2010, p. 8) and

instead focuses on what works in practice to answer the research questions at hand. Pragmatism is grounded in the belief that the value of a proposition lies in its practical consequences, and thus, it prioritizes solutions that effectively address the research problem (Tashakkori & Teddlie, 2003). It is a problem-oriented philosophy that takes the view that the best research methods are those that help to answer the research question most effectively. Pragmatism is a research philosophy based on the epistemology that there is no single way to learn, but many ways of understanding, because there are multiple realities (Kaushik & Walsh, 2019). Knowledge of multiple realities is therefore gained through the integration of multiple research methods encompassing both qualitative and quantitative research methods.

Two paradigms that informed my pragmatic stance are post-positivism and constructivism. In the postpositivist paradigm, there is a belief in reality and a desire to understand it like positivism, but post-positivists recognize the impossibility of total objectivity (Creswell, 2013; Polit & Beck, 2019). The post-positivist aspect (quantitative approach) will examine the predictors of access and utilization of hemodialysis among patients with ESKD.

Honebein, n.d. describes the constructivist philosophical paradigm as an approach that asserts that people construct their understanding and knowledge of the world through experiencing things and reflecting on those experiences. Ontologically, constructivists believe there are multiple realities. Epistemologically, the constructivist belief is that knowledge needs to be interpreted to discover the underlying meaning (Lincoln & Guba, n.d.). The voices and interpretations of study participants are crucial to understanding the phenomenon of interest. Findings in a constructivist inquiry are the product of the interaction between the inquirer and the participants (Polit & Beck, 2019, p. 9). It is imperative to use the principles of this philosophical approach because it is a powerful instrument in the creation of concrete and composite meanings of phenomena around us.

The constructivist aspect (the qualitative approach) will explore the barriers to and facilitators of ESKD care, specifically on accessing and using hemodialysis from the perspectives of patients, health care providers, and health service administrators.

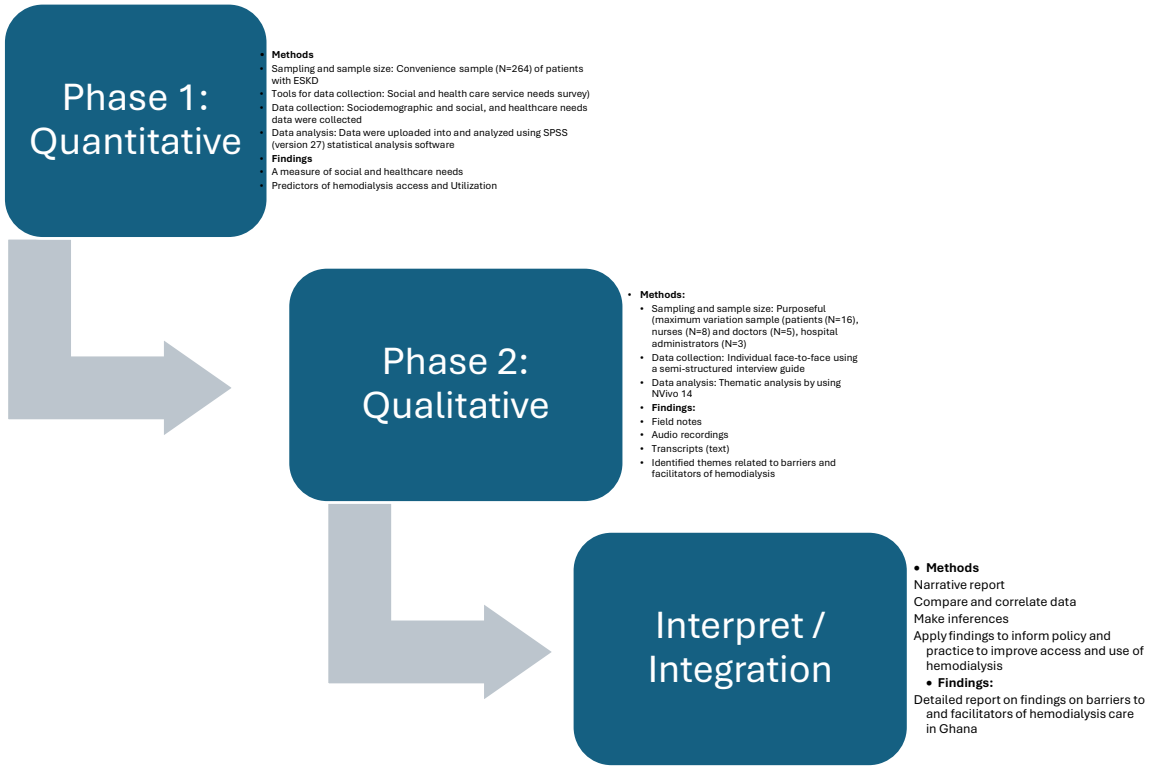
1.12 Research Design

An explanatory sequential two-phase mixed-methods design is used (see Figure 2). Creswell's sequential explanatory mixed method design is implemented, in which the researcher first conducts quantitative research, analyzes the results, and then, based on the results, explains and/or explores them in more detail with qualitative research (Creswell & Plano Clark, 2018). This approach is best suited to offer a rich, comprehensive, and in-depth understanding of ESKD patients' health care needs and the barriers to and facilitators of providing quality care to patients experiencing ESKD and specifically accessing and using hemodialysis.

In this study, Phase 1, the quantitative phase, examined the predictors of access and utilization of hemodialysis by patients with ESKD requiring or receiving hemodialysis, while Phase 2, the qualitative phase, further examined Phase 1 findings by further exploring the barriers to and facilitators of ESKD care from the perspective of patients, healthcare workers and health service administrators. A sequential design is preferred for this study because Phase 1 findings regarding patients' social and health care needs and uptake could be further explored and examined with in-depth semi-structured patient and provider/administrator interviews for Phase 2 to develop a more comprehensive understanding of patient access and utilization of hemodialysis. Thus Phase 1 identified the patients' needs and utilization of ESKD care while Phase 2 explored the barriers to access and use of hemodialysis from the patients, providers and administrators' perspectives (integration through building occurs when results from one data collection procedure inform the data collection approach of the other procedure, the latter building on the former (Fetters et al.,

2013). Combining research methods in this way is not uncommon in health care research (Sale, n.d.). Understanding what patients needed and what they were able to access opened the door for the researcher to examine the reasons for the needs and the barriers and facilitators to ESKD care.

Figure 2: **Overview of Research Study Phases**



1.13 Limitations (Potential Threats, and Mediating Threats)

Several limitations and potential methodological threats should be acknowledged from the outset of this study. First, convenience sampling was employed during the initial quantitative phase, which may introduce sampling bias and limit the generalizability of findings to the broader population of patients with ESKD in Ghana. To mitigate this, efforts were made to include participants from two large teaching hospitals with diverse patient populations and wide catchment areas.

Second, the cross-sectional design of the study limits the ability to establish causal relationships. This study was not designed to track patients across the entire illness trajectory from diagnosis through treatment to end-of-life care or recovery; such longitudinal follow-up lies beyond its scope. Nevertheless, the sequential mixed-methods approach enabled an in-depth exploration of patient and provider experiences, capturing the complexity and context-specific factors that influence hemodialysis access and use.

Third, the study relied heavily on self-reported data, which is subject to recall bias and social desirability bias, especially when discussing sensitive issues such as financial hardship, treatment adherence, or dissatisfaction with care. This was mitigated by ensuring participant anonymity, using neutral, nonjudgmental language in data collection tools, and triangulating data across patient, provider, and administrative perspectives to enhance validity.

Fourth, language barriers posed a potential threat to data quality, particularly for participants who were not fluent in English. Although the quantitative survey phase accommodated varying language preferences by administering questionnaires in English, Twi, Ga, and Dagbani, with support from bilingual research assistants, the qualitative interviews were conducted solely in English. While participants were selected based on the study's inclusion criteria rather than language proficiency, those who were purposively chosen happened to be proficient in English. As a result, the qualitative data may not fully reflect the perspectives of individuals less comfortable expressing themselves in English, potentially limiting the diversity and richness of insights

Finally, while purposive sampling in the qualitative phase enabled the inclusion of participants with rich experiential knowledge, it may have inadvertently excluded certain voices, such as patients too ill to participate or those receiving care in non-teaching facilities. Nevertheless,

the chosen sites provided a valuable lens into systemic and contextual challenges that are likely relevant to other parts of the country.

Despite these limitations, the study's design and execution were guided by rigorous methodological standards and ethical considerations to ensure credible, relevant, and context-sensitive findings. These limitations also highlight important areas for future longitudinal and nationally representative studies.

1.14. Ethical Considerations

This study protocol was approved by the Human Participants Review Sub-Committee of York University's Ethics Review Board under the protocol number [STU 2023-082] and the Scientific, Technical, and Ethics Committee of Korle Bu Teaching Hospital with protocol number [KBTH-STC/IRB/0001135/2023] ensuring compliance with ethical standards for research involving human participants. Authorization was obtained from the Tamale Teaching Hospital to conduct the study. Participation was voluntary, and participants were informed that whether they participated or not in the study would not impact the care they received in the hospitals. A detailed description of the study, risks, benefits, and confidentiality were explained to participants, and their consent was obtained before gathering data. Data will be safely stored for 5 years on a secure, password-protected computer, and only the primary investigator (Milipaak Japiong) will have access to this information. Participants' confidentiality was fully protected within the limits of the law, and participants were not identified by name in any of the reports. The research met all the standards of the Ethical Conduct of Research on Humans. The study adhered to COVID-19 safety protocols to protect participants and the study team during data collection. Appendix B: Ethics approval, Appendix C contained participant information and informed consent form (patients), and Appendix D contained participant information and informed consent (healthcare providers).

1.15 Conclusion

In conclusion, this dissertation aims to shed light on the multifaceted interplay of barriers and facilitators influencing hemodialysis care in Ghana. By exploring both barriers and facilitators from the perspectives of patients and healthcare workers, the study seeks to inform evidence-based policies for improving chronic kidney disease management and ultimately enhancing the well-being of individuals living with ESKD in resource-constrained settings.

CHAPTER TWO: PREDICTORS OF HEMODIALYSIS UTILIZATION AMONG PATIENTS WITH END STAGE KIDNEY DISEASE (ESKD) IN GHANA

2.0 Abstract

Background: End-stage kidney disease (ESKD) is a growing public health concern in Ghana, with hemodialysis serving as the primary treatment option. However, access to and utilization of hemodialysis services remain limited due to socioeconomic and systemic barriers. It is therefore important to identify the key factors influencing hemodialysis access and utilization to improve patient outcomes.

Aim: This study assessed the predictors of hemodialysis access and utilization among patients with ESKD in Ghana.

Methods: A cross-sectional analytical study was conducted with 264 patients receiving care for end-stage kidney disease (ESKD). Data were collected using a structured questionnaire. Bivariate and multivariate binary logistic regression analyses were performed to identify predictors of hemodialysis access and utilization. The analysis was conducted using SPSS Statistics version 27.

Results: Among the 264 participants, 74.2% had access to hemodialysis services. However, only 38.8% attended all prescribed dialysis sessions in the last four weeks. Bivariate analysis revealed that education level ($p < 0.001$), employment status ($p < 0.001$), monthly family income ($p < 0.001$), area of residence ($p < 0.001$), and duration of the condition ($p < 0.001$) were significantly associated with hemodialysis access and utilization. Multivariate analysis identified that participants with higher incomes (AOR = 4.08, 95% CI: 1.14–14.56, $p = 0.030$), those residing in urban areas (AOR = 3.84, 95% CI: 1.50–9.83), those diagnosed with ESKD for more than one year (AOR = 3.45, 95% CI: 1.47–8.07), and those living within 40 km of a dialysis facility (AOR = 3.28, 95% CI: 1.01–10.69) were more likely to access and utilize hemodialysis services.

Conclusion: Socioeconomic factors, disease duration, and health system factors such as healthcare accessibility significantly influence hemodialysis access and utilization in Ghana. To enhance access and utilization, it is essential to improve financial support, expand dialysis centers, and address urban-rural disparities.

Keywords: Hemodialysis, access, utilization, predictors, ESKD, Ghana

2.1 Introduction

Chronic kidney disease is a serious worldwide health concern that often progresses to end-stage kidney disease (ESKD), where kidney function is permanently lost, leading to morbidity and mortality rates (Walker & Gadegbeku, 2023). Despite the increasing burden of ESKD, access to renal replacement therapy, including hemodialysis, peritoneal dialysis, and kidney transplantation, remains inadequate in low-resource settings (Kaze et al., 2018; O'Halloran et al., 2018). Hemodialysis is the primary life-sustaining treatment for ESKD, but access to and use of it are influenced by some factors, such as inadequate patient awareness, healthcare infrastructure, and financial limitations (Mondal et al., 2023; Robinson et al., 2016).

However, little is known about the predictors of hemodialysis access and utilization in low-resource settings such as Ghana, where patients face unique structural and financial constraints. In Ghana, these challenges are further exacerbated by a shortage of dialysis centers, exorbitant treatment expenses, and inconsistent availability of essential consumables, limiting access to treatment (Tannor, 2023). Hemodialysis is extremely expensive in Ghana; a single session costs about US$53.9, which is almost the same as the monthly minimum wage of US$55.7 (Tannor et al., 2023). As a result, many patients are forced to have fewer sessions than the three times per week that are typically prescribed to patients globally, negatively impacting treatment outcomes (Japiong et al., 2023; Osei Appiah et al., 2022). Also, geographic disparities in Ghana aggravate access challenges, as nine out of the country's 16 regions lack dialysis centers, disproportionately affecting rural populations (Tannor et al., 2023).

The prevalence of chronic kidney disease in Ghana is estimated at 13.3% (Adjei et al., 2019). However, a significant proportion of patients with chronic kidney disease progress to ESKD without timely diagnosis or treatment. This delay is largely attributed to a lack of routine screening,

limited public awareness, and insufficient nephrology services across many regions of the country (Tannor et al., 2019). As a result, over 75% of patients with ESKD present at advanced stages of the disease, often requiring urgent renal replacement therapy upon diagnosis (Tannor et al., 2018). Unlike in high-income countries, where kidney failure predominantly affects older populations, ESKD in Ghana tends to occur at a younger median age of 45.5 years (Ghana Renal Registry, 2022). Furthermore, in-hospital mortality for ESKD patients reaches up to 50%, largely due to the inability to afford renal replacement therapy, as dialysis costs are not covered by the National Health Insurance Scheme (Tannor & Antwi, 2023). Poor adherence to prescribed dialysis regimens exacerbates these challenges, contributing to increased mortality, frequent hospitalizations, and diminished quality of life (Erickson et al., 2024; Murali & Lonergan, 2020).

To inform context-specific policy and programmatic responses, this study aimed to identify predictors of hemodialysis access and utilization among patients with ESKD in Ghana. While a few studies in Ghana have explored the quality of life (Tannor et al., 2019) and psychological well-being (Amoako & Owusu-Ansah, 2021) of patients with ESKD, limited research has examined the determinants of access to and utilization of hemodialysis services. These gaps constrain the development of targeted strategies to address inequities in dialysis care. By focusing on these predictors, the findings from this study are expected to guide policy reforms and the design of targeted, evidence-based interventions to improve dialysis access, reduce mortality, and promote health equity among patients with ESKD in Ghana.

2.3 Literature Review

2.3.1 Socioeconomic Factors

Socioeconomic factors play a critical role in determining hemodialysis access and adherence among patients with ESKD. According to many studies, education level influences

health literacy. Patients with ESKD who have attained higher levels of education are more likely to recognize early symptoms of kidney disease, present their condition at an early stage, and adhere to treatment. Conversely, those with limited education often experience delayed diagnoses and poor treatment compliance (Alhamad et al., 2023; Azizi et al., 2024; Mohamedi & Mosha, 2022; Toapanta et al., 2023).

Employment status and income level directly affect patients' financial capacity to afford hemodialysis. In countries like Ghana, where hemodialysis and kidney care are not fully funded, many patients bear substantial out-of-pocket expenses. These financial burdens are associated with treatment discontinuation, and patients receiving fewer hemodialysis sessions than medically required (Dodd et al., 2018; Tannor et al., 2023; Tannor & Antwi, 2023).

Unemployed patients with ESKD and those working in the informal sector are disproportionately affected, often skipping hemodialysis sessions due to cost constraints (Bazrafshan et al., 2023; Kustimah et al., 2019). Health insurance status also mediates access to care, with insured patients more likely to initiate hemodialysis earlier compared to their uninsured counterparts (Jurkovitz et al., 2013). As a result, a significant number of patients with ESKD end up receiving palliative care instead of hemodialysis because they cannot afford or access hemodialysis services (Jurkovitz et al., 2013).

2.3.2 Geographic Factors

Geographic disparities significantly impact hemodialysis access among patients with ESKD. Evidence shows that urban residents benefit from closer proximity to hemodialysis centers, while rural patients often face long travel distances, resulting in treatment delays and higher dropout rates (Crouch et al., 2024; Kim et al., 2024). Transportation costs further worsen these disparities, as many patients cannot afford frequent travel to urban facilities (Ogieuhi et al., 2025).

In addition, regional inequalities in healthcare infrastructure mean that some areas lack nephrology specialists or functioning hemodialysis machines, compelling patients to seek care in faraway hospitals (Scholes-Robertson et al., 2022; Tannor & Antwi, 2023). Addressing these geographic barriers requires decentralizing hemodialysis services, improving transportation support systems, and expanding rural healthcare infrastructure to ensure equitable access (Japiong et al., 2023; Tannor et al., 2023).

2.3.3 Systemic Factors

In many countries, limited hemodialysis infrastructure with few centers available creates severe bottlenecks, resulting in long waiting lists and hemodialysis machine shortages for patients with ESKD (Boateng et al., 2024; Trachtenberg & Goldberg, 2021). Frequent equipment breakdowns and inconsistent supplies of hemodialysis consumables further disrupt treatment schedules (Japiong et al., 2023; Tannor & Antwi, 2023).

Financial barriers remain a significant challenge due to inadequate health insurance coverage provided by national governments for patients with ESKD. As a result, many individuals face catastrophic healthcare expenses, which often lead to delayed treatment initiation or complete discontinuation of hemodialysis (Ogieuhi et al., 2025). Moreover, a shortage of healthcare providers, particularly nephrologists and hemodialysis nurses, further constrains the delivery of hemodialysis services, with rural areas being the most affected. This shortage not only limits access but also places an overwhelming burden on the existing healthcare workforce, potentially compromising the quality of care delivered to patients with ESKD (Iddrisu & Boateng, 2025).

2.4 Theoretical Framework

This study is based on a widely used framework for examining healthcare access and use: the Andersen Behavioral Model of Health Services Use. According to Andersen (1995), the model

identifies three areas as the determinants of healthcare use: predisposing factors (e.g., age, gender, education), enabling factors (e.g., income, social support, transportation, availability) and need factors (e.g., perceived health status, severity of disease) (Alkhawaldeh et al., 2023; Lederle et al., 2021). The model provides a comprehensive framework for understanding how individual characteristics, social structures, and health needs interact to influence healthcare-seeking. Specifically, it posits that predisposing and enabling factors mediate the relationship between background characteristics and health behaviors, including dialysis access and utilization (see Figure 1).

Although the Andersen model has been extensively used in research on chronic illness and healthcare usage worldwide, it is still not generally used in sub-Saharan African nephrology studies (Felix, n.d.; Solanke et al., 2023). Many existing studies focus on geographic barriers, financial hardship, and systemic health service limitations as impediments to dialysis access (Kaze et al., 2018; Mondal et al., 2023; O'Halloran et al., 2018). These studies, however, frequently lack integrated multivariable methodologies or do not evaluate systemic, geographic, and individual determinants of treatment at the same time. In contrast, high-income country studies using the Andersen model have demonstrated its utility in analyzing complex interactions between health system structures and patient behavior in chronic disease management (Alkhawaldeh et al., 2023).

By applying the Andersen model in the Ghanaian context, this study seeks to fill these critical gaps by examining a range of factors that influence dialysis access and utilization. These include socioeconomic and demographic factors (e.g., age, gender, and employment), as well as systemic and structural facilitators (e.g., location of residence). This theoretically informed study allows for a more nuanced understanding of the factors that influence hemodialysis access and

usage and serves as a foundation for the creation of evidence-based local interventions aimed at enhancing dialysis access and health equity in settings with limited resources.

2.5 Materials and Methods

2.5.1 Study design

This study utilized an analytical cross-sectional design to assess predictors of hemodialysis access and utilization among patients with ESKD in Ghana.

The study received research ethics approval from the Human Participants Review Sub-Committee of York University's Ethics Review Board under the protocol number [STU 2023-082] in Toronto, Canada, and from the relevant ethics boards at the study sites in Ghana. The study was conducted between September 2023 and December 2023 at two teaching hospitals in Ghana, one in the South and the other in the North.

2.5.2 Study Setting

This study was conducted at two major teaching hospitals in Ghana: Korle-Bu Teaching Hospital (KBTH) in Accra and Tamale Teaching Hospital (TTH) in Tamale. Both hospitals serve as national referral centers and provide hemodialysis services to patients with ESKD.

At the time of data collection (September 2023 to December 2023), the dialysis unit at KBTH served approximately 470 patients, providing treatment for 46 patients daily, while TTH served about 310 patients, dialyzing up to 30 individuals daily. KBTH had four nephrologists, 55 dialysis nurses, and 19 dialysis machines, while TTH was staffed with one nephrologist, 26 dialysis nurses, and 11 dialysis machines

2.5.3 Study population

The study comprised patients diagnosed with ESKD who either required initiation of hemodialysis or were already receiving hemodialysis treatment at the two hospitals.

2.5.4 Inclusion and exclusion criteria

The study included patients who: (1) were diagnosed with ESKD and either required initiation of hemodialysis or were already receiving hemodialysis treatment, (2) being at least 18 years old, and (3) possessing the ability to communicate in English and/or Akan, Dagbani, or Ga. The exclusion criteria were patients receiving peritoneal dialysis treatment or having experienced a kidney transplant because their experiences with renal replacement therapy differ significantly from those undergoing hemodialysis.

2.5.5 Sample size and sampling procedure

The total sample size for the study was 264 patients, determined using Taro Yamane's formula (1967), which estimates the minimum number of participants required for a given population and margin of error. The target population consisted of 780 patients with ESKD, and using a margin of error (e) of 0.05, the sample size (n) was calculated as: $n = \frac{N}{1+N(e)^2}$, where n is the sample size, N is the target population (780), and e is the sampling error (0.05), n = 780/ $(1+780(0.05)^2$, n = 780/ (1+780(0.0025), n = 780/ (1+1.95), n = 780/2.95, n = 264. To ensure proportional representation from the two study sites, a proportionate stratified random sampling technique was used. The sample size for each hospital was determined using the formula: $n_h = \left(\frac{N_h}{N}\right)$ x n, where n_h is the sample size for each hospital (stratum), N_h is the hospital's population, N is the total population, and n is the overall sample size. Based on this calculation, 159 patients were selected from KBTH and 105 from TTH, reflecting their respective proportions of the total ESKD population.

2.5.6 Recruitment

Convenience sampling was employed to recruit participants who were readily available and willing to participate in the study.

The charge nurses on the renal units at the two hospital sites assisted with initial recruitment. The researcher explained the study to the charge nurses and provided them with a written summary of the study protocol, including participant inclusion and exclusion criteria, and the researchers' (MJ and MMI) contact information. Charge nurses pre-screened patients based on these criteria and identified potentially eligible participants, who were then informed about the study and asked for their permission to have the researchers speak with them about the study. The researchers visited the hospital and met with potential participants identified by the charge nurses. The researchers provided detailed information to the patients about the study's objectives, data collection procedures, the reasons for conducting the research, what participation would entail, and independently confirmed each patient's eligibility. Informed consent was obtained from participants who agreed to participate. (See Appendix C: Informed consent, Appendix E: Recruitment poster, and Appendix F: Recruitment script)

2.5.7 Data collection tool

Data collection was done using a pretested structured questionnaire. The instrument used was the End-Stage Renal Disease Adherence Questionnaire (ESRD-AQ), developed by Kim et al. (2011), which was modified to fit the current study. The questionnaire consisted of two sections and comprehensively captured both sociodemographic and clinical information related to ESKD and hemodialysis utilization.

Section A focused on collecting detailed sociodemographic information about the participants. These questions aimed to capture key demographic and socioeconomic variables that could influence utilization of hemodialysis services. Participants were asked to report their age, categorized into groups such as 18–30 years, 31–40 years, and so on, as well as their sex (male or female), employment status (e.g., private employee, public employee, self-employed,

unemployed, or retired), and level of education (ranging from no formal education to post-secondary education). Additional questions addressed variables such as marital status, income level, and area of residence (urban or rural).

Section B assessed participants' clinical characteristics and treatment modalities, such as the duration and etiologies of their ESKD, as well as their access to and utilization of hemodialysis services (e.g., length of time undergoing hemodialysis, duration of hemodialysis sessions, prescribed number of hemodialysis sessions per week, attendance at prescribed sessions). The survey items were adapted from the ESRD-AQ (Kim et al., 2011), a validated self-report instrument designed to assess adherence among patients with ESKD (Kim et al., 2011).

Participants were asked whether they were receiving hemodialysis for their kidney disease, and those who answered "yes" were prompted to provide additional details. These included the length of time they had been undergoing hemodialysis (e.g., less than a month, 1–3 months, 3–6 months, 6 months–1 year, or more than 1 year), the duration of each hemodialysis session (e.g., 3 hours, 4 hours), the recommended number of sessions per week prescribed by their doctor (e.g., 2 days or less, 3 days), and their adherence to prescribed sessions in the last four weeks (yes or no). Participants were also asked whether they had missed any sessions in the past week (yes or no). Additionally, participants were asked whether they had missed any sessions in the past week (yes or no). Those who indicated "no" to receiving hemodialysis skipped these questions and proceeded directly to the next section of the survey.

2.5.8 Validity and reliability

Content and face validity of the complete survey instrument was evaluated by a panel of five experts. The panel assessed each item for clarity, relevance, and appropriateness within the Ghanaian context, as well as the overall organization and formatting of the instrument. A pilot

study was then conducted with a convenience sample of ten participants recruited from Ho Teaching Hospital. Findings from the pilot indicated that the survey instructions were clear, the items were easily understood, and the format was suitable for the target population, with no major concerns identified. Test-retest reliability of the survey was evaluated using a total of 10 participants with ESKD who were part of the pilot study. These participants completed the survey twice, with a two-week interval between administrations, and reliability was assessed using Pearson's correlation, which quantified the consistency of responses over time. The tool demonstrated high test-retest reliability, with a correlation coefficient of 0.87, indicating consistent responses across both administrations. See Appendix G for the structured survey.

Study Variables

Outcome variable

In this study, the outcome variable was hemodialysis utilization. Hemodialysis utilization was defined as the actual uptake of hemodialysis treatment among patients with ESKD. Utilization was measured in terms of whether patients were currently receiving hemodialysis or not. Patients who responded "yes" were classified as hemodialysis users, whereas those who responded "no" were classified as non-users.

Predictor/ Independent variables

The predictor variables (independent variables) included *sociodemographic factors* (age, gender, marital status, educational level, religion, employment status, monthly family income, area of residence, and number of children), *clinical factors* (duration since ESKD diagnosis, and whether participants received adequate information about their condition), and *healthcare system factors* (hospital where hemodialysis care was received, primary mode of transportation, distance

travelled to the hospital, involvement in treatment decisions, and perceived respect and dignity in care).

2.5.9 Data collection procedure

Consenting participants completed an online forced-choice survey with the assistance of the researchers using the researcher's phone. The survey was administered in English via the Qualtrics platform (Qualtrics survey, 2023). Participants who were proficient in English answered the survey themselves; however, for those who had difficulty reading or navigating the digital survey, researchers read the questions aloud and entered responses directly into the online form. For those with limited English proficiency, trained researchers orally translated the survey into Akan, Dagbani, or Ga and entered participants' verbal responses into the online form. The survey took between 30 and 45 minutes to complete. All participants received $10 (GHC70) to thank them for their participation in the study.

2.5.10 Data analysis

Data were extracted from Qualtrics and imported into JMP Pro 17.1 (SAS Institute Inc., Cary, North Carolina, USA) for initial data screening and cleaning. All subsequent statistical analyses were conducted using SPSS Statistics version 27 (IBM Corp., Armonk, NY, USA). Descriptive statistics were used to summarize the sample characteristics, including frequencies, percentages, means, and standard deviations.

Bivariate and multivariate binary logistic regression analyses were performed to determine the predictors of hemodialysis utilization. Bivariate binary logistic regression analysis was first conducted to examine the unadjusted associations between each independent variable and hemodialysis access and utilization. Subsequently, multivariate binary logistic regression analysis was performed to identify significant predictors while adjusting for potential confounders.

Predictor variables were entered into the multivariate model in conceptual blocks: socioeconomic, geographic, and systemic factors to evaluate their individual and combined effects on hemodialysis utilization.

Prior to conducting the regression analyses, preliminary diagnostics were performed to assess multicollinearity among the predictor variables. Variance Inflation Factor (VIF) and Condition Number diagnostics were employed, particularly due to the potential correlation between variables. Condition numbers between 10 and 30 are indicative of the presence of multicollinearity (Kim, 2019). In this study, multicollinearity was not considered problematic, with a mean VIF of 2.36, a minimum VIF of 1.18, and a maximum VIF of 6.19. Model performance was assessed using the Receiver Operating Characteristic (ROC) curve, and all relevant statistical assumptions were verified prior to analysis. Statistical significance was determined at a p-value threshold of < 0.05.

2.6 Results

2.6.1 Sociodemographic Information

The mean age of the participants was 46.72 years (SD14.83). The majority of participants (25.4%) were aged between 41-50 years, with more males (57.6%) than females. The most common ethnic group was Akan (29.5%). More than half (54.2%) were married, and the highest level of education attained by most participants was tertiary (35.6%). Christianity was the predominant religion (57.6%). The largest proportion of participants were unemployed (29.9%), and the most common monthly family income category was Ghc1000 or less (32.6%). Most participants resided in urban areas (66.7%), and 37.9% had three or more children (Table 1).

Table 1: Sociodemographic information of the participants (N=264)

Variable	Category	Frequency	Percentage
Age in years	18-30	42	15.9
	31-40	44	16.7
	41-50	67	25.4
	51-60	53	20.1
	> 60	58	22.0
Gender	Female	112	42.4
	Male	152	57.6
Ethnicity	Akan	78	29.5
	Dagomba	40	15.2
	Ewe	25	9.5
	Frafra	7	2.7
	Ga	31	11.7
	Ga Adangbe	13	4.9
	Gonja	12	4.5
	Hausa	10	3.8
	Kassena	5	1.9
	Konkomba	8	3.0
	Krobo	4	1.5
	Mamprusi	10	3.8
	Others*	21	8.0
Marital status	Single/ never married	61	23.1
	Married	143	54.2
	Informal/ living together	10	3.8
	Divorced	24	9.1
	Widowed	17	6.4
	Separated	9	3.4
Education level	No formal education	47	17.8
	Primary school	49	18.6
	Secondary school	74	28.0
	Tertiary (College/University)	94	35.6
Religion	Christianity	152	57.6
	Islam	92	34.8
	Non-denominational	12	4.5
	Not religious/No religion	4	1.5
	Traditional	4	1.5
Employment status	Private employee	28	10.6
	Public employee	45	17.0
	Retired	42	15.9
	Self-employed	70	26.5
	Unemployed	79	29.9
Monthly family income (Ghc)	No income	54	20.5
	≤ 1000	86	32.6
	1001 - 3000	78	29.5
	3001 - 5000	29	11.0

Variable	Category	Frequency	Percentage
	5001 - 7000	10	3.8
	> 7000	7	2.7
Area of residence	Rural	88	33.3
	Urban	176	66.7
Number of children	0	57	21.6
	1	36	13.6
	2	71	26.9
	≥ 3	100	37.9

*Others include Bimoba, Bisa, Builsa, Dagati, Moshie, Kusasi, Sisala, Talensi, Moo, Waala
[1]At the time of data collection, 1 USD ≈ 14.69 GHS. Therefore: ≤1000 GHS ≈ ≤68 USD; 1001–3000 GHS ≈ 68–204 USD; 3001–5000 GHS ≈ 204 –340 USD; 5001–7000 GHS ≈ 340–476 USD; >7000 GHS ≈ >476 USD.

2.6.2 Characteristics of participants with ESKD

The majority of participants had been living with the disease for 3 months to 1 year (35.6%), with hypertension (61.3%) being the primary cause. Most participants received hemodialysis at Korle Bu Teaching Hospital (60.2%). Among those undergoing hemodialysis, the majority had been on treatment for 3 months to 1 year (36.7%), with 3 days per week (61.2%) being the most common session schedule. Over half of the participants (53.6%) spent 3 hours per dialysis session.

The majority of participants reported being fully involved in decisions regarding their treatment (71.2%) and received necessary information about ESKD (74.6%). The most common mode of transportation to the hospital was public buses (51.9%), and the highest proportion of patients traveled 41 to 60 km (26.9%) to access care (Table 2).

Table 2: Characteristics of participants with ESKD (N=264).

Variable	Category	Frequency	Percentage
Duration of condition (ESKD)	< 3 months	69	26.1
	3 months - 1 year	94	35.6
	1 - 2 years	44	16.7
	2 - 3 years	32	12.1
	3 - 5 years	16	6.1

Variable	Category	Frequency	Percentage
	> 5 years	9	3.4
Cause of end-stage kidney disease	Hypertension	162	61.3
	Diabetes	56	21.2
	Glomerulonephritis	13	4.9
	Genetic	5	1.9
	Herbal medicines	13	4.9
	Systematic lupus erythematosus	1	0.4
	Unknown	65	24.6
Hospital where hemodialysis and kidney disease care are received	Korle Bu Teaching Hospital	159	60.2
	Tamale Teaching Hospital	105	39.8
Duration of receiving hemodialysis treatment (N=196)	1-2 months	42	21.4
	3 months - 1 year	72	36.7
	1 - 2 years	37	18.9
	2 - 3 years	23	11.7
	3 years - 5 years	13	6.6
	> 5 years	9	4.6
Hemodialysis session schedule (N=196)	≤ 2 days	73	37.3
	3 days	120	61.2
	4 days	3	1.5
Number of hours spent for each dialysis session (N=196)	3 hours	105	53.6
	4 hours	73	37.2
	5 hours	14	7.1
	> 5 hours	4	2.0
Have enough say about treatment in the hospital	Yes	188	71.2
	No	76	28.8
Feel treated with respect and dignity while in the hospital	Yes	199	75.4
	No	65	24.6
Receive necessary information about end-stage kidney disease	Yes	197	74.6
	No	67	25.4
Primary mode of transportation to and from the hospital	Family member or friend's car	15	5.7
	My own car/motorbike	44	16.7
	Public buses (Trotro)	137	51.9
	Taxis	68	25.8

Variable	Category	Frequency	Percentage
Distance travelled to the hospital	0 to 20 kms	41	15.5
	21 to 40 kms	41	15.5
	41 to 60 kms	71	26.9
	61 to 80 kms	46	17.4
	> 80 kms	65	24.6

2.6.3 Hemodialysis utilization

Of the 264 participants, the majority had access to and utilized hemodialysis services (74.2%). Among the 196 participants receiving hemodialysis, fewer than half (38.8%) were able to attend all their prescribed dialysis sessions in the past four weeks, and more than half (54.6%) missed at least one session in the last week (Figure 1).

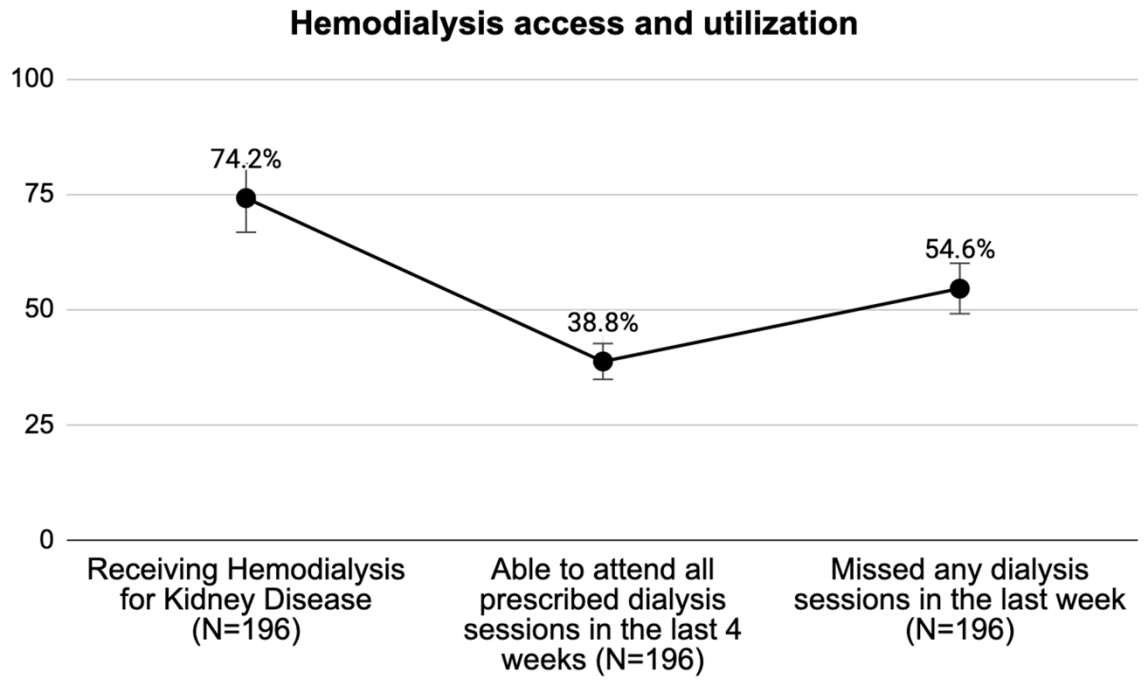


Figure 3: Hemodialysis utilization among participants

2.6.4 Barriers to hemodialysis utilization

The most reported barriers to utilizing hemodialysis services among participants were financial constraints (83.3%) and longer distance from the dialysis facility (21.2%). The least reported barrier was lack of awareness of the necessity for care (0.4%) (See Figure 4).

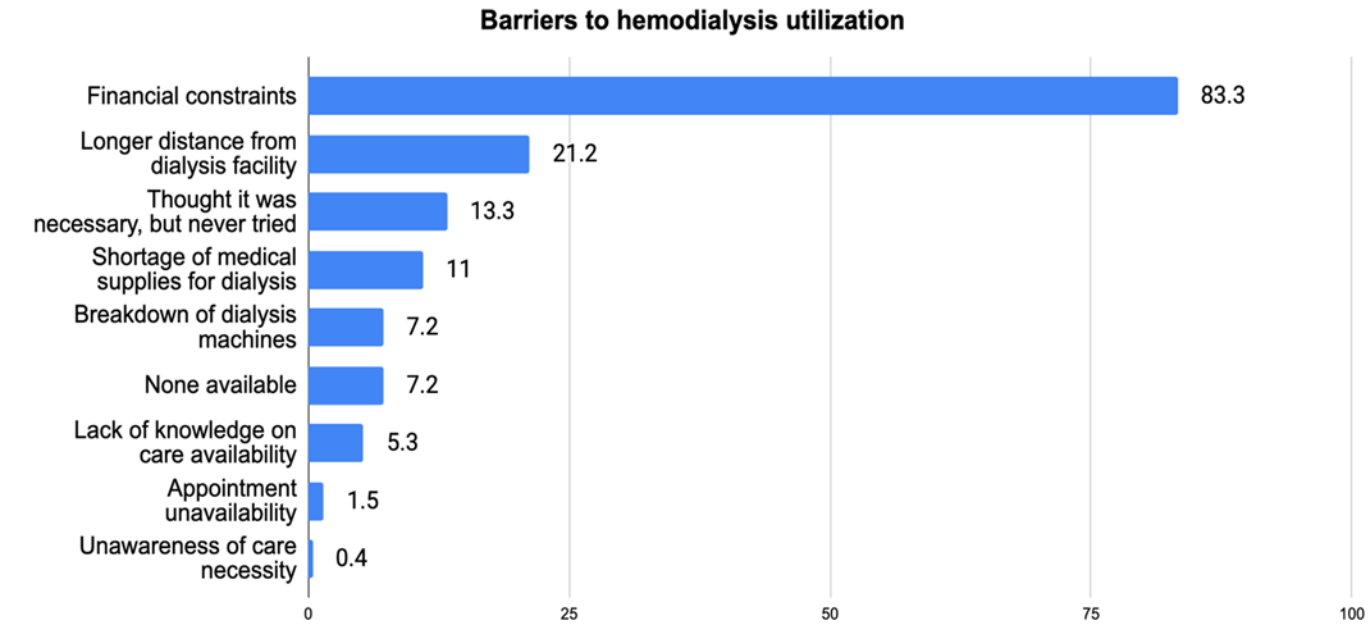


Figure 4: Barriers to hemodialysis utilization among the participants (N=264)

2.6.5 Factors associated with hemodialysis access and utilization

The bivariate binary logistic regression analysis revealed a significant association between hemodialysis access and utilization and education level ($p < 0.001$), employment status ($p < 0.001$), monthly family income ($p < 0.001$), area of residence ($p < 0.001$), and duration of the condition ($p < 0.001$). Having a tertiary education (COR = 3.21, 95% CI: 1.39–7.57, $p = 0.006$), being a public sector worker (COR = 4.47, 95% CI: 1.57–16.09, $p = 0.009$), having a high income (COR = 3.97, 95% CI: 1.86–8.62, $p < 0.001$), residing in an urban area (COR = 2.41, 95% CI: 1.36–4.28, $p < 0.001$), and having a diagnosis duration of more than one year (COR = 4.40, 95% CI: 2.25–9.31, $p < 0.001$) were independently associated with hemodialysis access and utilization (Table 3).

2.6.6 Predictors of hemodialysis access and utilization

The multivariate binary logistic regression model analysis revealed that monthly family income, area of residence, duration of the condition, and distance travelled to the hospital were significant predictors of hemodialysis access and utilization. The odds of utilizing hemodialysis were higher among participants who had high monthly family income (AOR = 4.08, 95% CI: 1.14–14.56, p = 0.030), resided in urban areas (AOR = 3.84, 95% CI: 1.50–9.83, p = 0.005), had end-stage kidney disease for more than one year (AOR = 3.45, 95% CI: 1.47–8.07, p = 0.004), and lived within 0 to 40 kilometers of a hospital (AOR = 3.28, 95% CI: 1.01–10.69, p = 0.048). These findings suggest that patients with higher income, urban residency, longer disease duration, and proximity to healthcare facilities are more likely to access and utilize hemodialysis services (Table 3). The multivariate model demonstrated good discriminative ability, with an area under the curve (AUC) value of 0.79753, which exceeds the acceptable range (0.70), indicating a good fit for predicting hemodialysis access and utilization (Figure 5).

Table 3: Bivariate and multivariate analysis of the relationship between hemodialysis access and utilization, and social, economic, and healthcare-related factors (N=264)

Variable	Category	COR [95% CI]	P value	AOR [95% CI]	P value
Age in years					
	18-30				
	31-40	1.13 [0.45 – 2.73]	0.785	1.09 [0.30 – 3.84]	0.895
	41-50	1.60 [0.57 – 4.60]	0.372	0.51 [0.11 – 2.37]	0.388
	51-60	0.90 [0.35 – 2.22]	0.818	0.47 [0.10 – 2.19]	0.336
	> 60	0.79 [0.31 – 1.89]	0.598	0.65 [0.12 – 3.59]	0.618
Gender					
	Female				
	Male	0.79 [0.44 – 1.38]	0.418	1.10 [0.50 – 2.21]	0.893
Marital status					
	Married				
	Single	0.75 [0.43 – 1.32]	0.332	0.81 [0.24 – 2.73]	0.736
Education level					
	No formal education				
	Primary school	1.16 [0.50 – 2.77]	0.719	0.99 [0.34 – 2.95]	0.994
	Secondary school	1.08 [0.49 – 2.32]	0.854	1.20 [0.44 – 3.26]	0.722

Variable	Category	COR [95% CI]	P value	AOR [95% CI]	P value
	Tertiary (College/University)	3.21 [1.39 – 7.57]	0.006*	1.44 [0.47 – 4.43]	0.522
Religion					
	Christianity				
	Islam	1.67 [0.91 – 3.18]	0.105	2.35 [0.58 – 9.47]	0.229
	Traditional	0.95 [0.35 – 2.82]	0.922	1.27 [0.33 – 4.93]	0.725
Employment status					
	Unemployed				
	Private employee		0.104	1.31 [0.22 – 7.71]	0.759
	Public employee	4.47 [1.57 – 16.09]	0.009*	0.54 [0.08 – 3.69]	0.534
	Retired	0.87 [0.39 – 1.97]	0.739	0.50 [0.12 – 2.07]	0.339
	Self-employed	0.95 [0.47 – 1.92]	0.889	0.52 [0.13 – 0.70]	0.356
Monthly family income (Ghc)					
	No income				
	Low (≤ 1000)	0.99 [0.48 – 2.01]	0.983	1.28 [0.43 – 3.84]	0.651
	High (≥ Ghc1001)	3.97 [1.86 – 8.62]	<0.001*	4.08 [1.14 – 14.56]	0.030*
Area of residence					
	Rural				
	Urban	2.41 [1.36 – 4.28]	<0.001*	3.84 [1.50 – 9.83]	0.005*
Number of children					
	0				
	1	1.01 [0.40 – 2.63]	0.975	0.87 [0.22 – 3.30]	0.837
	2	1.23 [0.55 – 2.75]	0.673	1.62 [0.39 – 6.65]	0.502
	≥ 3	1.17 [0.55 – 2.42]	0.596	1.21 [0.31 – 4.74]	0.783
Duration of condition (end-stage kidney disease)					
	0 to 1 year				
	> 1 year	4.40 [2.25 – 9.31]	<0.001*	3.45 [1.47 – 8.07]	0.004*
Receive necessary information about end-stage kidney disease					
	No				
	Yes	1.32 [0.70 – 2.42]	0.375	1.20 [0.45 – 3.19]	0.710
Hospital where hemodialysis and kidney disease care are received					
	Korle Bu Teaching Hospital				
	Tamale Teaching Hospital	1.67 [0.94 – 3.06]	0.083	1.73 [0.32 – 9.33]	0.523
Primary mode of transportation to and from the hospital					
	Family member or friend's car				
	My own car/motorbike	1.53 [0.19 – 8.87]	0.640	1.59 [0.20 – 12.55]	0.656
	Public buses (Trotro)	0.38 [0.06 – 1.48]	0.224	0.70 [0.11 – 4.24]	0.694
	Taxis	0.30 [0.04 – 1.21]	0.134	0.99 [0.14 – 6.79]	0.997
Distance travelled to the hospital					
	Greater than 80 kms				
	41 to 80 kms	0.68 [0.32 – 1.33]	0.270	1.06 [0.42 – 2.63]	0.901

Variable	Category	COR [95% CI]	P value	AOR [95% CI]	P value
	0 to 40 kms	1.14 [0.51 – 2.52]	0.732	3.28 [1.01 – 10.69]	0.048*
Have enough say about treatment in the hospital					
	No				
	Yes	1.25 [0.68 – 2.26]	0.451	0.99 [0.35 – 2.75]	0.988
Feel treated with respect and dignity while in the hospital					
	No				
	Yes	1.40 [0.74 – 2.57]	0.288	1.05 [0.34 – 3.19]	0.935

*Statistical significance at $p < 0.05$, Crude Odds Ratio (COR), Adjusted Odds Ratio (AOR), Confidence Intervals (CI)

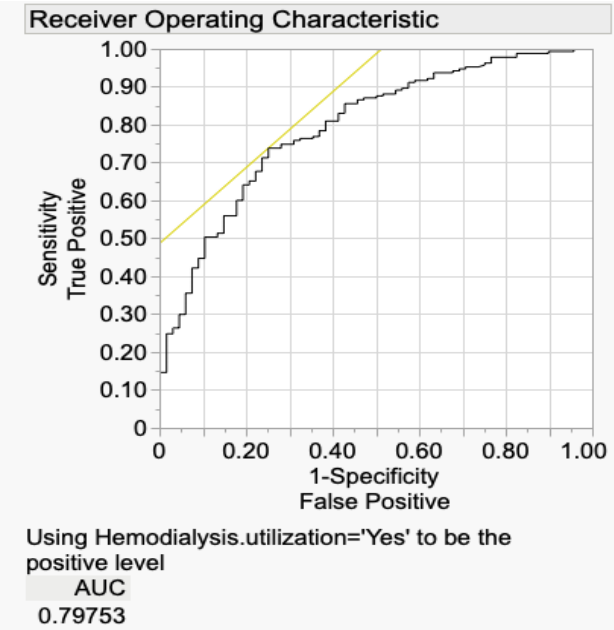


Figure 5: Receiver Operating Characteristic (ROC) curve showing the model's discriminative ability for predicting hemodialysis access and utilization (Area Under Curve [AUC] = 0.79753)

2.7 Discussion

This is the first study in Ghana to examine the predictors of hemodialysis utilization among patients with ESKD. Not surprising, the number one barrier reported by 83.3% of participants to utilizing prescribed hemodialysis was financial constraints. However, our results may not accurately reflect the larger population of patients with ESKD in Ghana, particularly those who

are not receiving nephrology care or who are unable to access healthcare facilities, as we acknowledge that our study population was limited to people who were already receiving care in kidney units. This result is similar to findings from a systematic review of low income countries (Dodd et al., 2018, and Kaze et al., 2018), and other studies conducted in other low- and middle-income countries such as Nigeria (Ekuma, 2018), Burundi (Nyandwi et al., 2019), and Palestine (Naalweh et al., 2017), where participants also utilized hemodialysis services despite facing significant financial and systemic barriers, including out-of-pocket payment for treatment.

It is important to note that, in Ghana, hemodialysis is not covered under the national health insurance scheme and is not funded by tax dollars, requiring patients to pay out of pocket (Blanchet et al., 2012; Boima et al., 2020; Tannor et al., 2023). Sub-Saharan African countries use various approaches to provide hemodialysis services for patients with kidney failure. These include government subsidies for hemodialysis (Senegal, Ethiopia, Cameroon), universal coverage for acute kidney failure only (South Africa, Ethiopia), and state coverage for chronic hemodialysis under limited conditions (South Africa). Other countries, such as Ghana, Nigeria, Burundi, and the Democratic Republic of the Congo, do not offer state coverage for hemodialysis (Luyckx et al., 2018, 2021). Similarly, in Mexico, Agudelo-Botero et al. (2020) and Azizi et al. (2024) in Iran found that hemodialysis treatment is not funded. This creates a substantial financial burden, severely limiting access to regular and timely care for many patients with ESKD.

Importantly, our predictive model also identified employment status and monthly income as significant independent predictors of hemodialysis utilization. Employed participants and those with higher family income had significantly greater odds of utilizing hemodialysis (AOR = 4.08, 95% CI: 1.14–14.56), supporting the observed trend that income strongly influences access and adherence to treatment. This result is in line with studies in Iran (Bazrafshan et al., 2023) and

Indonesia (Kustimah et al., 2019), which highlighted the influence of economic stability on treatment adherence. This interconnection highlights that financial hardship is not a stand-alone issue, but one closely tied to broader structural determinants such as employment and earning capacity. In settings like Ghana, where healthcare expenses are paid out-of-pocket, employment and income serve as enabling factors in navigating the high cost of hemodialysis.

In contrast, studies from high-income countries like the United States, Canada and countries in Western Europe, where hemodialysis is largely financed through tax-based health systems or private comprehensive health insurance, higher rates of dialysis uptake and adherence are reported likely due to minimal direct financial burden on patients (Dodd et al., 2018; Himmelfarb et al., 2020; Murali & Lonergan, 2020). For example, the prevalence of patients receiving dialysis is up to 601 per million population (pmp) in high-income countries compared to only about 15 pmp in low-income countries (Himmelfarb et al., 2020; Kalyesubula et al., 2024; Murali & Lonergan, 2020). This stark contrast underscores the inequities in global dialysis access.

The ability of patients in Ghana to access and utilize hemodialysis services, despite financial constraints, highlights their determination to seek life-sustaining treatment. However, the high number of participants in our study that were unable to receive the prescribed hemodialysis care is an ongoing concern and draws attention to the critical need for systemic financial support likely best delivered through government funded hemodialysis service and/or private health insurance, as in many high income countries.

Of particular concern is also our finding that less than half of the participants attended all prescribed dialysis sessions. This poor hemodialysis treatment utilization is likely due to the high cost of care. This finding aligns with systematic reviews reporting that in many low middle-income countries, where hemodialysis funding is predominantly out-of-pocket and insurance coverage is

minimal or absent, patient adherence to dialysis regimens is generally low due to substantial financial and systemic barriers (Dodd et al., 2018; Stanifer et al., 2014; Murali et al., 2017). These reviews highlight the pervasive access gaps, showing that a majority of patients in low- and middle-income countries cannot afford prescribed dialysis frequency, resulting in frequent session skipping or treatment interruptions.

Primary studies from countries such as Nigeria, Cameroon, Pakistan, and others reflect similar challenges of low adherence linked to financial hardship, Akpan et al. (2020); Halle et al. (2020); and Barket et al. (2024). In contrast, studies in Saudi Arabia by Alatawi et al. (2024), Alhamad et al. (2023), and Alzahrani and Al-Khattabi (2021), along with research in Rwanda by Mukakarangwa et al. (2018), in Tanzania, by Mohamedi & Mosha (2022) reported higher hemodialysis adherence rates among patients with ESKD. This discrepancy raises questions about the healthcare infrastructure in Ghana, indicating a need for local interventions such as financial support programs and subsidized dialysis services tailored to the financial and social realities of patients with ESKD in Ghana. Further research is needed to more fully understand the range of barriers affecting the uptake of hemodialysis care in this setting.

In addition, education level emerged as a significant independent predictor of hemodialysis utilization. Participants with higher levels of education, particularly those with tertiary education, were more likely to access and utilize hemodialysis treatment. This finding is consistent with studies in Saudi Arabia (Alzahrani & Al-Khattabi, 2021) and Iran (Azizi et al., 2024; Sheikh et al., 2022), where higher education levels were associated with better utilization of hemodialysis services. Educated people may have a greater understanding of the importance of adherence to treatment regimens and may be more proactive in seeking healthcare services. Higher education is linked to higher-paid employment (Leonforte et al., 2025).

However, this finding contrasts with studies in Tanzania (Mohamedi & Mosha, 2022) and Rwanda (Mukakarangwa et al., 2018), where education level was not significantly associated with hemodialysis utilization. This suggests that in those contexts, access to dialysis services may be shaped more by factors such as access to subsidized treatment, effective patient education from healthcare providers, than formal education. Therefore, while education appears to be an important predictor in our Ghanaian setting, its influence may be context-dependent and shaped by financial assistance and the ability to navigate the healthcare system.

Therefore, health literacy programs may help bridge the gap in hemodialysis utilization among less educated individuals. These programs could use simple, culturally appropriate materials to explain the benefits of hemodialysis and the risks of non-adherence.

The area of residence was another key factor influencing hemodialysis utilization. Participants living in urban areas were more likely to access and utilize hemodialysis services compared to those in rural areas (AOR = 3.84, 95% CI: 1.50–9.83, p = 0.005). Participants who lived within 0 to 40 kilometers of a hospital had higher odds of utilizing hemodialysis (AOR = 3.28, 95% CI: 1.01–10.69, p = 0.048). This disparity is largely due to the limited availability of dialysis centers in rural regions, which forces patients to travel long distances for treatment. The financial logistical challenges associated with traveling to urban centers can act as significant barriers to consistent treatment. This finding is supported by studies in Ghana (Boateng et al., 2024), Cameroon (Odette Dorcas et al., 2018), South Africa (Mbeje & Mtshali, 2021), Canada (Trachtenberg & Goldberg, 2021), and the United States by (Crouch et al., 2024), which emphasized the challenges faced by rural patients in accessing hemodialysis services. In some instances, patients in rural areas are forced to make radical decisions, such as selling their homes and relocating permanently to urban areas, as reported in a study in Australia (Scholes-Robertson

et al., 2022). These challenges contribute to higher mortality rates among rural patients compared to their urban counterparts (Meremo et al., 2017). The government and healthcare facilities should therefore invest in building more dialysis centers in rural areas. Mobile dialysis units could be deployed to reach remote communities, reducing the need for patients to travel long distances. Telemedicine could also be utilized to provide remote consultations and follow-ups, ensuring that rural patients receive continuous care without the need for frequent travel.

Lastly, the duration of the disease also played a significant role in hemodialysis utilization. Participants who had been diagnosed with ESKD and had treatment for a year were more likely to afford and continue treatment (AOR = 3.45, 95% CI: 1.47–8.07, p = 0.004). This may be because long-term patients have had more time to adjust to their treatment regimen and understand its importance, or due to increased familiarity with the treatment and improved financial planning over time. This may also be attributed to these patients having better resources to afford the treatment. Continuous adherence to hemodialysis has been shown to reduce mortality rates and improve the quality of life among patients with ESKD. This outcome is in line with studies in Rwanda (Mukakarangwa et al., 2018), Australia (Murali et al., 2017), and Greece (Raikou & Gavriil, 2024), which underlined the positive impact of treatment adherence on patient outcomes. Conversely, among hemodialysis patients, poor adherence is predictive of higher mortality and complications. Healthcare facilities should put in place routine follow-up and monitoring procedures to help patients with ESKD comply with their treatment plans over the long term. Patients who have been on hemodialysis for more than a year could serve as peer mentors to newly diagnosed patients, sharing their experiences and encouraging adherence. Also, healthcare facilities could offer incentives, such as reduced treatment costs or transportation support, for patients who consistently attend their dialysis sessions.

2.8 Implications and Future Research

To increase utilization of hemodialysis within the country, the government and other health stakeholders can seek partnerships with international bodies and Non-Governmental Organizations for dialysis funding support. In addition, emerging public-private partnerships can also help to reduce the financial burden on patients. At the same time, the range of coverage under the National Health Insurance Scheme can also be expanded to make hemodialysis affordable and accessible.

The government can also initiate health campaigns to create awareness among the people regarding the early identification and management of kidney diseases to minimize the need for dialysis in the long run. In a related aspect, the clinical domain can invest resources in arrangements tailored to socioeconomic factors such as the level of income and location to improve adherence.

Future research should include longitudinal studies to assess trends in access, adherence, and outcomes over time, providing deeper insights into the long-term effectiveness of policy and clinical interventions.

2.9 Strengths and Limitations

This study has several strengths. Notably, the study was conducted across two geographically and socioeconomically distinct regions of Ghana, included participants from varied backgrounds and settings, and provided broader insight into the experiences of patients with ESKD. The inclusion of both patients currently undergoing hemodialysis and those not receiving dialysis allowed for a more comprehensive understanding of predictors of access and use of hemodialysis.

However, this study also has some limitations that should be acknowledged. The cross-sectional design and the use of convenience sampling prevent the establishment of causality between the factors studied and hemodialysis access and utilization. In addition, participants were recruited in hospitals. There may be many more persons with ESKD who do not seek medical care. Also, the study relied on self-reported data, which may be subject to recall bias or social desirability bias. Participants may have either overestimated or underestimated their adherence to prescribed hemodialysis sessions. The study was also conducted in only two major hospitals in Ghana, which may limit the generalizability of the findings to patients receiving hemodialysis in other healthcare facilities across Ghana. Lastly, unmeasured confounding factors, such as comorbidities, cultural beliefs, and social support systems, may have impacted hemodialysis access and utilization but were not captured in this study.

2.10 Conclusion

The outcome of the study showed that although the majority of participants utilized hemodialysis, many face challenges in attending all prescribed sessions. Also, the study identified that significant predictors of hemodialysis utilization are education level, employment status, monthly family income, area of residence, distance traveled to the hospital, and duration of the condition. The results of the study highlight the need for targeted interventions, such as financial support programs, improved healthcare infrastructure, and enhanced patient education, to improve hemodialysis accessibility and utilization. The Ghanaian government, policymakers, and healthcare facilities should work together towards reducing disparities in hemodialysis utilization by addressing socioeconomic barriers and expanding dialysis services to underserved regions.

CHAPTER THREE: EXPLORING BARRIERS AND FACILITATORS TO HEMODIALYSIS ACCESS AND UTILIZATION: PERSPECTIVES OF PATIENTS WITH END-STAGE KIDNEY DISEASE IN GHANA

3.1 Abstract

Background: Chronic kidney disease (CKD) affects over 13% of Ghanaians, with many progressing to end-stage kidney disease (ESKD), which requires renal replacement therapy such as hemodialysis. Despite the necessity of hemodialysis, access to it in Ghana remains limited due to the unequal distribution of dialysis centers, high out-of-pocket costs, and a lack of national insurance coverage. This qualitative study explores patient perspectives on barriers and facilitators to accessing hemodialysis, aiming to inform strategies for more equitable access.

Methods: We conducted an exploratory descriptive qualitative study at two teaching hospitals in Ghana between March 2024 and June 2024. Using maximum variation purposive sampling, we recruited sixteen adults with ESKD who were either receiving or in need of hemodialysis. Data were collected through semi-structured, in-depth interviews and analyzed thematically using Braun and Clarke's framework with NVivo 14.

Result: Qualitative analysis revealed five themes regarding hemodialysis access: (1) Individual Barriers and Facilitators (emotional resilience, physical burden, symptom relief, socioeconomic challenges), (2) Social Barriers and Facilitators (family support, provider relationships), (3) Systemic Barriers (equipment shortages, transportation), (4) Cultural and Knowledge Barriers (beliefs, stigma), and (5) Absence of Public Funding for Hemodialysis Services (costs, insurance).

Conclusion: This study provides new insights into the multilevel barriers and facilitators influencing hemodialysis access for patients with ESKD in Ghana. By identifying systemic barriers such as financial inaccessibility, limited facility capacity, and workforce shortages, as well as social and cultural influences, the findings underscore the need for focused policy reforms, infrastructure development, and stakeholder engagement to improve access and equity in dialysis care

Keywords: Health Service use, End stage, kidney, disease, hemodialysis, qualitative study

3.2 Introduction

Chronic conditions are the leading cause of mortality and disability worldwide, with disease rates rising across all regions and socioeconomic classes (Hajat & Stein, 2018). In the absence of a cure, chronic conditions are medically managed through treatment regimens to slow or stop disease progression and prevent related complications. Chronic kidney disease (CKD) is a significant public health concern affecting 10% to 13% of people worldwide (Adu & Ojo, 2020; Duff et al., 2024). The estimated prevalence of chronic kidney disease in Ghana is 13.3% (Adjei et al., 2019; Boima et al., 2019; Tannor et al., 2023) with hypertension regarded as its number one cause, while diabetes, inflammation of the kidney, use of herbal drugs, and hereditary factors contribute to the rising incidence of chronic kidney disease (Adu & Ojo, 2020; Ashuntantang et al., 2017). Chronic kidney disease progression to end-stage kidney disease (ESKD), an irreversible condition where patients require renal replacement therapy like hemodialysis or a kidney transplant, is particularly concerning in low-income regions such as Sub-Saharan Africa where over 70% of global ESKD cases are expected to emerge by 2030 and where access to renal replacement therapy is limited (Okorie et al., 2018).

The main type of renal replacement therapy for patients with ESKD in Ghana is hemodialysis, which is essential for their lives. Ghana has 51 hemodialysis centers, but only 40 are operational (Tannor et al., 2023). Hemodialysis remains difficult to access in some regions of Ghana due to the country's unequal distribution of hemodialysis centers, leaving some areas better served than others. The lack of sufficient funding for hemodialysis services and high out-of-pocket expenses, exacerbated by the absence of national health insurance coverage, further limit access for patients in underserved regions (Blanchet et al., 2012; Boima et al., 2020; Tannor et al., 2023). Our previous research has identified that many patients in Ghana face financial barriers to

hemodialysis, with 83.3% unable to afford treatment (Japiong et al., unpublished). Consequently, only 38.8% of participants reported consistently following the prescribed regimen for hemodialysis (Japiong et al., unpublished).

Despite the importance of hemodialysis, little research has been done in Ghana to examine the facilitators and barriers patients experience in accessing and using hemodialysis. Prior studies conducted in the United States, Singapore, Rwanda, and Tanzania have identified barriers and facilitators to hemodialysis access, including insufficient healthcare support, logistical challenges, and financial hardship (Chenitz et al., 2014; Griva et al., 2013; Mukakarangwa et al., 2018; Pancras et al., 2018), but did not examine the specific situated barriers to the access and use of hemodialysis in Ghana.

This qualitative study examines the perspectives of patients with ESKD in Ghana on barriers to, and facilitators of, accessing and utilizing hemodialysis. Such understanding is essential to designing strategies to enhance hemodialysis equity, as well as improve health outcomes for individuals with ESKD. Specifically, the following research questions were addressed:

3.3 Research questions

1. What are the perceived barriers to accessing and utilizing hemodialysis among patients with ESKD in Ghana?
2. What facilitators enable patients with ESKD to access and utilize hemodialysis in Ghana?
3. What recommendations do patients with ESKD have for improving access to and utilization of hemodialysis services in Ghana?

3.4 Methods

3.4.1 Study design

This qualitative study employed an exploratory descriptive design (Sandelowski, 2000). The goal was to provide rich, detailed descriptions of patients' perspectives on the systemic, institutional, and interpersonal factors affecting hemodialysis access and utilization insights that could not be adequately captured by quantitative methods alone, building on findings of our quantitative study (Japiong et al., unpublished).

The study received research ethics approval from the Human Participants Review Sub-Committee of York University's Ethics Review Board under the protocol number [STU 2023-082] in Toronto, Canada, and from the relevant ethics boards at the study sites in Ghana. The study was conducted between March 2023 and June 2024.

3.4.1 Study Settings

This study was conducted at two major teaching hospitals in Ghana: Korle-Bu Teaching Hospital (KBTH) in Accra and Tamale Teaching Hospital (TTH) in Tamale. Both hospitals serve as national referral centers and provide hemodialysis services to patients with ESKD.

At the time of data collection (March 2024 to June 2024), the dialysis unit at KBTH served approximately 470 patients, providing treatment for 46 patients daily, while TTH served about 310 patients, dialyzing up to 30 individuals daily. KBTH had four nephrologists, 55 dialysis nurses, and 19 dialysis machines, while TTH was staffed with one nephrologist, 26 dialysis nurses, and 11 dialysis machines**.**

3.4.2 Population and Criteria

Eligible participants: (1) had ESKD and were either needing, accessing, or utilizing hemodialysis treatment, (2) were at least 18 years old, and (3) were able to communicate in English and/or in Akan, Dagbani, and Ga. The exclusion criteria were patients receiving peritoneal dialysis

treatment or having experienced a kidney transplant because their experiences with renal replacement therapy differ significantly from those undergoing hemodialysis.

3.4.3 Sampling

The study employed maximum variation sampling to capture diverse participant experiences (Benoot et al., 2016; Moser & Korstjens, 2018; Cresswell & Cresswell, 2017). Our previous study (Japiong et al., unpublished) identified predictors of access and utilization of hemodialysis varying with income level, degree of family support, and distance from hemodialysis centers. Based on these findings, we purposely refined our sampling criteria for the current study to ensure the inclusion of individuals representing a wide range of socioeconomic backgrounds, family support situations, and geographic proximity to hemodialysis centers. We purposefully recruited 16 participants (N = 16), including those not receiving hemodialysis (n = 4) and those receiving hemodialysis for various durations: 1–3 months (n = 3), 4–6 months (n = 3), and over 6 months (n = 6). This diverse sampling approach enabled us to obtain a broader perspective on the medical and social circumstances shaping patients' experiences and a more comprehensive understanding of the barriers and facilitators to hemodialysis.

3.4.4 Recruitment

Charge nurses in the renal units at the two hospitals assisted with identifying and recruiting participants. Charge nurses received a written summary of the study protocol, including eligibility criteria and researchers' contact information. Charge nurses informed eligible participants about the study's purpose and sought their consent to share their contact information with one of the researchers (MJ).

One of us (MJ) contacted and then arranged hospital meetings with potential participants to confirm eligibility, explain the study, and obtain written informed consent. Recruitment and

data collection continued until data saturation was reached, meaning no new concepts, themes, or categories emerged (O'Reilly & Parker, n.d.; Saunders et al.., 2018).

3.4.5 Interview Guide

A semi-structured interview guide was used to guide the one-to-one in-depth interviews exploring the experiences and perspectives of patients with ESKD regarding barriers to, and facilitators of, accessing and using hemodialysis care in Ghana. Findings from our previous study (Japiong et al., Unpublished), which highlighted barriers such as financial hardship and long travel distances to dialysis centers, were used to shape the core questions of the interview guide. In addition, our review of the literature on hemodialysis access and use (Bagasha et al., 2020; Bates et al., 2017; Mukakarangwa et al., 2018; Pancras et al., 2018) informed the development of the interview guide.

The interview guide questions explored barriers and facilitators to hemodialysis access and utilization, such as financial challenges, transportation and logistical barriers, and, from the literature, social and cultural influences, stigma, and coping strategies as potential facilitators. The interview guide underwent expert review by qualitative research specialists and clinicians with knowledge of hemodialysis services in Ghana. A pilot study was conducted with a small subset of participants to refine question wording, flow, and timing, and adjustments were made accordingly. The final versions of the interview guides are provided in Appendices H and I for participants receiving hemodialysis and for participants not receiving hemodialysis, respectively. Participants also completed a sociodemographic questionnaire asking about their age, sex, ethnicity, employment, education, income, marital status, and comorbidities.

3.4.5 Data collection

In-depth face-to-face interviews were between 30 and 60 minutes in length and conducted in a private office within the hospital at a time convenient to the participant. All interviews were conducted by the researcher (MJ), a registered nurse and lecturer with experience in qualitative research, which allowed for informed engagement with participants and reflexive awareness of the research context**.** Field notes were written after each interview to document the setting, contextual factors, and participant mannerisms that were not captured in the audio recordings. All interviews were conducted in English, audio recorded, and transcribed verbatim for analysis.

3.4.6 Rigor

To ensure rigor and trustworthiness, we followed Lincoln and Guba's (1985) criteria and Consolidated Criteria for Reporting Qualitative Research (COREQ) guidelines (Tong et al., 2007). Credibility was achieved through prolonged engagement in the hospital setting and member checking, which was done by providing a verbal summary at the end of each interview. The interviewer summarized the main points discussed and asked participants to confirm, correct, or add to these summaries. Data were collected from two renal centers to achieve data source triangulation (Morgan, 2024), enhancing credibility.

Dependability and confirmability were ensured through an audit trail, external peer review, and inter-coder reliability. An experienced qualitative researcher (ARD) reviewed a subset of the coded data to assess consistency and accuracy, while two researchers (MJ and MMI) independently coded and analyzed the data, resolving discrepancies through discussion to ensure consistency and minimize bias. Purposive sampling further strengthened dependability and confirmability, while the analysis of nonverbal cues provided deeper insights.

Reflexivity was maintained through journaling to minimize bias. Transferability was supported through thick descriptions and direct quotes, which provided rich contextual details,

allowing readers to assess the applicability of findings to similar settings. This study's methods and findings are grounded in comprehensive, transparent reporting in line with the Consolidated Criteria for Reporting Qualitative Research (COREQ).

3.4.7 Data analysis

We employed thematic analysis, following the six-step framework by Braun and Clarke (2019) and Campbell et al., (2021), in line with Sandelowski's (2000) recommendations for qualitative descriptive research. NVivo 14 software (Guetterman et al., 2015) was used for data management and organization. Transcripts were carefully proofread and compared against audio recordings to ensure accuracy.

Data analysis began concurrently with data collection. Field notes taken during interviews, capturing non-verbal cues, contextual details, and initial impressions, were incorporated into the coding process to enrich understanding and support descriptions of the participants' responses**.** Familiarization with the data involved verbatim transcription, repeated reading, and iterative refinement of the interview guide. Initial codes were systematically generated with consideration of the study's research questions, which had previously identified key categories of factors influencing hemodialysis access and utilization; these categories guided the identification and labeling of relevant data segments while remaining open to new codes emerging inductively. These codes were then examined for patterns, with similar codes grouped to form preliminary themes. Themes were iteratively reviewed and refined through discussions among researchers, ensuring coherence and alignment with the dataset. Each theme was clearly defined and named, maintaining consistency and analytical depth.

Although the thematic analysis was primarily inductive, Andersen's Behavioral Model of Health Services Use provided a framework, guiding the development of themes related to patient

perspectives on access and utilization of hemodialysis services. The final stage involved synthesizing the findings to address the research questions and the broader theoretical context.

3.5 Findings

3.5.1 Characteristics of participants

Twenty-eight patients were approached, but 12 declined the offer to participate, resulting in a sample size of 16. Participants had a mean age of 40 years (SD 8.5). Nine of the 16 participants were females, and seven were males. Hypertension was the primary cause of ESKD. The study included patients not receiving hemodialysis and those undergoing hemodialysis for durations ranging from one month to fifteen years. Participants included several ethnic groups, with 5 (31.3%) being Akan, 4 (25.0%) Dagomba, 2 (12.5%) Ewe, and the remaining groups (Ga, Gonja, Kusasi, Frafra, and Mamprusi) each having 1 participant (6.3%). Their highest level of education ranged from elementary school to doctorates, and some had worked as teachers, midwives, nurses, or accountants. Many participants reported being unemployed due to health problems during the interviews. The majority (n=11) identified as Christians, with five identifying as Muslims. Five of the participants were married, two were divorced, and eight were unmarried. Eight participants were recruited from each hospital.

3.5.2 Themes and Subthemes

Five overarching themes emerged regarding barriers and facilitators to hemodialysis access and utilization from the perspectives of participants Table 4.

Table 4: Themes and Subthemes from Participants' Perspectives

S/N	Theme	Subtheme
1.	Individual Barriers and Facilitators in Accessing and Using Hemodialysis	1. Coping Strategies and Emotional Resilience Among Patients Undergoing Hemodialysis 2. Symptom Burden as a Barrier to Accessing and Continuing Hemodialysis Treatment 3. Symptom Relief as a Facilitator for Continued Hemodialysis Use 4. The Socioeconomic Impact of Hemodialysis on Employment and Education
2.	Social Barriers and Facilitators in Hemodialysis Access and Use	1. Family Support and Burden in Hemodialysis Access and Utilization 2. Social Stigma and Isolation in Hemodialysis Access and Utilization 3. Patient-Provider Relationship and Communication as Both a Barrier and a Facilitator
3.	Systemic Barriers to Accessing and Utilizing Hemodialysis in Ghana	1. Healthcare System and Infrastructure Barriers to Hemodialysis 2. Geographical and Transportation Barriers to Hemodialysis Access and Utilization
4.	Cultural and Knowledge Barriers in Hemodialysis Access and Utilization	1. Cultural and Spiritual Beliefs Impacting Hemodialysis Access and Utilization 2. Knowledge Gaps and Misconceptions about ESKD as Barriers
5.	Absence of Public Funding for Hemodialysis Services	1. Financial Burden and Affordability of Hemodialysis 2. Insurance Coverage Gaps and Policy Reform Needs

3.5.2.1 Individual Barriers and Facilitators in Accessing and Using Hemodialysis

Four subthemes of barriers and facilitators of hemodialysis access and utilization were identified through data analysis. They include Coping Strategies and Emotional Resilience Among Patients Undergoing Hemodialysis**,** Symptom Burden as a Barrier to Treatment Access and Use**,** Symptom Relief as a Facilitator for Continued Hemodialysis Use**,** and The Socioeconomic Impact of Hemodialysis. These subthemes illustrate the intricate interplay between the challenges patients face and the supports that enable continued treatment.

3.5.2.1.1 Coping Strategies and Emotional Resilience Among Patients Undergoing Hemodialysis

Participants' initial emotional reactions to an ESKD diagnosis created barriers to engaging in treatment. Many participants reported feelings of shock, confusion, and disbelief, leading them to question the necessity of treatment. One participant shared, *"I was undecided and very confused. I was even thinking maybe I don't need to go through hemodialysis"* (P1). Many recounted significant emotional and psychological hurdles, such as fear, denial, or distress, that initially delayed their decision to seek treatment. These initial responses delayed seeking hemodialysis among participants, even when they had been told that treatment was necessary. Over time, participants described a journey of overcoming their initial emotional responses to hemodialysis, which enabled their continued engagement with treatment. For some, acceptance of their condition emerged as a pivotal facilitator in overcoming these barriers. One participant shared, *"There are things that you have little control over or no control at all. I just have to accept it to be able to move on in life* [and accept hemodialysis]*"* (P14), [reflecting how acceptance helped them take the first step toward accessing hemodialysis].

In addition to acceptance, faith and hope emerged as important dimensions of emotional resilience that supported participants in engaging with hemodialysis despite challenges. One participant expressed, *"What will I do? I've just given everything to God"* (P10). Other participants described how the belief that hemodialysis could prolong life influenced their decision to continue with treatment: *"I have hope that I will survive this illness as long as I keep getting hemodialysis"* (P2). These facilitators' hope, faith, and emotional resilience helped participants navigate barriers and engage with hemodialysis as a life-sustaining therapy.

3.5.2.1.2 Symptom Burden as a Barrier to Accessing and Continuing Hemodialysis Treatment

Participants described the physical toll of ESKD and hemodialysis, which created barriers to adhering to treatment. Severe fatigue limited participants' ability to travel independently or perform daily tasks necessary for treatment access. One participant explained, *"I am not able to go to the hospital alone, not able to work, or even do household chores"* (P4), describing how the physical impact of illness limited their independence and ability to work, which in turn affected their finances and ability to pay for dialysis. For some participants, swelling in the legs, feet, and abdomen further impacted mobility to hemodialysis centers: *"My stomach was so swollen like I was nine months pregnant* [physical symptom barrier to dialysis]" (P2).

3.5.2.1.3 Symptom Relief as a Facilitator for Continued Hemodialysis Use

Despite the physical burden of ESKD, several participants described how symptom relief experienced after hemodialysis encouraged them to return for treatment. For some, this relief made the discomfort and challenges of attending hemodialysis worthwhile. One participant explained, *"Before hemodialysis, I feel heavy, but after, I feel relieved"* (P4), illustrating how symptom alleviation motivated continued use of hemodialysis. Another participant shared that hemodialysis helped restore their ability to function: *"After they dialyzed me twice, I started to be myself again"* (P5). These temporary improvements reinforced participants' motivation to continue accessing hemodialysis despite persistent challenges.

3.5.2.1.4 The Socioeconomic Impact of Hemodialysis on Employment and Education

Participants reported that the demanding nature of hemodialysis disrupted their ability to work, pursue education, and maintain supportive social ties, circumstances that directly affected their ability to access and continue treatment. Employment loss, in particular, reduced their

capacity to afford hemodialysis sessions or transportation to treatment centers. One participant shared, *"I got a job opportunity, but because of the situation, I wasn't employed"* (P2), while another said, *"They [*potential employers] *told me to go and come when I am well"* (P5), [reflecting how their illness and treatment schedule led to missed job opportunities and made sustained employment impossible].

For participants, these disruptions stalled educational and career plans, reducing their long-term ability to support themselves or afford hemodialysis. One participant noted, *"I was expecting to finish my National Service and get a job"* (P6).

3.5.2.2 Social Barriers and Facilitators in Hemodialysis Access and Use

Analysis of the data revealed three subthemes related to social influences on hemodialysis access and adherence: Family Support and Burden in Hemodialysis Access and Adherence, Social Stigma and Isolation as Barriers to Hemodialysis Access, and Patient-Provider Relationship and Communication. These subthemes highlight how family and community support can facilitate adherence, while stigma, social withdrawal, emotional burden, and the quality of patient-provider communication can act as barriers or facilitators to ongoing treatment

3.5.2.2.1 Family Support and Burden in Hemodialysis Access and Utilization

Participants described how family and community support played a crucial role in their ability to access and utilize hemodialysis treatment. As one participant explained, *"Sometimes, they* [family] *will contribute the money and give it to me for the dialysis session"* (P11). Practical support, including transportation to and from hemodialysis centers, also facilitated regular attendance. Emotional encouragement from family, friends, and religious groups helped participants remain committed to ongoing hemodialysis: *"Their presence gives me the strength to keep fighting despite the challenges I face"* (P16).

At the same time, dependence on family created emotional and relational strain, which in some cases disrupted continued access to treatment. Some participants described family fatigue, conflict, or loss of support due to the recurring demands of hemodialysis. One participant shared, *"They are fed up with me. They come with me to hemodialysis, but they complain all the time"* (P10). Others described more distressing experiences, such as being told by relatives to stop treatment altogether: *"At first, somebody told my mom to let them inject me to die"* (P4). These tensions affected participants' ability and motivation to adhere consistently to hemodialysis, revealing the complex and sometimes fragile role of family in sustaining treatment access.

3.5.2.2.2 Social Stigma and Isolation as Barriers to Hemodialysis Access and Utilization

Social stigma and isolation were significant barriers to initiating and utilizing hemodialysis treatment. Misconceptions about kidney disease within participants' communities contributed to their marginalization. One participant shared, *"In my neighborhood, some people think kidney disease is a spiritual illness, while others worry it might spread to them"* (P7). These beliefs about kidney disease contributed to social ostracism, which in turn discouraged some participants from disclosing their illness or seeking timely hemodialysis.

Such stigma often resulted in emotional distress and social withdrawal. One participant (P15) shared, *"Now that I am sick, I understand the world. Sick people have no friends; people say I can't make it, and some are distancing themselves,"* reflecting how social rejection eroded morale and undermined the motivation to continue dialysis.

Social isolation also further reduced participants' access to practical support, such as transportation or financial help, needed to adhere to treatment. Some lost contact with friends and family who could have assisted them. One participant (P1) shared, *"No! no! no! There is no*

support from friends and the community where I live," while another participant said, *"For me right now I have relocated here and I have nothing to do, so I moved from home to the hospital for dialysis"* (P12). These challenges further limited their ability to maintain regular hemodialysis.

3.5.2.2.3 Patient-Provider Relationship and Communication as Both a Barrier and a Facilitator

Participants highlighted the importance of positive relationships with healthcare providers in facilitating access to hemodialysis treatment. Participants reported positive exchanges with healthcare providers, noting feelings of trust and comfort and consistent engagement with treatment. One participant shared, *"I have a good relationship with almost all of the nurses, and they are good"* (P1), while another noted, *"The doctors and nurses are very supportive and have a good relationship with us"* (P12).

However, some participants reported negative experiences that created barriers to accessing hemodialysis. Poor communication or disrespectful behavior from healthcare staff discouraged patients from seeking treatment at times. One participant explained, *"Some of them are not respectful"* (P11).

3.5.2.3 Systemic Barriers to Accessing and Utilizing Hemodialysis in Ghana

Our analysis revealed two subthemes related to systemic barriers to hemodialysis access: Healthcare System and Infrastructure Barriers to Hemodialysis Access and Geographical and Transportation Barriers to Hemodialysis Access. These subthemes illustrate how structural and logistical factors within the healthcare system hinder consistent access to treatment.

3.5.2.3.1 Healthcare System and Infrastructure Barriers to Hemodialysis Access

Participants described numerous systemic challenges that hindered their ability to access and utilize hemodialysis treatment. Limited availability of hemodialysis machines and frequent

breakdowns resulted in long waiting times and disrupted treatment schedules. One participant noted, *"Sometimes you wait for hours because the machines are few. If you're unlucky, you come back the next day"* (P4), while another shared, *"Sometimes a machine breaks down mid-dialysis, and they have to stop everything"* (P14).

Shortages of essential consumables such as dialyzers, dialysis concentrate, dialysis tubing, and bloodlines further delayed treatment, with patients often needing to purchase supplies themselves: "*Sometimes, the hospital tells us there are no dialysis consumables, so we have to buy them ourselves. The cost is unbearable"* (P12). Unreliable power and water supplies also disrupted sessions, with participants experiencing power outages during hemodialysis: *"The lights go off while I'm on the machine, and they say there's no fuel for the generator"* (P10) or missed treatments due to water shortages: *"If there's no water, we can't do dialysis"* (P13).

Operational inefficiencies within the healthcare system compounded these challenges. Scheduling difficulties and staffing shortages created unpredictability in treatment availability, as one participant explained: *"Sometimes they change my dialysis day last minute, and it messes everything up" (P9).*

3.5.2.3.2 Geographical and Transportation Barriers to Hemodialysis Access and Utilization

Participants described significant geographical and transportation challenges that hindered their ability to access hemodialysis. Long travel distances, poor road conditions, and high transport costs created substantial financial and time burdens. One participant shared, *"I have to get up at one o'clock am... just to make it here"* (P5), while another participant noted, *"Our roads are not good, and you spend the whole day traveling to and from the hospital"* (P3).

Unreliable transportation further complicated access, with some participants canceling hemodialysis sessions: *"I can be assigned to come three times a week, but I just cancel and come*

once a week due to … the distance I have to travel" (P12). Some participants reported not being able to travel back home when their hemodialysis sessions end late in the night. *"Sometimes my dialysis session ends very late at night, and I can't go back home. I have to find a place to sleep, which means spending more money"* (P4). To mitigate these challenges, some participants relocated closer to hemodialysis centers: *"I had no choice but to move closer so I could reduce my travel costs"* (P9).

3.5.2.4 Cultural and Knowledge Barriers in Hemodialysis Access and Utilization

Our analysis revealed two subthemes related to cultural and informational barriers: (i) Cultural and Spiritual Beliefs Impacting Hemodialysis Access and Utilization, (ii) Knowledge Gaps and Misconceptions about ESKD. Participants reported that limited awareness and misconceptions about kidney disease, along with reliance on traditional or spiritual healing, contributed to delays and inconsistencies in accessing hemodialysis.

3.5.2.4.1 Cultural and Spiritual Beliefs Impacting Hemodialysis Access

Cultural beliefs significantly influenced patients' perceptions of kidney disease and its treatment, creating barriers to accessing hemodialysis. Many participants attributed their condition to supernatural causes, such as witchcraft, rather than recognizing it as a medical issue requiring clinical treatment. One participant shared, *"People think that somebody has done something to you"* (P10), while another participant noted, *"People were saying that it was witchcraft and that it is not a normal sickness for his age"* (P11). Some participants reported using alternative treatments, such as herbal remedies or spiritual practices, before starting hemodialysis. One participant explained, *"They would boil it (herbs)… I would bathe and drink from it"* (P13).

Tensions between cultural practices and medical recommendations were evident, with some participants avoiding hemodialysis due to traditional views. As one participant shared,

"Some people believe that my illness is a result of spiritual causes and should be treated through traditional methods rather than dialysis" (P15). Participants reported that such beliefs influenced decisions about when to start or continue dialysis.

3.5.2.4.2 Knowledge Gaps and Misconceptions About ESKD as Barriers

Participants described limited awareness and widespread misconceptions about ESKD prior to diagnosis, which delayed treatment initiation. Several had never heard of kidney failure: *"I didn't have any idea about kidney failure"* (P3); *"I had no clue about this disease until I got diagnosed"* (P8). Others encountered misinformation, such as the belief that the illness was contagious*: "Some people think this sickness can be transmitted"* (P13). Some participants reported that their lack of awareness or exposure to misinformation made them unsure about when or whether to start hemodialysis.

Participants emphasized that public education played a crucial role in improving understanding of ESKD and its treatment, helping them overcome stigma and engage with dialysis. One participant noted, *"Public education is necessary to reduce stigma and for early detection of kidney diseases"* (P2). Another shared, *"Being educated helps me understand my condition and treatment better"* (P14), describing how receiving accurate information helped them seek hemodialysis earlier.

3.5.2.5 Absence of Public Funding for Hemodialysis Services

The analysis of data revealed two subthemes related to financial barriers hindering hemodialysis access: Financial Burden and Affordability of Hemodialysis and Insurance Coverage Gaps and Policy Reform Needs. Participants described how the high cost of treatment, limited insurance coverage, and inadequate government support affected their ability to access and utilize hemodialysis, and they called for policy reforms and financial assistance to improve accessibility.

3.5.2.5.1 Financial Burden and Affordability of Hemodialysis

Participants identified the high cost of hemodialysis as a significant barrier to accessing treatment. Out-of-pocket expenses, including fees for each dialysis session, medications, medical supplies, and transportation to dialysis centers, made regular attendance unaffordable for many. One participant explained, *"Each dialysis session is very expensive, 400 GHC (40 USD) per session, and I need it three times a week"* (P11). For some, these costs made accessing hemodialysis unattainable: *"Dialysis money is hard to come by. I wish I was receiving treatment as advised, but it is still a pipe dream"* (P15). Others reported having to reduce their frequency of sessions due to financial constraints: *"I used to go twice a week, but now I can only afford once"* (P9).

The financial burden extended beyond medical costs to affect daily living expenses, forcing patients to make difficult choices. One participant noted*, "Even if you have a room full of money, dialysis will consume it all"* (P5). Families often provided initial support but were unable to sustain it long-term: *"My family supported me* [financially] *for a while, but they have exhausted their resources"* (P13). The requirement for upfront payments further limited access: *"You have to pay and bring the receipt to be registered for dialysis"* (P6).

3.5.2.5.2 Insurance Coverage Gaps and Policy Reform Needs

Participants reported limited financial support for hemodialysis under Ghana's National Health Insurance Scheme (NHIS). Many expressed a desire for government assistance in covering treatment costs. One participant shared, "The government should pay for or subsidize dialysis so we can also enjoy free dialysis" (P12). Other participants suggested eliminating import taxes on dialysis materials: *"If they remove the tax on dialysis medical supplies, the cost will go down and*

improve dialysis delivery" (P1, P3). Some participants also called for better-equipped dialysis centers and more consistent availability of supplies: *"The government should provide new hemodialysis machines and ensure materials are always available"* (P11). The financial burden led to feelings of despair for some: *"The government needs to come to our aid, or else we are dying slowly*" (P15).

3.6 Discussion

This study identifies barriers and facilitators to hemodialysis access and utilization for patients with ESKD in Ghana, with a focus on the multifaceted factors influencing access and treatment utilization. Financial constraints, limited healthcare resources, and gaps in insurance coverage emerge as critical barriers, while social support and faith-based practices are pivotal in sustaining access to treatment and adherence.

Participants in this study reported facing severe emotional distress, such as shock, confusion, and disbelief, and, in certain cases, suicidal thoughts, following a diagnosis of ESKD. These emotional reactions were cardinal to their willingness and capability to participate in treatment, aligning with findings of studies conducted in other countries (Taylor et al., 2016; Goh & Griva, 2018).

The high expense of hemodialysis emerged as a substantial barrier to accessing and using hemodialysis treatment. Many participants described the expense-averaging US $53.9 ± 8.8 per session (Tannor et al., 2023; Tannor & Antwi, 2023), as very high, often resulting in reduced session frequency despite related health risks. These barriers were made worse by the lack of government support or insurance, particularly Ghana's National Health Insurance Scheme, which forced many people to rely on family resources or risk treatment abandonment (Darwish et al., 2020; Manns et al., 2019).

These findings lend support to Andersen's Behavioral Model, which acknowledges financial capability as a key barrier to healthcare access (Lederle et al., 2021; Andersen, 1995). High dialysis out-of-pocket costs are a dominant problem in low- and middle-income countries, according to the literature, which often leads to treatment cessation and an increase in mortality (Kaur et al., 2018; Saeed et al., 2020; Japiong et al., 2023). Considerably, the monetary burden of managing ESKD extends beyond individual patients, affecting entire families through asset sales or indebtedness, and intensifying the emotional toll of caregiving.

Ghanaian patients with ESKD face economic challenges similar to those from India, Nigeria, and Pakistan, where hemodialysis access is frequently denied on the grounds of no money (Ekuma, 2018; Kalyesubula et al., 2024). Where government-supported dialysis programs or health insurance coverage are nonexistent, only the privileged and wealthy are able to access treatment in these countries (Kalyesubula et al., 2024; Ekuma, 2018). This disparity has resulted in significant death rates among the poor due to their inability to access treatment and underscores the pressing need for the reform of policies in low-middle-income countries to address monetary and infrastructure issues, which hinder dialysis access (Kalyesubula et al., 2024).

In addition to financial hardship, treatment-seeking behaviors and adherence were influenced by social stigma and cultural beliefs. Participants shared how ESKD was often viewed as a punishment for wrongdoing or as a communicable illness, which resulted in social marginalization and disrupted relationships with friends and family (Moorthi & Latham-Mintus, 2019; Sarfo-Walters & Boateng, 2020). This social stigma was heightened by misconceptions about the causes of kidney disease, with some ascribing it to supernatural forces. As a result, some participants were urged to seek alternative treatments, such as traditional medicine or faith-based healing, rather than following conventional medical treatments. While these beliefs offered

comfort to some, they also created a conflict for others who struggled to balance traditional expectations with the need for medical care. The unwillingness to disclose one's illness, driven by fear of judgment, often delays treatment, aggravating health outcomes (Elias et al., 2025; Stanifer et al., 2014). These findings are not specific to Ghana as the same has been reported in several other African and Asian countries where traditional beliefs of health and ill-health play a role in determining patients' decisions to seek conventional medical treatment (Mayes et al., 2022; Wang et al., 2019).

In line with Andersen's Behavioral Model, these cultural barriers represent predisposing factors that influence individuals' health behaviors and decisions to seek care. These cultural barriers should be addressed by education and awareness initiatives that dispel harmful cultural misconceptions that prevent patients from accessing the care they require and that provide accurate information about kidney disease and its treatment (Bawah et al., 2021). By addressing these cultural barriers, policy makers in Ghana can take important steps toward improving the overall well-being of patients with ESKD and ensuring that they have access to the life-saving hemodialysis they require (Kaur et al., 2018; Saeed et al., 2020).

The availability of hemodialysis access in participants from this study was even more limited than that reported in other populations within Ghana and comparable low- and middle-income settings, largely due to their geographic location and transportation challenges. Most participants traveled long distances to hemodialysis facilities and often arrived late for hemodialysis. Many participants reported missing their haemodialysis appointment caused to unreliable transport and a bad road network, worsening their ESKD. These findings are consistent with research from other low-middle-income settings like Pakistan and India, where travel distance and associated delays lead to suboptimal health outcomes and late treatment initiation (Kaur et al.,

2018; Saeed et al., 2020). In low-middle-income countries, healthcare resources are generally located in urban centers, leaving rural populations underserved and overly affected by these transportation and geographical barriers (Mbeje & Mtshali, 2021; Tannor et al., 2018). Due to restricted access to medical facilities and the expense of going to treatment facilities, this problem is made worse in rural locations, where access to hemodialysis and adherence are further discouraged (Mbeje & Mtshali, 2021; Tamayo et al., 2016). These interconnected barriers emphasize the need for comprehensive strategies that address both physical access to hemodialysis and the structural inequities that contribute to delayed or missed treatments.

Healthcare system barriers, including shortages of hemodialysis machines, consumables, and trained personnel, considerably aggravate the challenges patients face in accessing timely and consistent hemodialysis services. These are challenges that are not exclusive to Ghana but are prevalent in other low-resource settings where underdeveloped healthcare infrastructure restricts the availability of interventions that save lives (Cullis et al., 2022; Sawhney & Luyckx, 2024). In addition to these healthcare system constraints, participants in our study further identified societal infrastructure barriers, such as that power outages and water cuts, that led to considerable repercussions on the provision of timely treatment. Power failures, out-of-order machines, and long waits reduced the number of open time slots for participants and likely contributed to increased rates of morbidity and mortality in patients with ESKD. Such shortages, both in the healthcare delivery system and in the basic utilities that support it, inevitably have an impact on the rationing of hemodialysis sessions and thus patient health. These findings illustrate the larger struggle healthcare systems in low-resource settings face and emphasize an immediate need for dedicated infrastructure investments to provide timely, equal access to life-saving care for patients with ESKD.

Participants in this study experienced some facilitators that supported their engagement with hemodialysis care, demonstrating a degree of emotional resilience in navigating the substantial challenges associated with ESKD in Ghana. In this context, resilience refers to the ability to adapt positively and continue engagement with life-sustaining treatment despite substantial difficulty, aligning with components such as coping, confidence, and connection from Ginsburg's 7 Cs of Resilience (Ginsburg, Jablow, & American Academy of Pediatrics, 2020). Participants employed a variety of adaptive coping techniques, including faith and self-acceptance of their diagnosis. Faith provided a sense of hope and strength, enabling patients to endure their illness's emotional and physical toll. Despite financial constraints and resource limitations, religious beliefs functioned as a powerful motivator for hemodialysis access, utilization, and treatment adherence (Boateng et al., 2018; Taylor et al., 2023).

These findings lend support to Andersen's Behavioral Model, which proposes that personal health beliefs, classified under predisposing characteristics, shape health-seeking behaviors (Lederle et al., 2021; Andersen, 1995). In this study, positive health beliefs, including acceptance of illness and faith, served as important facilitators, encouraging participants to engage with and adhere to hemodialysis treatment. Although some beliefs, discussed earlier under barriers, discouraged care-seeking (e.g., viewing illness as a form of punishment), the beliefs highlighted here reflect positive perceptions that promoted timely access and continued use of hemodialysis. In addition, the Social Ecological Model highlights how individual resilience, often rooted in religious and cultural contexts, supports continued engagement with care despite systemic barriers (Caperon et al., 2022; Nguyen et al., 2022). Many participants relied on religious beliefs for emotional resilience, finding strength in divine intervention, which reinforces the significance of these health beliefs in influencing hemodialysis access, use, and treatment adherence.

An important implication of this finding is the need to promote a supportive environment that recognizes patients' cultural and religious beliefs to help optimize patients' access. By doing so, healthcare providers can enhance patients' ability to navigate treatment challenges and improve overall access and use of hemodialysis.

Ghana, similar to many low and middle-income countries, has a very limited tax-based social and health care safety net, unlike many high-income nations. Interestingly, our findings reveal that the participants had a type of informal social safety net similar to those reported in previous study findings in other low and middle income countries (Alatawi et al., 2024; Bello et al., 2022; Sułkowski et al., 2024). Many participants reported receiving multifaceted support encompassing emotional encouragement, practical help, and financial assistance from immediate and extended family members, close friends, religious organizations, and non-governmental organizations whoextended essential financial aid. This support facilitated patients to continue treatment in the short term, emphasizing the importance of informal networks in their healthcare access. The support mitigated both emotional and financial hardships, emphasizing the importance of communal support in health outcomes (Gillespie et al., 2023; Neumann et al., 2018). This informal social safety net echoes the ongoing existence of aspects of the traditional communal nature of Ghanaian Society (Gyan & Kwakye 2025) and is related to the communal emphasis in many Indigenous African societies as reflected in Mbiti's adage: "*I am because we are, and since we are, therefore I am,*" (Mbiti, 1969, p. 106). However, the study found that the financial assistance received was often unsustainable, leaving patients susceptible to long-term financial uncertainty and negative health consequences.

In addition, participants' reliance on family support occasionally led to feelings of shame and anxiety since some people struggled with the burden they imposed on their loved ones, underscoring the emotional weight involved with financial dependence.

We found that social dynamics substantially influenced access and use of hemodialysis treatment. The ability to afford and regularly attend hemodialysis sessions often depended on the collective effort of relatives, religious groups, and non-governmental organizations. This study emphasizes that social support networks are essential but complex in facilitating hemodialysis access and utilization. Although informal networks are a vital support, their shortcomings highlight the need for more sustainable and structured support.

The study also found that the relationship between patients and providers facilitated patients' access to and use of hemodialysis. Patients are more likely to follow treatment plans and ask for assistance when necessary if they believe that their healthcare providers understand, value, and respect them (Moudatsou et al., 2020; Martire & Helgeson, 2017). Similar to previous research findings, many participants mentioned that compassionate and communicative providers helped them deal with the emotional and physical challenges of long-term dialysis (Osei Appiah et al., 2022). Thus, the relationship between the patient and the provider goes beyond just technical care; it is crucial for achieving positive treatment results and ensuring patient satisfaction (Olaisen et al., 2020).

3.7 Contributions to Existing Knowledge

This study extends current knowledge on hemodialysis access in Ghana by incorporating economic, cultural, biomedical, and psychosocial dimensions. The findings of this study highlight the emotional, social, and cultural barriers, such as stigma, spiritual interpretations of illness, and a lack of psychosocial support, that significantly influence treatment adherence, whereas prior

research has primarily focused on biomedical or infrastructure barriers, such as a lack of dialysis centers or equipment shortages. This is consistent with studies in other low- and middle-income countries (LMICs), such as Uganda and Nigeria, where similar sociocultural and economic constraints hinder access to care (Kalyesubula et al., 2024; Ekuma, 2018). However, this study diverges by demonstrating how faith, family networks, and community organizations operate as both facilitators and unintended stressors in the treatment experience, adding a nuanced perspective not fully captured in earlier research (Tannor et al., 2023; Boateng et al., 2024). In addition, this study shows how patients without strong social support systems face compounded vulnerabilities, a dimension that has received less attention in prior Ghanaian and other sub-Saharan African studies.

3.8 Implications for Policy and Practice:

1. Strengthening Healthcare Infrastructure: To improve hemodialysis services, it is important to invest in dialysis equipment, a reliable power and water supply, and the training of additional nephrologists and renal nurses. Like other low- and middle-income countries, Ghana has infrastructure problems that affect the availability and quality of hemodialysis. Equitable access to healthcare requires addressing these problems.

2. Expanding Public and/or Private Financial Coverage: Financial barriers remain the most considerable barrier to hemodialysis access in Ghana. While short-term aid from religious and charitable organizations provides temporary relief, it is not a sustainable solution. Patients' financial burden would be reduced, and accessibility would be greatly boosted if the National Health Insurance Scheme were expanded to cover hemodialysis (Boima et al., 2020; Tannor et al., 2023). This strategy is in line with global models, such as Canada's universal dialysis coverage, which guarantees fair access for all people, despite their financial situation (Nguyen et al., 2021).

Comparable financial hardships are seen in India, Nigeria, and Pakistan, where only the wealthy can afford dialysis due to the lack of government-sponsored programs (Jha et al., 2013; Rumun, 2014; Zafar & Rizvi, 2023). Policies to improve access in Ghana can be informed by lessons learned from other low- to middle-income countries, such as Rwanda and Tanzania's successful financing models (Mohamedi & Mosha, 2022; Mukakarangwa et al., 2018).

3. Cultural Education and Awareness: Public health initiatives that dispel myths about dialysis and ESKD can help people seek treatment earlier. Because of cultural and societal misperceptions of kidney disease and how to treat it, many patients are put off from seeking treatment. Improving awareness and early actions can be achieved by integrating culturally sensitive education into healthcare policies.

4. Enhancing Social Support Systems: To enhance treatment access and adherence, healthcare professionals should integrate patient support systems, such as community-based initiatives, family engagement strategies, and counseling.

3.9 Implications for Future Research

Future studies should assess the economic impact of expanding the National Health Insurance Scheme coverage for hemodialysis in Ghana. Comparative analyses with successful public dialysis funding models in other countries and studies of partial subsidy programs in low- and middle-income countries like Rwanda and Tanzania could provide evidence-based recommendations for improving hemodialysis access and affordability. There is a need for research on the hard-to-recruit population that is not accessing medical care. Also, future research should be conducted to more fully understand the engagement, communal support, and factors that prevent some patients from having access to this communal support (informal social safety net). It would also be interesting to examine whether there are differences in communal support

experiences by patients in rural versus urban communities. Finally, there is a need for research in understanding the experiences of the community support systems in helping patients with ESKD.

3.10 Strengths and Limitations

This qualitative study has both strengths and limitations. Some of the strengths of the study include that it gave voice to participants with ESKD from varied socioeconomic backgrounds, receiving and not receiving hemodialysis, and allowed them to share their experiences accessing hemodialysis care. The sample was recruited from teaching hospitals in two diverse regions of Ghana. The qualitative interview schedule was developed based on the results of our previous survey study examining hemodialysis access and uptake in the same two Ghanaian regions and the literature on dialysis uptake, which allowed for more in-depth examination of the quantitative findings and further exploration of new findings that emerged in the interviews. This permitted the development of more comprehensive knowledge/understanding about the barriers and facilitators experienced by patients with ESKD, to hemodialysis.

This study also has several limitations. Though this study was conducted at two major teaching hospitals in Ghana, which, while cosmopolitan and drawing patients from varied backgrounds, may not fully reflect the experiences of patients with ESKD in other geographic (e.g. rural areas) or cultural settings. As participant recruitment took place in the hospital setting, the experiences of people with ESKD who have not sought or not yet sought treatment are absent in this research. Their experiences regarding access and uptake of ESKD care remains unknown.

3.11 Conclusion

This study offers a detailed look at the barriers and facilitators to accessing and utilizing hemodialysis for ESKD patients in Ghana, highlighting the complex factors that affect treatment access and utilization. The study underscores the importance of holistic, patient-centered care that

combines medical, psychological, and social support. The lack of hemodialysis facilities and qualified personnel, as well as insufficient healthcare infrastructure, continues to be a major barrier. Policy initiatives, such as insurance coverage, subsidies, and public educational campaigns, are crucial to overcoming these barriers. Improving provider training and healthcare facilities are also essential for raising the standard of care. By addressing both systemic healthcare issues and the personal, social, and cultural aspects of care, Ghana can make meaningful progress in improving the health and treatment outcomes for its ESKD population.

CHAPTER FOUR: HEALTHCARE WORKERS' PERSPECTIVES ON HEMODIALYSIS ACCESS AND UTILIZATION FOR PATIENTS WITH END-STAGE KIDNEY DISEASE IN GHANA

4.1 Abstract

Background: Chronic kidney disease (CKD) is a growing public health issue in Ghana, with a prevalence of 13.3%. A significant number of patients progress to end-stage kidney disease (ESKD), requiring renal replacement therapy such as hemodialysis. However, there remains a limited understanding of the specific health system and patient-level factors that constrain hemodialysis access, particularly from the perspectives of key stakeholders. This study examines healthcare providers' and hospital administrators' perspectives on the barriers and facilitators to accessing and utilizing hemodialysis for patients with ESKD in Ghana, providing essential insights to inform strategies for improving equity.

Methods: We conducted an exploratory descriptive qualitative study at two teaching hospitals in Ghana between March 2024 and June 2024. Using maximum variation purposive sampling, we recruited sixteen healthcare workers based on their experience in providing hemodialysis to patients with ESKD. Data were collected through semi-structured, in-depth interviews and analyzed thematically using Braun and Clarke's framework with NVivo 14.

Result: This study identified five themes affecting hemodialysis access and utilization in Ghana: patient-specific factors, sociocultural influences, facility-level challenges, community-level barriers, and policy-related issues. Barriers included psychological, sociocultural beliefs, inadequate facilities, and lack of insurance coverage. Facilitators such as family support and coping strategies were also noted. Addressing these barriers requires a multifaceted focus to improve access.

Conclusion: The study highlights barriers to hemodialysis access in Ghana, including travel distances, financial burdens, limited facilities, psychological distress, and cultural beliefs, which contribute to poor adherence and health outcomes. Facilitators such as family support and effective coping strategies were also identified to enhance access. Systemic reforms, increased funding, healthcare training, and educational campaigns are urgently needed to improve access and outcomes for patients with ESKD.

Keywords: Health Service use, End stage, kidney, disease, hemodialysis, qualitative study

4.2 Introduction

Chronic kidney disease (CKD) is a major public health problem with a global prevalence of 10-13% based on data up to 2022 (Duff et al., 2024). Some patients with chronic kidney disease eventually progress to end-stage kidney disease (ESKD), depending on factors such as disease severity, comorbidities, and access to treatment. According to Long et al., (2017), patients with ESKD have a glomerular filtration rate of less than 15 mL/minute/1.73 m^2, persistent kidney damage, and loss of renal function. ESKD is an increasingly significant health challenge worldwide, contributing to illnesses (e.g., Cardiovascular disease) and deaths (Rhee et al., 2014, 2017, 2020). If treatments such as hemodialysis or kidney transplantation are not initiated when critically needed, ESKD can be fatal, particularly in settings where access to timely dialysis or transplant is limited, and patients may die while waiting for care. This challenge is particularly critical in low-income regions such as Sub-Saharan Africa, where over 70% of global ESKD cases are expected to emerge by 2030; however, there is currently limited access to hemodialysis and kidney transplant (Okorie et al., 2018).

Ghana is experiencing an increase in the prevalence of ESKD, mostly due to increased rates of hypertension and diabetes mellitus, and other factors such as inflammatory diseases, herbal medicine use, hereditary predisposition, and, more recently, environmental exposures linked to illegal small-scale mining activities known as galamsey ("A Review of Health Hazards Associated with Exposure to Galamsey-Related Pollutants," 2024; Adu & Ojo, 2020; Ashuntantang et al., 2017). The estimated prevalence of chronic kidney disease in Ghana is 13.3% (Adjei et al., 2019;

Boima et al., 2019, 2020). For patients diagnosed with ESKD, hemodialysis is the primary mode of renal replacement therapy (Liyanage et al., 2015). However, access to and utilization of hemodialysis in Ghana are constrained by resource limitations, including insufficient specialized equipment such as hemodialysis machines, a shortage of skilled healthcare professionals, and inconsistent supplies necessary for hemodialysis (Boateng et al., 2018; Tannor et al., 2018, 2023).

Ghana faces challenges in providing hemodialysis because only 40 of its 51 hemodialysis centers are operational, and these are unequally distributed across the country, with most located in urban areas. Also, there is a lack of funding for hemodialysis, not to mention that hemodialysis is not covered by national health insurance, even though most patients do not have the financial means to pay the high out-of-pocket expenses for hemodialysis (Tannor et al., 2023). This financial burden often falls on individuals, their families, organizations, and even philanthropists (Osafo et al., 2018; Tannor et al., 2023). Furthermore, the country has a severe shortage of trained nephrology specialists such as nephrologists, medical officers, and nurses (Boateng et al., 2018; Tannor et al., 2023).

Despite the importance of hemodialysis, there is surprisingly little research in Ghana that examines the barriers and facilitators influencing access and utilization of hemodialysis. While studies from other parts of the world, including the United States of America by Chenitz et al., (2014); Singapore, by Griva et al., (2013, 2020); Rwanda, by Mukakarangwa et al., (2018); and Tanzania, by Pancras et al., (2018) have explored barriers and facilitators to accessing and using dialysis, but findings specific to Ghana are sparse. Our previous research has shown that many patients in Ghana face financial barriers to hemodialysis, with 83.3% unable to afford treatment (Japiong et al., unpublished). Consequently, only 38.8% of participants reported consistently following the prescribed regimen for hemodialysis (Japiong et al., unpublished).

Building on these findings, the present qualitative study explores the perspectives of healthcare workers on the systemic, institutional, and interpersonal factors affecting hemodialysis access and utilization. Such understanding is essential to designing strategies to enhance hemodialysis access and equity, as well as improve health outcomes for individuals with ESKD. Specifically, the following research questions were addressed:

4.3 Research questions

1. What are the perceived barriers to hemodialysis access and utilization for patients with ESKD in Ghana from the perspectives of healthcare providers and hospital administrators?
2. What specific challenges do healthcare providers face in delivering hemodialysis to patients with ESKD in Ghana?
3. What facilitators enable patients with ESKD to access and utilize hemodialysis in Ghana from the perspective of healthcare providers and hospital administrators?
4. What strategies do healthcare providers and hospital administrators suggest to improve hemodialysis access and utilization for patients with ESKD in Ghana?

4.4 Methods

4.4.1 Study design

This qualitative study employed an exploratory descriptive design (Sandelowski, 2000). The goal was to provide rich, detailed descriptions of healthcare providers' perspectives on the systemic, institutional, and interpersonal factors affecting hemodialysis access and utilization, insights that could not be adequately captured by quantitative methods alone, building on findings of our quantitative study (Japiong et al., unpublished).

The study received research ethics approval from the Human Participants Review Sub-Committee of York University's Ethics Review Board under the protocol number [STU 2023-082] in Toronto, Canada, and from the relevant ethics boards at the study sites in Ghana. The study was conducted between March 2023 and June 2024.

4.4.2 Setting

This study was conducted at two major teaching hospitals in Ghana: Korle-Bu Teaching Hospital (KBTH) in Accra and Tamale Teaching Hospital (TTH) in Tamale. Both hospitals serve as national referral centers and provide hemodialysis services to patients with ESKD.

At the time of data collection (March 2024 to June 2024), the dialysis unit at KBTH served approximately 470 patients, providing treatment for 46 patients daily, while TTH served about 310 patients, dialyzing up to 30 individuals daily. KBTH had four nephrologists, 55 dialysis nurses, and 19 dialysis machines, while TTH was staffed with one nephrologist, 26 dialysis nurses, and 11 dialysis machines**.**

4.4.3 Population and Criteria

The study's target population comprised healthcare providers (i.e., nephrologists, medical officers, nurses) and health service administrators responsible for overseeing or supporting hemodialysis services at the two study hospitals. Inclusion criteria were full-time employees and at least six months of experience either working directly in the dialysis unit or involved in the administration or oversight of hemodialysis services. This criterion ensured that participants had sufficient knowledge and experience with hemodialysis practices.

4.4.4 Sampling

The study employed maximum variation sampling (Benoot et al., 2016; Moser & Korstjens, 2018) to capture diverse participant perspectives. We purposefully recruited 16 participants from two public hospitals, one in southern Ghana and one in northern Ghana, to capture geographic diversity, as well as variation in role in the dialysis unit (direct patient care vs. oversight/administration), and years of work. Participants included those directly involved in patient care, nurses (n = 8), Physicians (n = 5), and those with administrative or oversight responsibilities for hemodialysis services (n = 3). This approach enabled the inclusion of diverse professional perspectives and provided a comprehensive understanding of provider and administrator views on barriers to and facilitators of hemodialysis access and utilization.

4.4.5 Recruitment

Charge nurses in the renal units at the two hospitals assisted with identifying and recruiting participants. Charge nurses received a written summary of the study protocol, including eligibility criteria and researchers' contact information. Charge nurses informed eligible participants about the study's purpose and sought their consent to share their contact information with one of the researchers (MJ).

One of us (MJ) contacted and then arranged hospital meetings with potential participants to confirm eligibility, explain the study, and obtain written informed consent (see Appendix D for information sheet and informed consent). Recruitment and data collection continued until data saturation was reached, meaning no new concepts, themes, or categories emerged (O'Reilly & Parker, n.d.; Saunders et al., 2018).

4.4.6 Interview Guide

A semi-structured interview guide was used to guide the one-to-one in-depth interviews exploring the experiences and perspectives of healthcare workers regarding barriers to, and facilitators of accessing and using hemodialysis in Ghana. The guide was developed intentionally by including key findings from our previous study (Japiong et al., unpublished), which identified definitive barriers such as financial hardship, long travel distances, and limited family support, among others, that were used to shape the core questions of the interview guide.

Additionally, our review of the literature on hemodialysis access and utilization (Bagasha et al., 2020; Bates et al., 2017; Mukakarangwa et al., 2018; Pancras et al., 2018) informed the development of the interview guide. The interview questions specifically covered the full range of challenges faced by patients and providers, including financial constraints, transportation barriers, cultural and societal influences, coping strategies, and potential facilitators, as well as suggestions for improving hemodialysis access and utilization.

Participants also completed a sociodemographic questionnaire asking about their age, sex, ethnicity, profession, education, and years of work experience. The interview guide underwent expert review by qualitative research specialists and clinicians with knowledge of hemodialysis services in Ghana. A pilot study was conducted with a small subset of participants to refine question wording, flow, and timing, and adjustments were made accordingly. The final versions of the interview guides are provided in Appendices J and K for providers and administrators, respectively.

4.4.7 Data collection

In-depth face-to-face interviews were between 30 and 60 minutes in length and conducted in a private office within the hospital at a time convenient to the participant. All interviews were conducted by the researcher (MJ), a registered nurse and lecturer with experience in qualitative research, which allowed for informed engagement with participants and reflexive awareness of the research context**.** Field notes were written after each interview to document the setting, contextual factors, and participant mannerisms that were not captured in the audio recordings. All interviews were conducted in English, audio recorded, and transcribed verbatim for analysis.

4.4.8 Rigor

To ensure rigor and trustworthiness, Lincoln and Guba's (1985) criteria and Consolidated Criteria for Reporting Qualitative Research (COREQ) guidelines (Tong et al., 2007) were followed. Credibility was achieved through prolonged engagement in the hospital setting and member checking, which was done by providing a verbal summary at the end of each interview. The interviewer summarized the main points discussed and asked participants to confirm, correct, or add to these summaries. Data were collected from two renal centers to achieve data source triangulation (Morgan, 2024), enhancing credibility.

Dependability and confirmability were ensured through an audit trail, external peer review, and inter-coder reliability. An experienced qualitative researcher (PA) reviewed a subset of the coded data to assess consistency and accuracy, while two researchers (MJ and MMI) independently coded and analyzed the data, resolving discrepancies through discussion to ensure consistency and minimize bias. Purposive sampling further strengthened dependability and confirmability, while the analysis of nonverbal cues provided deeper insights.

Reflexivity was maintained through journaling to minimize bias. Transferability was supported through thick descriptions and direct quotes, which provided rich contextual details, allowing readers to assess the applicability of findings to similar settings. This study's methods and findings are grounded in comprehensive, transparent reporting in line with the COREQ.

4.4.9 Data analysis

We employed thematic analysis, following the six-step framework by Braun and Clarke (2019) and Campbell et al., (2021), in line with Sandelowski's (2000) recommendations for qualitative descriptive research. NVivo 14 software (Guetterman et al., 2015) was used for data management and organization. Transcripts were carefully proofread and compared against audio recordings to ensure accuracy.

Data analysis began concurrently with data collection. Field notes taken during interviews, capturing non-verbal cues, contextual details, and initial impressions, were incorporated into the coding process to enrich understanding and support interpretation of the participants' responses**.** Familiarization with the data involved verbatim transcription, repeated reading, and iterative refinement of the interview guide. Initial codes were systematically generated with consideration of the study's research questions, which had previously identified key categories of factors influencing hemodialysis access and utilization; these categories guided the identification and labeling of relevant data segments while remaining open to new codes emerging inductively. These codes were then examined for patterns, with similar codes grouped to form preliminary themes. Themes were iteratively reviewed and refined through discussions among researchers, ensuring coherence and alignment with the dataset. Each theme was clearly defined and named, maintaining consistency and analytical depth.

Although the thematic analysis was primarily inductive, Andersen's Behavioral Model of Health Services Use provided a framework that guided the development of themes related to patient, provider, and administrator perspectives on access and utilization of hemodialysis services. The final stage involved synthesizing the findings to the research questions and the broader theoretical context.

4.5 Findings

4.5.1 Characteristics of participants

Twenty-three participants were approached, but 7 declined the offer to participate, citing reasons such as workload pressures, lack of time, and competing professional commitments, resulting in a sample size of 16. Participants had a median age of 36 years (range: 28–49 years). The study's participants were healthcare providers and health service administrators with an array of experience in hemodialysis, from eight months to 12 years, averaging about six years. Nine of the 16 participants were males, and seven were females. The majority (n=11) identified as Christians, with five identifying as Muslims. They consisted of 8 nurses, 3 nephrologists, 2 medical officers, and 3 health service administrators, with their highest level of education ranging from diplomas to doctorates. Participants included members of several ethnic groups, such as Akan (n = 7, 43.8%), Dagomba (n = 3, 18.8%), Ga (n = 2, 12.5%), Dagati (n = 2, 12.5%), Gonja (n = 1, 6.3%), and Ewe (n = 1, 6.3%). Five were single, and nine were married. Eight participants were from each hospital.

4.5.2 Themes and Subthemes

Five overarching themes emerged regarding the barriers and facilitators to hemodialysis access and utilization from the participants' perspectives Table 5.

Table 5: Themes and Subthemes from Providers' and Administrators' Perspectives

S/N	Theme	Subtheme
1.	Patient-Specific Barriers and Facilitators to Hemodialysis Access and Utilization	1. Psychological and Emotional Barriers to Initiating Hemodialysis 2. Socioeconomic status and out-of-pocket costs impact patient hemodialysis access and use 3. Providers' perception of how patients cope with ESKD and Hemodialysis treatment
2.	Sociocultural Influences on Hemodialysis Access and Adherence	1. Cultural Beliefs and Practices 2. Role of Family and Community in Treatment Adherence
3.	Facility-Level Challenges to Hemodialysis Access and Use	1. Resource and Operational Constraints in Hemodialysis Delivery. 2. Human Resource Challenges in Hemodialysis Access 3. Impact of Provider-Patient Relationships on Hemodialysis Access and Use
4.	Community-Level Barriers and Facilitators to Hemodialysis Access	1. Public Awareness and Early Detection of ESKD 2. Geographic and Travel Challenges to Hemodialysis Access and Use
5.	Policy-Related Barriers and Facilitators to Hemodialysis Access	1. Lack of insurance coverage /Government subsidy 2. Policy Gaps and the Need for Reform to Improve Hemodialysis Access

4.5.2.1 Patient-Specific Barriers and Facilitators to Hemodialysis Access and Utilization

Our analysis revealed three subthemes related to patient-level barriers influencing hemodialysis access and adherence: Psychological and emotional barriers to initiating hemodialysis; socioeconomic status and out-of-pocket costs impact patient hemodialysis access and use; and providers' perceptions of how patients cope with ESKD and Hemodialysis Treatment.

4.5.2.1.1 Psychological and Emotional Barriers to Initiating Hemodialysis

Participants reported that some patients exhibited denial as a psychological barrier to accepting their illness, which often showed in avoidance behaviors. Some patients did not engage

in discussions about hemodialysis and often downplayed the significance of their kidney disease, which led to delays in treatment decisions. A participant observed: *"Some patients do not even want to hear the word 'dialysis.' They insist they will find another solution, even when their condition is worsening" (P10).* Another participant added: *"We have patients who ignore their symptoms for as long as possible. Even when we explain the need for dialysis, they sometimes disappear and only return when they are critically ill" (p 14).*

Participants reported that patients often expressed fears related to dependency on dialysis machines and anticipated suffering associated with treatment. For example, one participant (P6) noted: *"Many patients believe that once they start dialysis, their life is over. The fear of dependency on a machine makes them reluctant to begin treatment, even when their kidneys have completely failed."* Another participant (P9) added: *"Some patients associate dialysis with suffering. They see others struggling and become terrified of starting treatment themselves."* Participants reported that patients often expressed fears of becoming dependent on dialysis machines and anticipated suffering based on observing others undergoing treatment.

Healthcare providers reported that the fears associated with hemodialysis often prevented patients from accessing or utilizing treatment. Many providers noted that patients became exhausted due to the demanding nature of hemodialysis, which sometimes led to missed sessions or discontinuation of treatment. A participant stated, "*Dialysis is exhausting for patients, both physically and emotionally. Some of them get tired of coming three times a week, especially when they see little improvement in their overall health"* (P3). Another participant said, *"We've had patients who just stop coming because they feel overwhelmed by the routine and the emotional toll it takes on their lives*" (P7).

4.5.2.1.2 Socioeconomic Status and Out-of-Pocket Costs Impact Patient Hemodialysis Access and Use

Participants emphasized that patients' socioeconomic status including their educational and income as well as the direct costs of treatment significantly influenced their ability to access and utilize hemodialysis treatment. Many patients held low-paying or informal jobs, making it difficult to afford regular treatment. A participant explained, *"Because money is a problem, patients skip [miss] dialysis until they can afford it, worsening their condition"* (P1). Even when scheduled for three weekly sessions, some patients reduced their visits due to cost, as one noted, *"Somebody will be scheduled to do the three times, but they are not able to do it"* (P16).

While some received financial help from family members, this support often waned over time. *"The family support may dwindle over time,"* a participant observed (P5). Others stated, *"Most of these people are not in any good income-generating jobs [to afford dialysis]"* (P4).

Participants observed that educational attainment also shaped patients' understanding of their condition and treatment options. Patients with lower education levels often delayed seeking care or struggled with adherence. One participant remarked, *"Individuals with lower educational levels lack the understanding and awareness, leading to delays in seeking treatment or adherence to the prescribed regimen"* (P4). Some turned to alternative or spiritual treatments, further delaying biomedical care. In contrast, participants highlighted that patients with higher education or access to disease-specific education were more likely to adhere: *"Once patients are educated, they can go online, search for information, and better understand their condition; this helps them stick to their treatment"* (P15).

Participants highlighted that the direct cost of hemodialysis care posed a critical challenge for many patients. One healthcare worker shared, *"Patients often struggle with the cost. They are required to pay before the session, and for some, this becomes a barrier to accessing the treatment regularly"* (P11). Each dialysis session costs approximately 380 Ghanaian cedis, and most patients require three sessions per week. *"There are patients who want to continue with dialysis, but they cannot afford the prescribed frequency of sessions,"* one participant added. *"They often come less frequently or stop altogether when they cannot pay"* (P15). These financial difficulties led some patients to delay care until their condition worsened. *"Patients will wait until their condition becomes critical, and then they'll rush the patient in* [barrier to timely access]*"* (P11). In addition, the cost of transportation, particularly from remote or rural areas, further compounds financial barriers. *"Someone cannot even afford to do dialysis, how much more transporting him or herself to a dialysis center,"* explained a participant (P15).

4.5.2.1.3 Providers' perception of how patients cope with ESKD and Hemodialysis Treatment

Healthcare providers described how patients adopted acceptance and adaptation as strategies to access and utilize hemodialysis and the challenges of living with ESKD. They observed that many patients gradually came to terms with their condition and adjusted to the challenges of undergoing hemodialysis. As one participant noted, *"Some patients come in very distressed at the beginning, but over time, they accept that dialysis is now a part of their lives*. *They find ways to adjust and keep going* [facilitator to continued dialysis use]*"* (P12). Another participant shared, *"We have patients who tell us that they have learned to live with it.* [facilitator to adherence]" (P8).

Humor was another coping mechanism reported by healthcare workers that facilitated access and use of hemodialysis. Some patients used humor when discussing their hemodialysis

experience. One participant noted, *"There are patients who make jokes about their situation. They say things like, 'I am half human, half machine now!' It helps them cope with the stress of being dependent on dialysis*" (P16). Another participant similarly shared, *"Some patients try to make light of the situation. They laugh about the struggles they face, and that seems to help them get through each* [hemodialysis] *session"* (P13).

4.5.2.2 Sociocultural Influences on Hemodialysis Access and Adherence

Our analysis revealed two subthemes related to sociocultural influences on hemodialysis access and adherence*:* Cultural Beliefs and Practices*,* and Role of Family and Community in Treatment Adherence*.* Participants described turning to traditional or spiritual healing, including herbal remedies and prayer, which often delayed or replaced hemodialysis. Family and community support, such as financial assistance, transportation, and emotional encouragement, facilitated treatment access, while limited support further hindered adherence.

4.5.2.2.1 Cultural Beliefs and Practices

Healthcare workers reported that cultural and religious beliefs often served as barriers to accessing and utilizing hemodialysis. Some patients turned to traditional healers or spiritual interventions, believing that *"God will heal them* [barrier to accessing dialysis]*"* (P3). Others (patients) abandoned hemodialysis entirely; as one participant explained, *"Some may completely abandon hemodialysis… and then go for spiritual assistance [*indicating that reliance on spiritual assistance can lead patients to discontinue evidence-based treatment, thus acting as a barrier to ongoing hemodialysis]" (P5). Religious beliefs also led some patients to refuse hemodialysis altogether, as stated by a participant: *"Some don't believe in hemodialysis at all; they believe prayers will work* [barrier to treatment initiation]*"* (P4).

Superstitions and beliefs in supernatural causes further delayed or prevented conventional hemodialysis. For instance, one participant shared that a patient *"believed that it was the grandmother who has been sucking his blood"* (P12). Another participant explained that patients also avoided hospitals with the belief that "*people think when they go to the hospital, they won't make it"* (P13). These beliefs often led patients to choose alternative therapies, such as rituals or markings on their bodies, described by one participant: *"Patients have sought traditional treatments, including rituals or markings on their arms, legs, or waist, for spiritual assistance to dialysis* [barrier to evidence-based dialysis]*"* (P5).

Financial limitations compounded these decisions, as one participant noted, *"They try to find ways and means of getting solutions because they can't afford dialysis* [financial barrier influencing cultural choices]*"* (P3). Such reliance on alternative remedies sometimes resulted in serious health complications. One participant described a case where a patient *"came here in distress"* after seeking alternative treatment (P10), while another participant shared that a patient returned in a worse condition after pursuing prayer-based interventions: *"A patient came back in a worse state* (P11). In extreme cases, patients interfered with medical procedures based on spiritual advice, such as removing catheters, as one participant recounted: *"A patient asked us to remove their catheter because their pastor said with the catheter he couldn't pray for them"* (P10).

4.5.2.2.2 Role of Family and Community in Treatment Adherence

Family and community support emerged as facilitators, enabling patients with ESKD to access and utilize hemodialysis. Healthcare workers noted that family members often provided transportation, financial assistance, and emotional support, facilitating adherence to treatment schedules. One participant explained: *"The family often has to provide transportation for the patient to the dialysis center* [facilitator to accessing hemodialysis]*"* (P2). Another participant

highlighted disparities in family support: *"Some patients have supportive families who do everything possible to ensure they receive dialysis. Others, unfortunately, are left to fend for themselves when their families can no longer bear the financial burden"* (P3).

Community support also played a significant role in facilitating access. Local communities often contributed financially or emotionally when families struggled. One participant shared*: "In some communities, when a patient cannot afford treatment, the community comes together to support them"* (P3). Emotional and spiritual support from communities further motivated patients. Another participant explained: *"The community often prays for the patient, giving them hope to continue with their treatment"* (P7).

4.5.2.3 Facility-Level Challenges in Hemodialysis Access and Use

The analysis of data revealed three subthemes related to Facility-Level Challenges in Hemodialysis Access and Use: Resource and Operational Constraints in Hemodialysis Delivery, Human Resource Challenges in Hemodialysis Access, and Impact of Provider-Patient Relationships on Hemodialysis Access and Use.

4.5.2.3.1 Resource and Operational Constraints in Hemodialysis Delivery

Healthcare workers described how resource limitations affected the delivery of hemodialysis services. One participant explained: *"Staff are ready to perform the procedure, but the materials to use… are not there"* (P13). Another participant added: *"Hemodialysis here is like hell for patients; they don't get the treatment they need"* (P1).

Participants reported an insufficient number of dialysis machines, many of which were frequently non-functional. One participant shared: *"Sometimes we have to wait the whole day because the machine is down, and there's only one working; patients suffer because of this"* (P8). Others noted that irregular maintenance contributed to machine breakdowns, leading to delays or

missed treatments (P15). Long waiting times were reported as a result of limited access to functional machines. Some participants noted that patients remained at the facility for extended periods to receive treatment (P2, P14).

In addition to equipment-related issues, participants also described bureaucratic challenges related to the supply chain and payment systems. One participant noted: "*Even the time we start hemodialysis, 3 a.m., people have to leave home and come and pay before they come the next day to show receipts before receiving hemodialysis" (P1).* Others described frequent stockouts of essential materials due to limited suppliers (P13).

4.5.2.3.2 Human Resource Challenges in Hemodialysis Access

The shortage of specialized personnel, including nephrologists, dialysis-trained nurses, and biomedical engineers, was commonly reported. In some facilities, there was only *"one nephrologist… with other administrative duties"* (P15), limiting clinical support. Delays in equipment repairs were attributed to the lack of specialized technical staff, such as biomedical engineers. One participant shared: *"They* (nurses and patients) *have to wait until the morning* [for equipment repairs]" (P5).

High staff attrition further exacerbated workforce shortages. Many trained professionals were reported to have migrated in search of better working conditions. As one participant stated: *"The majority of our employees are leaving this country in search of better service conditions"* (P10). Frequent departures of experienced staff required constant onboarding and training of new personnel. One participant noted: *"Frequent departure of experienced staff… requires the hospital to continuously train new staff"* (P8).

Due to these shortages, many dialysis nurses were trained on the job rather than through formal nephrology education, which participants noted could impact the quality and consistency

of care. One participant estimated that *"98% of staff working here were trained on the job"* (P2). Several participants emphasized the need for structured and continuous professional development. As one participant put it: *"We need ongoing training and professional development for our staff to keep them updated on the latest techniques and technologies"* (P8).

4.5.2.3.3 Impact of Provider-Patient Relationships on Hemodialysis Access and Use

Healthcare provider-patient relationships played a role in hemodialysis access and utilization. Strong communication and trust facilitated care, as one participant stated, *"We strive to establish open lines of communication and involve patients in shared decision-making* [facilitator to treatment adherence]*"* (P14). Positive relationships encouraged patient engagement, with one participant explaining, *"Our relationships are so good they disclose even personal lives to us"* (P12). This trust and rapport made patients more comfortable sharing concerns, asking questions, and following treatment regimens, thereby promoting continued use of hemodialysis.

Language differences emerged as a significant barrier to effective patient–provider communication, impacting the delivery of hemodialysis. While not solely a patient-specific barrier, the inability of either party to communicate in a common language hindered mutual understanding. As one participant noted, *"You cannot understand the patient if they do not understand your language" (P12).* Another participant added, *"They won't understand it (information, instructions, or medical advice) very well because of the language barrier [language as a barrier to effective hemodialysis delivery]" (P16).*

4.5.2.4 Community-Level Barriers and Facilitators to Hemodialysis Access

Our analysis revealed two subthemes related to community-level influences on hemodialysis access: Public Awareness and Early Detection of ESKD, and Geographic and Travel Challenges. Participants reported limited public awareness of ESKD and emphasized the need for

education on prevention and early diagnosis, particularly concerning hypertension and diabetes. Long travel distances and poor road conditions, especially in rural areas, further hindered timely access to treatment.

4.5.2.4.1 Public Awareness and Early Detection of ESKD

Participants identified low public awareness of kidney disease as a barrier to early detection and hemodialysis access. Many patients are diagnosed late because they do not undergo routine health checks; as one participant noted, *"Most people don't check their health* [barrier to early diagnosis]*"* (P15). However, participants suggested that integrating kidney function tests into routine healthcare could facilitate earlier detection: *"Kidney tests should be added to the routine care"* (P5).

4.5.2.4.2 Geographic and Travel Challenges to Hemodialysis Access and Use

Participants reported that long travel distances to dialysis centers serve as a significant barrier to accessing and using hemodialysis. Patients from areas such as Bawku and Zebilla (approximately 232 km from Tamale and over 828 km from Accra) often needed to travel to cities like Tamale or Accra for dialysis. As one participant explained, *"The majority of our patients are coming from the Upper East… from Bolga to Tamale or from Bawku to Tamale… is not a small journey* [barrier to geographical access]*"* (P11). Poor road conditions exacerbate the issue: *"A journey that is supposed to take like one hour eventually takes like five or more hours* [barrier due to travel delays]*"* (P13). *"Some people come to wait for about two or three days before they can get a session of dialysis* [barrier to timely hemodialysis]*"* (P15).

4.5.2.5 Policy-Related Barriers and Facilitators to Hemodialysis Access

The analysis of data revealed two subthemes related to Policy-Related Barriers and Facilitators to Hemodialysis Access: Lack of Insurance Coverage/Government Subsidy and Policy

and Education for Improved Access. Participants highlighted the exclusion of hemodialysis from NHIS and private insurance schemes, leaving patients to bear high out-of-pocket costs. This financial burden often led to delayed treatment and non-adherence. Participants emphasized the need for government subsidies and policy reforms to improve affordability and access.

4.5.2.5.1 Lack of insurance coverage/Government subsidy

Participants described inadequate health insurance coverage for hemodialysis in Ghana, noting that patients bear a significant monetary burden. Several participants stated that hemodialysis is not covered under the National Health Insurance Scheme (NHIS) or private insurance, making treatment unaffordable for many. One participant remarked, *"Hemodialysis is not on NHIS nationally* [barrier to affordability of dialysis]*"* (P2). Another participant added, *"Most private insurance companies do not cover hemodialysis* [barrier to financial access]*"* (P5). Some participants linked the absence of NHIS directly to challenges in accessing hemodialysis. One participant shared, *"If the national health insurance can cater for one or two sessions, the patient should maneuver at least for the last one session left* [barrier to regular hemodialysis access]*"* (P1).

Concerns were also raised about the NHIS's limitations in sustaining long-term hemodialysis coverage. One participant stated, *"The health insurance cannot afford; dialysis is very expensive* [barrier to sustainable coverage]*"* (P3). Another participant added, *"If it* (NHIS*)is going to operate like it currently does with other conditions, then I'm afraid the hemodialysis centers will close down* [barrier to continued hemodialysis service delivery]*"* (P13).

Healthcare providers emphasized the need for financial facilitators, such as government subsidies and nongovernmental organization's support, to reduce out-of-pocket costs. A participant suggested, *"If the government can make it affordable for patients with kidney failure*

to have their three sessions of treatment [facilitator to affordability and adherence]*"* (P1) Another participant noted, *"If the government can subsidize some of the cost... it will help a lot* [facilitator to sustained hemodialysis use]*"* (P5).

4.5.2.5.2 Policy Gaps and the Need for Reform to Improve Hemodialysis Access

Participants identified specific policy-related barriers that hinder timely hemodialysis access, including the absence of national insurance coverage for dialysis, financial hardship due to high out-of-pocket costs, lack of subsidies for consumables, and limited policy support for expanding dialysis infrastructure. One participant noted, *"The poverty situation in the area makes it impossible for people to access healthcare services at the onset of any condition* [barrier to early dialysis-seeking]*"* (P13). Policy reform was suggested as a key facilitator to enhancing access, including the passage of laws supporting kidney transplantation programs [facilitator via policy] (P7).

4.6 Discussion

The findings of this study provide an in-depth understanding of the perspectives of health service administrators and healthcare providers regarding barriers and facilitators that patients with ESKD in Ghana face in accessing and utilizing hemodialysis. This study highlights the significance of socioeconomic status, education, cultural beliefs, and family support in shaping patients' ability to access and utilize hemodialysis in Ghana. These variables were not arbitrarily selected but emerged inductively from participant accounts across different stakeholder groups and were consistently identified as central to understanding barriers and facilitators.

Health care providers and administrators repeatedly emphasized that financial constraints are one of the key barriers for patients in accessing and using hemodialysis in this study, with the high cost of dialysis, out-of-pocket expenses, and limited or no insurance coverage leading to

missed sessions and treatment withdrawal. The price includes three weekly dialysis sessions, medications, laboratory tests, and other basic health care. These financial burdens often lead patients to receive inadequate hemodialysis, leading to poor health outcomes and increased mortality (Vanholder et al., 2021). Similar findings have been reported in other Ghanaian studies (Tannor & Antwi, 2023) and in other countries, including Ethiopia (Baye et al., 2024), Nigeria (Bamgboye, 2003, 2016), Pakistan (Shouket et al., 2022), and India (Ahlawat et al., 2017), where the high cost of hemodialysis led to early dropout from treatment schedules and reduced adherence to prescribed treatments (Dodd et al., 2018). Long-term dialysis sustainability in most low and middle income countries depends on public subsidies, as patients cannot bear these costs indefinitely (Agada-Amade et al., 2024).

The financial burden of hemodialysis extends beyond patients to their families, who often bear the cost of treatment. Unemployed or low-income patients often depend on family members, personal savings, or other forms of financial support, leading to substantial economic difficulty for the entire household. This study's findings align with those of Boateng et al. (2024) in Ghana, Darwish et al. (2020) in Egypt, and Scholes-Robertson et al. (2023) in Australia, which reported similar financial burdens on families. A concerning finding, according to healthcare providers of this study, was that a large number of ESKD patients discontinued their treatment due to financial hardships. This issue is made worse by the fact that most Ghanaian patients have low incomes and engage in low-wage or non-professional jobs like farming, small trading, or unorganized labor. The nationally accepted minimum wage as of March 2025 is GHS 19.97 (USD 1.28), or approximately GHS 539.19 per month (Ghana News Agency, 2025). Many informal workers earn between GHS 1,000 and 1,500 (USD 85–130) per month, which is still much less than what is required to sustain hemodialysis (Tannor & Antwi, 2023). Providing government subsidies and

assistance to patients who cannot afford treatment and community-based financial support initiatives is key to easing this hardship and improving hemodialysis access (Kim et al., 2024).

Hemodialysis is typically prescribed three times per week, but each session costs about GHS 380–900 (USD 33–98), depending on the facility (Tannor et al., 2023). This totals over GHS 4,500 per month (USD 390), excluding extra costs such as laboratory tests, transportation, and medications (Tannor and Antwi, 2023). Many patients find it practically impossible to continue receiving treatment at the required frequency due to this financial burden, which may lead to missed sessions, treatment delays, or the complete cessation of dialysis (Tannor et al., 2023). These findings are similar to those reported in a systematic review by Thurlow et al. (2021) and O'Halloran et al. (2018), as well as a study by Ashuntantang et al. (2017), which found substantial dropout rates among patients with ESKD in sub-Saharan Africa.

Participants also emphasized that patients on hemodialysis face considerable employment challenges due to the time demands of treatment and the physical toll of chronic kidney disease, which can include fatigue, weakness, and frequent hospital visits. These findings align with research conducted in Iran (Motiei et al., 2024) and the Netherlands (Alma et al., 2023) and a systematic review by Kirkeskov et al. (2021) that documented comparable difficulties in patients with ESKD. For patients to maintain their financial security and standard of living, clinical and social interventions like flexible work schedules and employment assistance programs are crucial.

In light of all the financial barriers experienced by patients the health care providers and administrators identified, our study's findings emphasize the need to offer low-income patients publicly funded subsidies to cover the cost of accessing and receiving hemodialysis. Interestingly, in Nigeria, Agada-Amade and colleagues (2024) did a cost benefit analysis of hemodialysis

treatment compared to conservative management and found that "the benefit of haemodialysis outweighs its cost, making it cost-beneficial to society" and thus justifies public funding (p.1).

Study participants identified education as a factor influencing access to and compliance with hemodialysis. Patients with low levels of education were found to have limited knowledge and awareness of the importance of early treatment for ESKD and the need for consistent dialysis, leading to delayed dialysis-seeking or reliance on alternate treatments. Studies in Vietnam (Jones, 2022) and Pakistan (Ahmed et al., 2022) support this finding, highlighting how limited health literacy negatively affects chronic disease management. Navaneethan et al. (2008) and Ahmed et al. (2022) further noted that lower education levels are linked to delays in seeking nephrology care. This was one of the concerns identified by our participants. Educational interventions, such as the provision of online patient information about ESKD suggested by one of the participants aimed at both patients and the wider community, could improve awareness and encourage earlier diagnosis and treatment (Kim et al., 2024).

Participants observed that patients' treatment choices were greatly influenced by their cultural and religious beliefs, with many opting for herbal or spiritual remedies rather than conventional medical treatments. Such decisions have been linked to worsening health outcomes and delaying the start of dialysis in several countries, including Ghana (Boateng et al., 2018), Malaysia (Zakaria et al., 2021), Trinidad (Bahall, 2017), and Nigeria (Rumun, 2014). Among the cultural beliefs identified that created barriers to timely medical care was that some patients ascribed their illness to supernatural causes and is in line with a study by Pan et al. (2020), which described how beliefs in supernatural beings could discourage the use of healthcare services. Striving to bridging the gap between medical and cultural practices can be challenging but are needed to overcome the barriers to timely ESKD treatment. Educational campaigns and culturally

sensitive healthcare strategies and interventions are key in addressing these gaps and encouraging timely dialysis access. Suggested strategies include training healthcare workers in culturally competent communication, involving religious and traditional leaders in kidney health education, using local languages and culturally relevant materials, and integrating patient education into routine clinical encounters. These efforts aim to bridge the gap between traditional beliefs and medical treatment, promote earlier engagement with dialysis services, and improve outcomes for patients with ESKD.

Participants in this study identified the precariousness of medical and basic societal infrastructure which continually challenged their ability to provide hemodialysis care. Human resource constraints, consumable shortages, and poor hemodialysis infrastructure were barriers to hemodialysis access and utilization at the healthcare system level. Recurrent shortages of essential hemodialysis supplies such as dialyzers, dialysis concentrate, bloodlines, and catheters, along with understaffing and erratic power and water supply, disrupted service delivery, leading to missed or delayed dialysis sessions and irregular treatment schedules. Power and water outages also delayed care. Similar medical and infrastructure challenges in providing patients with hemodialysis care were reported in a scoping review of 30 studies of factors affecting access to dialysis for patients with ESKD in Sub-Saharan Africa (Japiong et al., 2023).

Participants in this study emphasized that challenges were made worse by bureaucratic shortcomings, as delays in resource allocation and procurement limit timely access to essential medical supplies. In addition to lowering the quality of hemodialysis, these resource limitations also make it more difficult for hemodialysis facilities to accommodate the rising demand for their services. To ensure continuous hemodialysis services, it is imperative to improve healthcare infrastructure and fortify supply chain management.

Our study also found that a perceived lack of knowledge, skills, and expertise among healthcare personnel, coupled with a shortage of nephrology staff, considerably impedes the provision of hemodialysis services in Ghana. This shortage of nephrology healthcare workers aligns with findings from other studies highlighting the insufficient number of renal specialists globally (Ajayi et al., 2020; Japiong et al., 2023; Osman et al., 2018; Pancras et al., 2018; Tadesse et al., 2021; Tannor & Antwi, 2023). Contributing factors include limited nephrology training programs, low remuneration, and the migration of trained professionals to higher-paying regions (Japiong et al., 2023; Osman et al., 2018). These shortages contribute to the poor prognosis of patients with ESKD and may worsen as healthcare workers leave for greener pastures and better working conditions in Europe and North America (Crews et al., 2019; Japiong et al., 2023). In addition, training disparities and skill gaps among staff negatively impact hemodialysis, underscoring the need for standardized training, continuous professional development, and incentives to attract skilled personnel to dialysis centers (Japiong et al., 2023).

Participants identified geographic barriers as a barrier to access and use of hemodialysis, as many participants identified that patients must travel long distances for treatment, increasing both financial and physical burdens, a finding that concurs with other studies from Ghana (Boateng et al., 2024; Tannor et al.,2023), Rwanda (Mukakarangwa et al., 2018), and Ethiopia (Tadesse et al., 2021), where patients with ESKD often travel great distances to access hemodialysis services. This suggests that the inaccessibility of hemodialysis services is a widespread issue in sub-Saharan Africa, and it often deters patients from seeking or continuing treatment. Establishing decentralized dialysis facilities could significantly reduce travel burdens and improve accessibility for underserved populations.

Participants identified language barriers as a significant challenge in this study. Patients with limited English proficiency often struggle to understand important treatment information, which hinders their ability to comply with care protocols. Miscommunication in healthcare settings can have serious consequences, as noted by Meuter et al. (2015) and Al-Yateem et al. (2023), and Martinez et al. (2024) that patients with limited English proficiency (versus English-proficient patients) report poorer communication with the dialysis care team (less listening, fewer clear explanations, less time spent). Hence, effective communication strategies, including the use of interpreters and culturally appropriate education materials, are essential to improving patient outcomes.

Participants in our study identified the severe psychological and emotional challenges faced by patients undergoing hemodialysis. The demanding treatment regimen disrupts daily activities, employment, and social interactions, compounding anxiety, depression, and emotional distress. These findings align with previous studies in Ghana (Thomas Nti & Frances Emily, 2021), the United Kingdom (Sein et al., 2020), Egypt (Elhadad et al., 2020), Ireland (Cogley et al., 2023) and Taiwan (Chen et al., 2022) reporting high rates of psychological distress in this population. Given these vulnerabilities, integrating mental health screenings, counseling, and peer support groups into dialysis care is essential for improving resilience and treatment adherence.

Participants recognized the importance of family and community support as facilitators of hemodialysis access, particularly in assisting with transportation, financial aid, and treatment adherence. Healthcare providers highlighted the critical role of families in ensuring that patients reach hemodialysis centers. Financial, emotional, and logistical assistance from families significantly influences treatment decisions, with patients receiving such support being more likely to adhere to treatment schedules (Boateng et al., 2024; Darwish et al., 2020). However, participants

also discussed the variability in family support available, i.e., while some families offered unwavering support, others struggle with the financial burden, leaving patients to navigate treatment independently. Prior studies emphasize that strong familial support enhances treatment adherence and improves health outcomes in chronic disease management (Japiong et al., 2023; Rosland & Piette, 2010).

Beyond family involvement, community support played a crucial role in enabling hemodialysis access. In some cases, local communities mobilize financial resources to assist patients who cannot afford treatment, while spiritual and emotional support provides encouragement. Social networks can mitigate the burden of ESKD, yet gaps in support persist, particularly for patients facing social stigma or financial constraints (Bulathwatta et al., 2023; Neumann et al., 2018). Strengthening both family and community engagement through structured support programs such as peer mentorship groups and community health worker outreach may enhance patient well-being and facilitate sustained hemodialysis access.

In addition to social support, strong healthcare provider-patient relationships facilitate hemodialysis access and utilization. Effective communication, trust, and shared decision-making enhance patient engagement and treatment adherence. Shared decision-making fosters autonomy and sustained care-seeking behaviors (Ubel et al., 2018). Prior research highlights that patient-centered communication improves trust and chronic disease management (Naughton, 2018). Training healthcare providers in empathetic, patient-centered care may further strengthen engagement and treatment continuity.

Psychological adaptation and humor also emerged as crucial coping strategies that facilitate access to and continued use of hemodialysis. Many patients initially experience distress but gradually accept dialysis as part of their lives. This process aligns with the theory of illness

adaptation, which suggests that patients who reframe their condition as manageable are more likely to adhere to long-term treatment (Chabowski et al., 2017; Jølstad, 2023). Research indicates that therapeutic patient education and psychosocial support can enhance acceptance and improve treatment adherence among individuals with chronic illnesses (Akyirem et al., 2022).

Humor also played a key role in reducing stress and enhancing resilience to dialysis utilization. Studies show that humor therapy alleviates depression, reduces anxiety, and improves overall coping in chronic disease management (Bennett et al., 2020). Encouraging adaptive coping mechanisms through patient education, psychosocial support, and humor therapy may enhance resilience and improve long-term adherence to hemodialysis.

4.7 Strengths and Limitations

This study has several strengths. The study gave voice to health care providers and administrators who provide and plan care for patients with ESKD. Their voices provides important insight into the complexity of delivering hemodialysis care to patients needing this life preserving treatment. The recruitment of participants in two socioeconomically and geographically distinct regions of Ghana, including participants from varied professional backgrounds, allowed for more in-depth exploration of the barriers and facilitators patients experience in receiving hemodialysis. Additionally, the interview guide used for the interviews was informed by the literature on dialysis access as well as findings from our previous quantitative patient health services study regarding patient access and utilization of hemodialysis in the same two study settings.

The study also has limitations. Though this study was conducted at two major teaching hospitals in Ghana, which, while cosmopolitan and drawing healthcare providers and health service administrators from varied backgrounds, may not fully reflect the experiences of providers and administrators in other regions or facility types. The sample of eight participants from each

site is small and may not reflect all administrators' and health care providers' perspectives in these sites. The use of purposive sampling, though appropriate for qualitative research, may have excluded perspectives from other facilities or providers with differing experiences. In addition, the use of self-reported data introduces the possibility of recall or social desirability bias.

4.8 Conclusion

The study highlights the value of a multifaceted perspective in our understanding of the barriers and facilitators of hemodialysis access and utilization for patients with ESKD in Ghana. Key challenges identified include significant travel distances to dialysis centers, limited availability of facilities, financial burdens, inadequate education, resource constraints, psychological distress, and cultural beliefs that may influence treatment choices. These barriers contribute to poor health outcomes, including treatment dropout and inadequate adherence to hemodialysis schedules.

Conversely, facilitators such as family and community support, positive healthcare provider-patient relationships, psychological adaptation, and even plain humor play a crucial role in enhancing patient access and adherence. The study underscores the urgent need for systemic reforms, including increased funding, improved training for healthcare staff, and the implementation of educational campaigns to address cultural beliefs and enhance awareness about ESKD. Overall, addressing these challenges through focused actions, such as public-private partnerships and comprehensive support programs, is essential for improving the quality of care and life for patients with ESKD in Ghana.

CHAPTER FIVE: CHAPTER 5: SUMMARY, DISCUSSION, IMPLICATIONS, AND RECOMMENDATIONS

5.1 Introduction

This dissertation examined the barriers and facilitators to hemodialysis access and utilization for patients with ESKD in Ghana, a setting where access to such life-sustaining treatment remains limited and uneven. Employing an explanatory sequential mixed methods design, the research examined the predictors of access and use of hemodialysis among patients, as well as the perspectives of patients, providers, and health service administrators, addressing a substantial gap in the literature.

The dissertation is organized around three interconnected manuscripts that each shed light on a different dimension of barriers to and facilitators of access and use of hemodialysis. The first paper examined how sociodemographic and geographic barriers affect access to and utilization of hemodialysis, as well as treatment adherence, laying the groundwork for understanding their care realities. The second explored barriers and facilitators of hemodialysis care in Ghana among patients with ESKD, while the third captures the views of providers and administrators on institutional and systemic barriers.

The quantitative and qualitative data from these three manuscripts in this dissertation provide a comprehensive and contextually informed understanding of hemodialysis access and utilization in Ghana. This holistic approach not only informs policy reforms but also advances the wider conversation on equitable healthcare delivery in resource-limited settings.

5.2 Summary of Key Findings

5.2.1 Quantitative Findings (Chapter 2)

Chapter 2 quantitatively assessed the predictors of hemodialysis utilization among patients with ESKD in Ghana. Among 264 participants, 74.2% reported access to dialysis services, yet only 38.8% attended all prescribed sessions in the previous four weeks, as 83.3% faced substantial monetary difficulties accessing hemodialysis. Multivariate analysis identified higher family income, urban residence, longer disease duration (>1 year), and living within 40 km of a dialysis facility as significant predictors of utilization. These results underline the importance of financial capacity, geographic proximity, and chronicity of disease in shaping dialysis utilization patterns.

5.2.2 Qualitative Findings (Chapters 3 & 4)

The findings of the qualitative interviews with ESKD patients identified five themes as barriers to and facilitators of access to and use of hemodialysis among Ghanaian patients with ESKD: 1. individual barriers and facilitators (emotional resilience, symptom burden, and the socioeconomic impact on employment and education), 2. social barriers (including family support, social stigma, and patient-provider relationships), 3. systemic barriers (equipment shortages, unreliable utilities, and transportation challenges), 4. cultural and knowledge barriers (including beliefs and misconceptions about kidney disease), and 5. Absence of Public Funding for Hemodialysis Services (notably high treatment costs and inadequate insurance). These findings show the relationship of personal, social, cultural, systemic, and financial factors that shape hemodialysis access and utilization in Ghana, underscoring the need for multi-level actions to improve equitable care.

Our findings from the healthcare providers and administrators' perspective also revealed five themes influencing hemodialysis access for patients with ESKD in Ghana: 1. patient-specific

barriers, 2. sociocultural influences, 3. facility-level challenges, 4. community-level barriers, and 5. policy-related barriers. Providers and administrators identified barriers that included psychological (denial and fear), low socioeconomic status, financial hardship, and limited patient education. Cultural beliefs, reliance on traditional or spiritual healing, and variable family and community support further affected treatment adherence. Facility-level barriers, such as a lack of dialysis machines, frequent machine breakdowns, staff shortages, and administrative barriers, often interfered with hemodialysis use and adherence. Community-level barriers consisted of low public awareness, late diagnosis, and issues related to geography and transportation. Policy barriers worsened financial barriers, including a lack of insurance and a lack of government support. Strong family and community support, patient coping strategies, and a good provider-patient relationship were facilitators. Overall, these findings highlight the need for comprehensive, multi-level actions (strategies, interventions, etc) to address the complex barriers to equitable hemodialysis access in Ghana.

5.2.3 Integration of Mixed-Methods Findings

This mixed-methods study examined the predictors of hemodialysis utilization among patients with ESKD undergoing or in need of hemodialysis in Ghana and explored the barriers and facilitators of access and utilization of hemodialysis services. The combination of quantitative (Chapter 2) and qualitative (Chapters 3 & 4) findings offers a comprehensive understanding of the multifaceted barriers these patients face and informs focused policy and practice actions.

Convergence Across Methods: Findings from both phases showed strong alignment around financial hardship and the Absence of public funding for hemodialysis services as a dominant barrier to hemodialysis access and utilization. Quantitative data showed that 83.3% of patients face economic difficulties, and only 38.8% adhered fully to prescribed dialysis sessions. Qualitative

narratives supported this, accentuating high treatment costs, limited insurance coverage, and income loss due to disease burden as barriers. In addition, geographic disparities were evident in the quantitative phase, with distance to facilities predicting utilization, reports of long travel distances, poor roads, and transportation costs were reinforced qualitatively. Qualitative narratives also demonstrated how strong family networks, communal ties, and provider relationships could either cushion challenges or, when absent, intensify vulnerability.

Divergence Between Data Strands: Knowledge and cultural beliefs emerged as a key area of divergence. Although there were no items included on this topic in the survey, qualitative findings revealed considerable cultural and informational gaps, ranging from misconceptions about dialysis to spiritual interpretations of disease, that shaped health-seeking behavior and treatment adherence. These nuances show the limitations of the survey in capturing complex socio-cultural influences, which were more effectively uncovered through qualitative inquiry.

Table 6: Synthesis Matrix: Mapping Integrated Findings

Core Domain	Quantitative Findings (Ch. 2 & 3)	Qualitative Findings (Ch. 4 & 5)	Integrated Interpretation
Absence of Public Funding for Hemodialysis Services	83.3% faced financial challenges; income predicted utilization	High cost, inadequate insurance, income loss, and financial dependency	Financial hardship is the central barrier across all levels; multi-sector financial support is needed
Geographic Access	Distance to facility and urban residence predicted access	Long travel distances, transportation costs, and regional disparities	Geographic inequity impacts timely and sustained care
Social Support	Not measured	The role of family, community, and provider relationships is critical	Strong social networks mitigate barriers; weak networks increase vulnerability
Healthcare System Factors	Not Measured	Equipment shortages, power outages, and staff shortages	Systemic dysfunction is normalized by patients but significantly impacts care quality
Knowledge/Cultural Beliefs	Not measured	Misinformation, spiritual beliefs, stigma	Cultural beliefs significantly shape treatment decisions and adherence
Policy/Systemic Facilitators	Not measured	Advocacy for NHIS coverage, decentralization, and education	Structural reform is essential for sustainable and equitable dialysis care

The combined findings emphasise the necessity for multi-level initiatives, focusing on national health policy, facility capacity, social support networks, and individual understanding. While quantitative data provided patterns of predictors of access, qualitative data illuminated underlying causes, patient experiences, and system-level dysfunctions. Together, both phases build a compelling case for planned investment in dialysis infrastructure, health financing reform, community-based education, and culturally sensitive care delivery to improve equity in ESKD management in Ghana.

5.3. Discussion

5.3.1 Integration and Interpretation of Findings

This dissertation provides a holistic, multi-perspective analysis of hemodialysis care in Ghana by integrating and synthesizing data from all study components to present a comprehensive picture. Together, these manuscripts add to the body of prior work by addressing conventional medical treatments and infrastructure constraints as well as emotional, economic, and cultural barriers. The findings align with research from other low- and middle-income countries, but uniquely demonstrate how faith, family networks, and community organizations can act as both supports and stressors in the Ghanaian context. They also reveal the deepened susceptibilities faced by patients without strong social support, a perspective underexplored in prior studies.

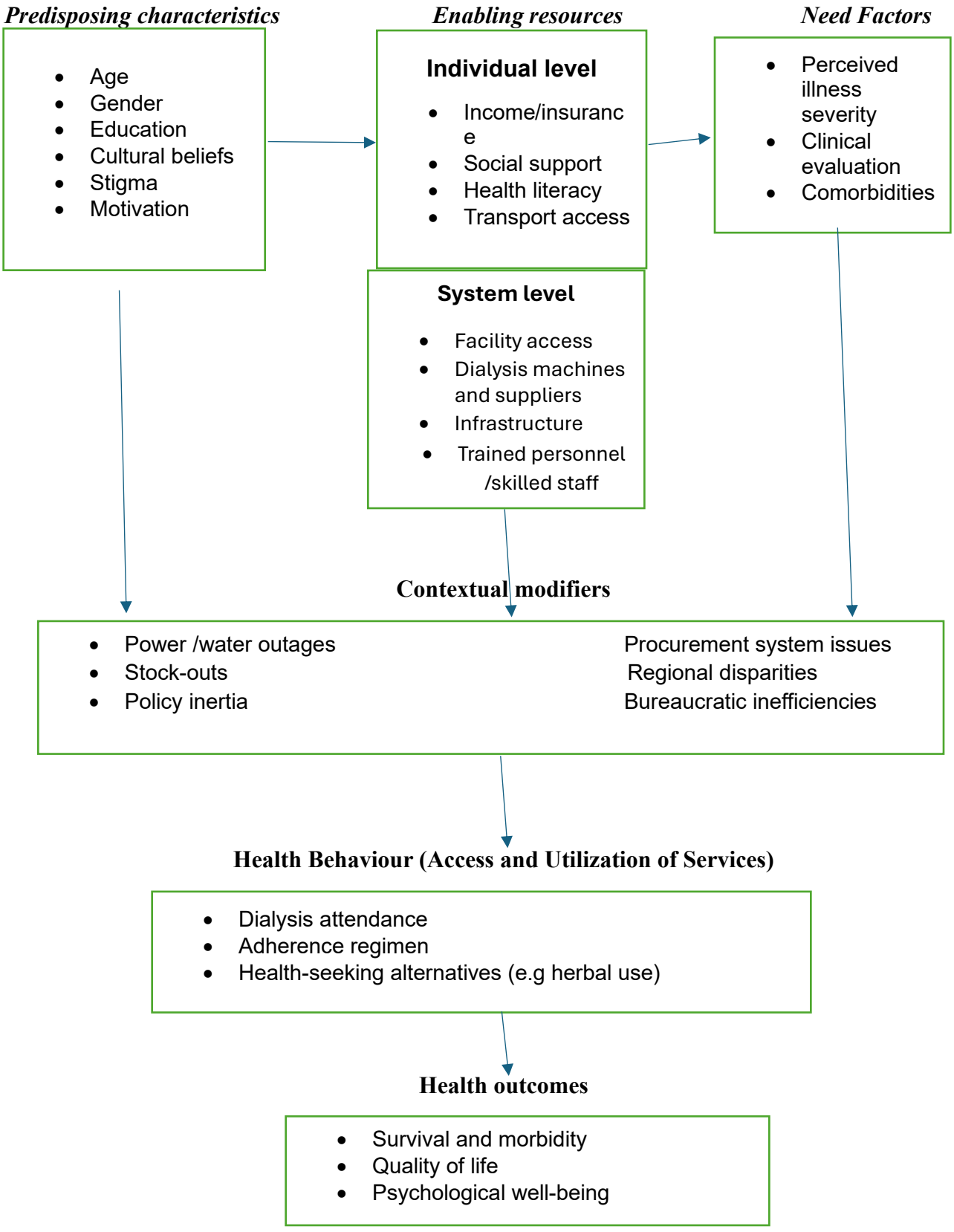
The results also show stark regional differences in the availability of hemodialysis services. For example, Tamale Teaching Hospital in Northern Ghana consistently lacks specialized staff, supplies, and equipment, while Korle Bu Teaching Hospital in the capital has comparatively adequate resources and offers better dialysis therapy. These differences reflect systemic enabling barriers within the Andersen Behavioral Model and highlight the urgent need for regionally tailored investments and policies to achieve equitable access to life-sustaining treatment across the country

By mixing quantitative and qualitative evidence from multiple stakeholders, this dissertation reinforces the value of holistic, equity-oriented approaches to hemodialysis care. The work supports the relevance of theoretical frameworks such as Andersen's Behavioral Model and provides new empirical evidence to inform clinical practice, policy, and future research in resource-constrained settings.

5.3.2 Model Name: Ghana Adapted Andersen Model for Health Services Access (GAAM-HSA)

The Ghana Adapted Andersen Model for Health Services Access (GAAM-HAS) is a modified version of the original Andersen Behavioral Model, based on real data from Ghanaian patients with ESKD and healthcare providers and hospital administrators. The model extends the traditional domains of predisposing, enabling, and need factors by incorporating important contextual modifiers that significantly affect service utilization and outcomes in low-resource settings, such as infrastructure constraints, supply shortages, sociocultural beliefs, stigma, and policy inefficiencies. By utilizing both qualitative and quantitative data, GAAM-HAS produces a more nuanced, contextually grounded, and actionable framework for understanding and improving healthcare access in Ghana and similar settings.

Figure 6: Ghana Adapted Andersen Model for Health Services Access (GAAM-HSA)



5.3.3 Implications for Policy, Practice, and Public Health

The conclusions of this dissertation have extensive implications for enhancing hemodialysis care in Ghana and other low-resource settings. Enhancing health infrastructure, through investment in dialysis equipment, stable utilities, and training of skilled staff, is essential to expanding access and quality of care. Expanding financial coverage, particularly through the National Health Insurance Scheme, is also critical to decreasing the burden of costs on patients and making life-sustaining hemodialysis universally accessible.

At the clinical level, strategies to improve patient-centered care, enhance treatment adherence, and address equipment shortages should be prioritized. The findings can be included in health worker education, especially nephrology nursing programs, to guarantee that healthcare professionals are aware of the emotional, knowledge, and cultural barriers that patients with ESKD face. This insight equips them to deliver appropriate coping strategies and holistic care tailored to patient needs.

Finally, tailored interventions that address sociodemographic disparities, such as income, transportation, and social support, are vital for equitable healthcare delivery. Collaborative action by policymakers, healthcare practitioners, and community stakeholders is necessary to implement these changes and improve outcomes for patients with ESKD in Ghana.

5.4. Strengths and Limitations

5.4.1 Strengths

This dissertation draws on a comprehensive body of data collected from multiple stakeholders across diverse settings in Ghana, providing a holistic understanding of hemodialysis access and utilization. Data collection was conducted in two geographically and socioeconomically diverse regions in Ghana, which provided variety to the sample and provided

a good representation of hemodialysis access and barriers to utilization, facilitators, predictors, and experiences. The inclusion of patients with ESKD on hemodialysis and those not yet receiving treatment, as well as perspectives from both healthcare providers and health service administrators, allowed for a holistic inquiry of the topic. The findings were further enhanced by using both quantitative and qualitative approaches, which allowed for a deeper understanding of the many variables affecting hemodialysis treatment.

While the findings are presented in three manuscripts for publication purposes, the strength of this dissertation lies in the integration and synthesis of all data, which together provide a fuller picture of the complexities of access, utilization, and service delivery for patients with ESKD.

5.4.2 Limitations

Some limitations should be acknowledged. The study only included two large teaching hospitals, which may not accurately reflect the experiences of all patients, administrators, or providers in Ghana, especially in rural or underdeveloped areas, despite their broad catchment areas and multiethnic makeup. The purposive sampling, although adequate for qualitative research, must have left some perspectives out, e.g., individuals who were too ill to participate or others from other facility types. The cross-sectional design of the quantitative elements does not permit drawing causal inferences or identification of causation. In addition, self-report data poses the threat of recall and social desirability bias, and a few uncontrolled confounding factors, such as cultural beliefs, potentially were not fully quantified. These must be borne in mind when interpreting the findings and their generalizability.

5.5 Recommendations for Future Research

Based on the findings of this dissertation, subsequent studies ought to explore several key areas to enhance knowledge and refine hemodialysis care in Ghana and low-resource environments

at large. Longitudinal research must track changes in access, utilization, and patient outcomes over time. Interventional studies would assess the effect of interventions such as funding support, patient education, and community engagement on promoting the adoption of care delivery and adherence. Comparative analyses with similar successful funding models in other sub-Saharan African countries can provide best practices, lessons, and applicable strategies. The effects of expanded insurance coverage can also be assessed, and sustainable, affordable funding options can be described using economic and policy analysis. Cumulatively, these bodies of research are able to develop robust evidence for policymaking, enhance clinical practice, and improve the lives of individuals with ESKD.

5.6 Conclusion

This dissertation advances knowledge on hemodialysis care in Ghana by providing a comprehensive, mixed-methods investigation that integrates economic, biomedical, psychosocial, and cultural perspectives. Drawing on data from multiple stakeholders, the research highlights that barriers to hemodialysis access and utilization are multifaceted, encompassing not only infrastructural limitations and financial constraints but also social stigma, spiritual beliefs, and a lack of psychosocial support. These findings are an extension of the literature in highlighting how religion, family support networks, and community institutions can be both facilitators and unsuspected stressors along the treatment pathway, and in demonstrating the varied vulnerabilities of patients without strong social support systems.

Barriers identified were limited availability of dialysis units, distant travel requirements, cost, absence of coverage by insurance, and regional differences. Psychological distress, cultural beliefs, and the absence of patient education also hinder access and adherence to treatment.

Facilitators such as supportive families, positive provider-patient relationships, and psychological adaptation were key factors in ensuring access and adherence.

These results solidify the importance of holistic, patient-centered approaches that meet not only medical needs but also social and cultural conditions among patients. The study validates the application of Andersen's Behavioral Model, where the incorporation of systemic resources, social processes, and personal influences is emphasized in the determination of access to healthcare.

To improve the outcomes of the patients with ESKD in Ghana, both the individual and systemic barriers need to be addressed, and the facilitators at hand need to be utilized. Policy changes need to aim at dialysis facility scaling up, insurance coverage and funding widening, and public education for demystification and removal of stigma. Provider training and enhanced support programs are also essential.

5.7 Call to action

Policymakers, health professionals, researchers, and stakeholders in communities all must work together to implement multi-level interventions that tackle the economic, social, and cultural determinants of hemodialysis access and utilization. Through establishing collaborations, allocating resources for infrastructure, and advocating for patient-focused treatment, Ghana can significantly advance the cause of fair and better health outcomes for people with ESKD. This dissertation provides a platform for future research and policy action, advocating for a more integrated and equity-oriented approach to kidney care in low-resource settings.

5.8 Reflections on the Research Journey (My PhD Journey)

5.8.1 Introduction

My professional, academic, and personal life has been greatly impacted since I began pursuing my PhD in Nursing at York University, Canada. I am a nurse educator and researcher from the Northern Region of Ghana. This is one of the most underserved regions in my country. Along with my ambitions, I carried the expectations of many patients, students, and fellow nurses who struggle with the day-to-day realities of a fatigued healthcare system. I have been on a purpose-driven journey of enduring challenges and fostering growth, which has helped me create a robust body of work aimed at improving hemodialysis care access for ESKD patients in Ghana.

5.8.2 Motivation and the Decision to Pursue a PhD Abroad

Before pursuing my doctorate, I had been a clinical nurse in Ghana for over eight years in the emergency and medical wards. I later transitioned to academia at the University of Health and Allied Sciences (UHAS), where I taught students and performed research work in the areas of maternal and child health and clinical nursing. But it became progressively clearer that resolutions to Ghana's profoundly entrenched systemic issues in healthcare and dialysis treatment, in particular, required international exposure and further research training.

York University's Doctor of Philosophy in Nursing was most appropriate for my needs. With the emphasis on social justice, critical thinking, and the four pillars of nursing: practice, education, research, and leadership, provided the ideal platform to further my capacity to conduct research with utility. I saw this as an opportunity not only to increase my knowledge but to distill my experiences into scholarship with practical application.

5.8.3 Navigating Cultural, Academic, and Emotional Transitions

The Canadian migration brought new challenges. Resilience and flexibility were needed to adjust to a Western academic setting. Academic expectations, especially about theoretical writing, critical reflexivity, and scholarly writing, were more theoretical and challenging than what I had experienced before. I sometimes felt like an impostor and questioned whether I was part of such a challenging academic community.

The adaptation also came with personal and emotional challenges. I missed the warmth of Ghana, family hospitality, teamwork culture, and sense of belongingness. The first few months were challenging due to the frigid winters and the loneliness of being a Black overseas student in a wealthy country. All of these experiences, however, bolstered my determination to achieve my objectives, broadened my perspectives, and helped me grow personally.

5.8.4 Academic and Research Milestones

My experience of doing my PhD has been intellectually demanding and methodologically rewarding. I acquired advanced competence in qualitative and mixed-methods research, using tools like NVivo in data analysis and management. I also developed my knowledge translation and policy-relevant research competencies, maintaining a firm grounding in the pragmatic realities of clinical nursing.

The core of my dissertation explores the barriers and facilitators to hemodialysis care in Ghana from the perspectives of patients, nurses, doctors, and hospital administrators. The study is conducted through a paper-based dissertation with four manuscripts conceived based on a combination of survey evidence and qualitative interviews. It addresses major issues such as unpredictable supply chains of dialysis materials, unaffordability, staffing shortages, and

infrastructure challenges. It also stresses resilience, innovation, and hope on the part of patients and health professionals operating within such constraints.

Fieldwork in Ghana was humbling and affirming. I heard the stories of patients who, because of the expense, had to travel great distances to receive dialysis or forego treatment entirely. I saw the dedication of administrators and nurses who demonstrated an unmatched dedication to care despite having less-than-ideal resources. These encounters strengthened my comprehension of healthcare issues unique to a certain setting and reaffirmed the importance of my work.

5.8.5 Reflexivity and Positionality in the Research Process

Reflectivity has been a cornerstone of my dissertation study. My experience as a nurse and instructor in Ghana informed my research question and data analysis. I conducted regular peer debriefings, employed neutral probes during interviews, and kept a reflexive diary throughout the study to prevent bias. Comments from my supervisory committee and reflexive dialogue with fellow researchers disciplined my thoughts and contributed to the trustworthiness of my findings.

5.8.6 Mentorship, Scholarly Engagement, and Contributions

Although I was far from home, I was fortunate to have colleagues and mentors nearby who pushed and motivated me through the program. Academic norms, collaborative research, and consultation with stakeholders enriched my learning and allowed me to build my professional growth.

My work has produced four manuscripts and other ongoing manuscripts. These will be input into policy briefs, scholarly articles, and collaborative projects towards the creation of stronger healthcare systems in the context of limited resources.

5.8.7 Looking Forward: Returning to Serve and Lead

As I near the completion of this journey, my determination remains strong: to return to Ghana and contribute to the transformation of nursing education, research, and healthcare delivery. I will maintain my faculty appointment at UHAS, develop an active research program in chronic illness care, and mentor future nurse scholars. I also plan to pursue postdoctoral training to further develop my research and leadership capabilities.

In conclusion, this PhD has been a journey of purpose, resiliency, and significant growth rather than just a scholarly endeavor. I have learned how to overcome structural and personal obstacles, negotiate unfamiliar academic territory, and turn lived experience into insightful research. As a scholar from the Global South, I am now more prepared, self-assured, and committed to making knowledge matter, not only in journals but also in practice, policy, and people's lives.

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APPENDICES

Appendix A: Search Strategy

Database(s): **Ovid MEDLINE(R) and In-Process, In-Data-Review & Other Non-Indexed Citations** 1946 to June 29, 2022

Search Strategy: **Medline 2022-06-20 Run on 2025 -07 -18**

#	Searches	Results
1	exp Kidney Diseases/	607426
2	(kidney* or renal*).mp.	1337386
3	1 or 2	1412031
4	renal dialysis/ or hemodiafiltration/ or hemodialysis, home/ or renal replacement therapy/ or continuous renal replacement therapy/ or hemoperfusion/ or hybrid renal replacement therapy/ or intermittent renal replacement therapy/	120678
5	(dialysis or haemodialysis or hemodialysis or hemodiafiltration or haemodiafiltration or renal replacement or hemoperfusion or haemoperfusion).mp.	238894
6	4 or 5	238894
7	3 or 6	1468654
8	Hospice Care/ or Palliative Care/ or Terminal Care/ or Terminally ill/ or "Hospice and Palliative Care Nursing"/ or Death/ or Hospices/	120259
9	(end-of-life or end of life).ti,ab,kf,kw.	36654
10	((life-limiting or life limiting or life-threatening or life threatening or end-stage* or end stage* or progressive) adj3 (illness* or disease* or condition*)).mp.	158714
11	(palliative adj2 (approach* or therap* or care or caring)).mp.	90644
12	(dying or palliation or hospice*).mp.	80819
13	or/8-12	344776
14	exp "Africa South of the Sahara"/	285846
15	(Africa* or Algeria or Angola or Benin or Botswana or Burkina Faso or Burundi or Cameroon or Canary Islands or Cape Verde or Central African Republic or Chad or Comoros or Congo or Democratic Republic of Congo or Djibouti or Egypt or Equatorial Guinea or Eritrea or Ethiopia or Gabon or Gambia or Ghana or Guinea or Guinea Bissau or Ivory Coast or Cote dIvoire or Jamahiriya or Jamahiryia or Kenya or Lesotho or Liberia or Libya or Libia or Madagascar or Malawi or Mali or Mauritania or Mauritius or Mayotte or Morocco or Mozambique or Mocambique or	866159

	Namibia or Niger or Nigeria or Principe or Reunion or Rwanda or Sao Tome or Senegal or Seychelles or Sierra Leone or Somalia or South Africa or St Helena or Sudan or Swaziland or Tanzania or Togo or Tunisia or Uganda or Western Sahara or Zaire or Zambia or Zimbabwe or Central Africa or Central African or West Africa or West African or Western Africa or Western African or East Africa or East African or Eastern Africa or Eastern African or North Africa or North African or Northern Africa or Northern African or South African or Southern Africa or Southern African or subSaharan Africa or subSaharan African or sub-Saharan Africa or sub-Saharan African).mp.	
16	14 or 15	866389
17	adult/ or aged/ or "aged, 80 and over"/ or centenarians/ or nonagenarians/ or octogenarians/ or middle aged/	8345938
18	(person* or people* or population* or wom?n* or m?n* or male* or female* or elder* or pensioner* or adult* or middle age*).mp. [mp=title, abstract, original title, name of substance word, subject heading word, floating sub-heading word, keyword heading word, organism supplementary concept word, protocol supplementary concept word, rare disease supplementary concept word, unique identifier, synonyms]	24061298
19	17 or 18	24122126
20	7 and 13 and 16 and 19	2198
21	limit 20 to yr="2011 -Current"	1382

Appendix B: Ethics Approval

YORK
UNIVERSITÉ
UNIVERSITY

OFFICE OF RESEARCH ETHICS (ORE)
3rd Floor, Kaneff Tower

4700 Keele St.
Toronto ON
Canada M3J 1P3 Tel
416 736 5914
www.research.yorku.ca

(on behalf of Janessa Drake, Chair, Human Participants Review Committee)

Date: Tuesday, June 27, 2023

Title: **Barriers to and Facilitators of Hemodialysis Care in Ghana: A Sequential Mixed-Method Study among Patients with End-Stage Kidney Disease and Healthcare Workers**

Risk Level: ☒ Minimal Risk ☐ More than Minimal Risk

Level of Review: ☒ Delegated Review ☐ Full Committee Review

I am writing to inform you that this research project, **"Barriers to and Facilitators of Hemodialysis Care in Ghana: A Sequential Mixed-Method Study among Patients with End-Stage Kidney Disease and Healthcare Workers"** has received ethics review and approval by the Human Participants Review Sub-Committee, York University's Ethics Review Board and conforms to the standards of the Canadian Tri-Council Research Ethics guidelines.

Note that approval is granted for one year. Ongoing research – research that extends beyond one year – must be renewed prior to the expiry date.

Certificate #: **STU 2023-082**
Approval Period: **06/27/23-06/27/24**

Any changes to the approved protocol must be reviewed and approved through the amendment process by submission of an amendment application to the HPRC prior to its implementation.

Any adverse or unanticipated events in the research should be reported to the Office of Research ethics (ore@yorku.ca) as soon as possible.

ETHICS APPROVAL

For further information on researcher responsibilities as it pertains to this approved research ethics protocol, please refer to the attached document, **"RESEARCH ETHICS: PROCEDURES to ENSURE ONGOING COMPLIANCE".**

Should you have any questions, please feel free to contact me at acollins@yorku.ca.

To: **Milipaak Japiong**
Graduate Student, School of Nursing, York University
milipaak@yorku.ca

From: Alison M. Collins-Mrakas M.Sc., LLM
Director, Office of Research Ethics

RESEARCH ETHICS: PROCEDURES to ENSURE ONGOING COMPLIANCE

Appendix C: Participant Information and Informed Consent (Patients with ESKD)

Purpose of the study. As part of the requirements for a Doctor of Philosophy (Ph.D.) degree at York University, Canada, I have to carry out a research study. The study is concerned with the barriers to and facilitators of providing quality care to patients experiencing ESKD and specifically accessing and using hemodialysis in Ghana.

What will the study involve? The study will involve a 30-to-45-minute survey on the social and healthcare needs of patients with ESKD and 30-60 minutes of face-to-face or telephone interviews on the barriers to and facilitators of hemodialysis care.

Why have you been asked to take part? You have been asked because you are specifically or generally suitable to provide data for the study.

Do you have to take part? Participation is voluntary, and patients who are interested in participating will be required to sign an informed consent form. Participants have the option of withdrawing before the study commences (even if they have agreed to participate) or discontinuing after data collection has started.

Will your participation in the study be kept confidential? Yes. I will ensure that no clues to your identity appear in the thesis. Any extracts from what you say that are quoted in the thesis will be entirely anonymous.

What will happen to the information that you give? The data will be kept confidential for the duration of the study, available only to me and my research supervisor. Data will be safely stored for 5 years on a secure, password-protected computer, and the data will be destroyed in July 2028.

What will happen to the results? The results will be presented in the thesis. The thesis may be read by future students in the course. This study's results will be published in peer-reviewed journals, presented at conferences and workshops, and discussed with policymakers, patient groups, and providers at the community and facility levels, and the electronic media to disseminate the findings to the public.

What are the possible disadvantages of taking part? I do not envisage any negative consequences for you in taking part. It is possible that talking about your experience in this way may cause some distress.

Who has reviewed this study? This research has been reviewed and approved by the Human Participants Review Sub-Committee, York University's Ethics Review Board.

Any further queries? If you have questions about the research in general or about your role in the study, please contact Milipaak Japiong by e-mail (milipaak@yorku.ca)

If you agree to take part in the study, please sign the consent form overleaf.

Adapted Informed Consent Form (from York University)

Study Name: Barriers and Facilitators to Hemodialysis Access and Utilization Among Patients with End-Stage Kidney Disease in Ghana: A Mixed-Methods Study from the Perspectives of Patients, Providers, and Administrators.

Researchers: Milipaak Japiong, RN, MScN, Ph.D. (Cand), School of Nursing, Faculty of Graduate Studies, York University, Canada. Email: milipaak@yorku.ca.

Purpose of the Research: The goal of this research is to develop a comprehensive understanding of the barriers to and facilitators to providing quality care to patients experiencing ESKD and specifically accessing and using hemodialysis in Ghana. This study's results will be published in peer-reviewed journals, presented at conferences and workshops, and discussed with policymakers, patient groups, and providers at the community and facility levels, and the electronic media to disseminate the findings to the public.

What You Will Be Asked to Do in the Research: You will be asked to review this informed consent form in its entirety, complete a 30 to 45-minute social and health care service needs survey, and participate in a 30 - to 60-minute interview. You will receive 70ghc cash for participating.

Risks and Discomforts: This research study will have minimal risks associated with the involvement of a survey and an interview. The focus of this inquiry is the human subjective experience of patients with ESKD needing or on hemodialysis. As such, the exact nature of the research encounter cannot be predetermined; an interview can become emotional or enter difficult psychological terrain. If so, the interview can be paused or terminated at any point.

Benefits of the Research and Benefits to You: While this research will have no direct benefits to you, it will provide valuable, in-depth knowledge regarding barriers to and facilitators of hemodialysis care. Understanding this phenomenon can inform directions for practice, policy, and education.

Voluntary Participation: Your participation in the study is completely voluntary, and you may choose to stop participating at any time. Your decision not to volunteer will not influence the nature of your relationship with York University or other agencies associated with this project, either now, or in the future.

Withdrawal from the Study: You can stop participating in the study at any time, for any reason, if you so decide. Your decision to stop participating or to refuse to answer questions will not affect your relationship with the researchers, York University, or any other group associated with this project. If a patient does not want to participate in the study, it will have no impact on their care in the hospital or by their health care providers. In the event you withdraw from the study, all associated data collected will be immediately destroyed wherever possible. If you stop participating, you will still be eligible to receive the 70ghc cash for agreeing to be in the project, even if you withdraw without completing the research.

Confidentiality: All information you supply during the research will be held in confidence, and unless you specifically indicate your consent, your name will not appear in any report or publication of the research. Data will be collected using a survey, field notes, and digital audio recordings. Data will be collected in face-to-face or telephone interviews. The principal investigator will keep a link that identifies you to your coded information, but this link will be kept secure and available only to the principal investigator and/or selected members of the research team. Any information that can identify you will remain confidential. Recordings (audio) will be saved in a password-protected file to research team members' local computers, not the cloud-based service. Please note that it is the expectation that participants agree not to make any unauthorized recordings of the content of a meeting/data collection session. Data will be safely stored for 5 years on a secure, password-protected computer, and only the primary investigator (Milipaak Japiong) will have access to this information and the data will be destroyed in July 2028. Confidentiality will be fully provided by law.

Questions About the Research? If you have questions about the research in general or about your role in the study, please contact Milipaak Japiong by e-mail (milipaak@yorku.ca) or my supervisor and Graduate Program Director, Dr. Christine Kurtz Landy, School of Nursing, York University, 4700 Keele St., Toronto, ON. Email: kurtzlcm@yorku.ca. This research has been reviewed and approved by the Human Participants Review Sub-Committee, York University's Ethics Review Board, and conforms to the standards of the Canadian Tri-Council Research Ethics guidelines. If you have any questions about this process or your rights as a participant in the study, please contact Research Ethics in the Office of Research Ethics, 3rd Floor, Kaneff Tower, York University (e-mail ore@yorku.ca).

Legal Rights and Signatures:

I _____ consent to participate in: Exploring the Barriers to and Facilitators of Hemodialysis Care in Ghana: A Sequential Mixed-Method Study among Patients with End-Stage Kidney Disease and Healthcare Workers, conducted by Milipaak Japiong. I have understood the nature of this project and wish to participate. I am not waiving any of my legal rights by signing this form.

My signature below indicates my consent.

Signature_____ Date_____ Participant

Additional consent

a. Audio recording: I consent to audio recording my interview(s). Yes / No

b. Consent to use of quotes: I consent to the use of quotations in any final reports/ publications of the research. Yes / No

Appendix D: Participant Information and Informed Consent (healthcare providers)

Purpose of the study. As part of the requirements for a Doctor of Philosophy (Ph.D.) degree at York University, Canada, I have to carry out a research study. The study is concerned with the barriers to and facilitators to providing quality care to patients experiencing end-stage kidney disease and specifically accessing and using hemodialysis in Ghana.

What will the study involve? The study will involve 30-60 minutes of face-to-face or telephone interviews with healthcare workers (doctors, nurses, and hospital administrators) on the barriers to and facilitators of hemodialysis care in Ghana.

Why have you been asked to take part? You have been asked because you are specifically or generally suitable to provide data for the study.

Do you have to take part? Participation is voluntary and healthcare workers who are interested in participating will be required to sign an informed consent form. Participants have the option of withdrawing before the study commences (even if they have agreed to participate) or discontinuing after data collection has started.

Will your participation in the study be kept confidential? Yes. I will ensure that no clues to your identity appear in the thesis. Any extracts from what you say that are quoted in the thesis will be entirely anonymous.

What will happen to the information which you give? The data will be kept confidential for the duration of the study, available only to me and my research supervisor. Data will be safely stored for 5 years on a secured, password-protected computer and the data would be destroyed in July 2028.

What will happen to the results? The results will be presented in the thesis. The thesis may be read by future students on the course. This study's results will be published in peer-reviewed journals, presented at conferences and workshops, and discussed with policymakers, patient groups, and providers at the community and facility levels and the electronic media to disseminate the findings to the public.

What are the possible disadvantage of taking part? I do not envisage any negative consequences for you in taking part. It is possible that talking about your experience in providing care to patients with end-stage kidney disease in this way may cause some distress.

Who has reviewed this study? This research has been reviewed and approved by the Human Participants Review Sub-Committee, York University's Ethics Review Board, and KBTH – Institutional Review Board.

Any further queries? If you have questions about the research in general or about your role in the study, please contact Milipaak Japiong by e-mail (milipaak@yorku.ca)

If you agree to take part in the study, please sign the consent form overleaf.

Adapted Informed Consent Form (from York University)

Study Name: Barriers and Facilitators to Hemodialysis Access and Utilization Among Patients with End-Stage Kidney Disease in Ghana: A Mixed-Methods Study from the Perspectives of Patients, Providers, and Administrators.

Researchers: Milipaak Japiong, RN, MScN, Ph.D. (Cand), School of Nursing, Faculty of Graduate Studies, York University, Canada. Email: milipaak@yorku.ca.

Purpose of the Research: The goal of this research is to develop a comprehensive understanding of the barriers to and facilitators to providing quality care to patients experiencing end-stage kidney disease and specifically accessing and using hemodialysis in Ghana. This study's results will be published in peer-reviewed journals, presented at conferences and workshops, and discussed with policymakers, patient groups, and providers at the community and facility levels, and the electronic media to disseminate the findings to the public.

What You Will Be Asked to Do in the Research: You will be asked to review this informed

consent form in its entirety and participate in a 30 - 60-minute interview. You will receive 70ghc cash for participating.

Risks and Discomforts: This research study will have minimal risks associated with the involvement of an interview. The focus of this inquiry is the human subjective experience and perspective **of doctors, nurses, and hospital administrators** providing hemodialysis care to

patients with ESKD. As such, the exact nature of the research encounter cannot be predetermined; an interview can become emotional or enter difficult psychological terrain. If so, the interview can be paused or terminated at any point.

Benefits of the Research and Benefits to You: While this research will have no direct benefits to you, it will provide valuable, in-depth knowledge regarding barriers to and facilitators of hemodialysis care. Understanding this phenomenon can inform directions for practice, policy, and education.

Voluntary Participation: Your participation in the study is completely voluntary, and you may choose to stop participating at any time. Your decision not to volunteer will not influence the nature of your relationship with York University or other agencies associated with this project, either now, or in the future.

Withdrawal from the Study: You can stop participating in the study at any time, for any reason, if you so decide. Your decision to stop participating or to refuse to answer questions will not affect your relationship with the researchers, York University, or any other group associated with this project. In the event you withdraw from the study, all associated data collected will be immediately destroyed wherever possible. If you stop participating, you will still be eligible to receive the 70ghc cash for agreeing to be in the project, even if you withdraw without completing the research.

Confidentiality: All information you supply during the research will be held in confidence, and unless you specifically indicate your consent, your name will not appear in any report or publication of the research. Data will be collected using field notes and digital audio recordings. Data will be collected in face-to-face or telephone interviews. The principal investigator will keep a link that identifies you to your coded information, but this link will be kept secure and available only to the principal investigator and/or selected members of the research team. Any information that can identify you will remain confidential. Recordings (audio) will be saved in a password-protected file to research team members' local computers, not the cloud-based service. Please note that it is the expectation that participants agree not to make any unauthorized recordings of the content of a meeting/data collection session. Data will be safely stored for 5 years on a secure, password-protected computer, and only the primary investigator (Milipaak Japiong) will have

access to this information and the data will be destroyed in July 2028. Confidentiality will be fully provided by law.

Questions About the Research? If you have questions about the research in general or about your role in the study, please contact Milipaak Japiong by e-mail (milipaak@yorku.ca) or my supervisor and Graduate Program Director, Dr. Christine Kurtz Landy, School of Nursing, York University, 4700 Keele St., Toronto, ON. Email: kurtzlcm@yorku.ca. This research has been reviewed and approved by the Human Participants Review Sub-Committee, York University's Ethics Review Board, and conforms to the standards of the Canadian Tri-Council Research Ethics guidelines. If you have any questions about this process or your rights as a participant in the study, please contact Research Ethics in the Office of Research Ethics, 3rd Floor, Kaneff Tower, York University (e-mail ore@yorku.ca).

Legal Rights and Signatures:

I _____ consent to participate in: Exploring the Barriers to and Facilitators of Hemodialysis Care in Ghana: A Sequential Mixed-Method Study among Patients with End-Stage Kidney Disease and Healthcare Workers, conducted by Milipaak Japiong. I have understood the nature of this project and wish to participate. I am not waiving any of my legal rights by signing this form.

My signature below indicates my consent.

Signature_____ Date_____ Participant

Additional consent

a. Audio recording: I consent to audio recording my interview(s). Yes / No

b. Consent to use of quotes: I consent to the use of quotations in any final reports/publications of the research. Yes / No

Appendix E: Recruitment for a Study

✓ Are you a patient with End Stage Kidney Disease (ESKD) receiving hemodialysis in KBTH or TTH in Ghana?

✓ Are you a nurse, doctor, or hospital administrator working in a dialysis unit in KBTH or TTH?

Would you like to participate in a study to explore the barriers to and facilitators of Hemodialysis care in Ghana?

If yes, we invite you to participate in this project.

What will you do?

- ✓ Patients with ESKD will complete 30 minutes self-administered digital survey or paper survey on the social and healthcare needs of hemodialysis in phase 1.
- ✓ Both Patients and healthcare providers will take part in a face-to-face or telephone interview for about 30 to 60 minutes in Phase 2 on barriers to and facilitators of accessing and using hemodialysis in Ghana
- ✓ You will receive a 70ghc cash for participating.

For further details, please contact.

Milipaak Japiong at milipaak@yorku.ca

Tel: 0249989917

*Approved by York University's Research Ethics Board and other agencies associated with this project.

Funded from Supervisor's Research Grant

Appendix F: Recruitment Script

This research is about the barriers to and facilitators of accessing and using hemodialysis among patients with End Stage Kidney Disease (ESKD) in Ghana. An explanatory sequential mixed method, represented by two phases of research activities, will be used. Phase 1 will be a survey of 264 patients with end-stage kidney disease on hemodialysis in Northern and Southern Ghana. In phase 1, the study population will include inpatients and outpatients at the Korle-bu and Tamale Teaching Hospitals in Ghana with ESKD who need or are on hemodialysis. Patients in the study must meet the following criteria: (1) have ESKD and need or are on hemodialysis treatment, (2) be at least 18 years old, and (3) be able to communicate in English or other local languages. Exclusion Criteria: (1) patients who cannot provide informed consent to participate, (2) patients receiving peritoneal dialysis treatment or who had a kidney transplant, as they might have a different experience than those on hemodialysis. In phase 2, in-depth interviews will be conducted with patients, nurses, doctors, and hospital administrators on the barriers to and facilitators of accessing and using hemodialysis in Ghana.

In phase 2, the population will include patients with ESKD, doctors, nurses, and hospital administrators employed as permanent staff in the two teaching hospitals who are working in the dialysis units. Only staff who have worked for at least six (6) months will be included in this study. This strategy is meant to obtain data that is reflective of the true experiences of respondents.

Purpose: This research aims to develop a comprehensive understanding of the barriers to and facilitators to providing quality care to patients experiencing ESKD, specifically accessing and using hemodialysis in Ghana, from the perspectives of patients, health care providers, and hospital administrators. Identifying the barriers to and facilitators of ESKD care, focusing primarily on accessing and using hemodialysis will enable policymakers and healthcare professionals to develop high-quality, holistic care.

What You Will Be Asked to Do in the Research:

✓ Patients with ESKD will complete a 30 to 45-minute self-administered digital survey or paper survey on the social and healthcare needs of hemodialysis in phase 1.

✓ Both Patients and healthcare providers will take part in a face-to-face or telephone interview for about 30 to 60 minutes in Phase 2 on barriers to and facilitators of accessing and using hemodialysis in Ghana

✓ You will receive a 70ghc cash prize for participating.

Risks and Discomforts: This research study will have minimal risks associated with the involvement of a survey and an interview. The focus of this inquiry is the human subjective experience of patients with ESKD needing or on hemodialysis, as well as the perspective of health care providers providing hemodialysis care. As such, the exact nature of the research encounter cannot be predetermined; an interview can become emotional or enter difficult terrain. If so, the interview can be paused or terminated at any point. Their participation is voluntary, and they can withdraw at any stage of the study. Participants who withdraw or refuse to take part in the study would not face any consequences on their hemodialysis treatment at the facility.

Appendix G: Social and Health Care Needs Survey

We invite you to please participate in this electronic-based survey to assess the social and healthcare needs of patients with end-stage kidney disease on hemodialysis (Barriers and Facilitators to Hemodialysis Access and Utilization Among Patients with End-Stage Kidney Disease in Ghana: A Mixed-Methods Study from the Perspectives of Patients, Providers, and Administrators).

Your input, thoughtfulness, and general feedback will enable policymakers and healthcare professionals to develop high-quality holistic care. Thank you for your assistance in assessing the social and healthcare needs of patients with end-stage kidney disease on hemodialysis.

The survey will take between 30 and 45 minutes to complete, and all responses will remain confidential and will only be analyzed at the aggregate level. This survey contains two sections. The first section will ask you for basic sociodemographic information, and the second will ask you about your social and healthcare needs on hemodialysis, adapted from the ESRD adherence questionnaire (Kim et al., 2010) and the RAND Health Care for Communities Household Survey (HCSUS) Baseline Questionnaire (RAND Corporation, 2023). Please answer every question by marking the appropriate box. If you are unsure about how to respond, please choose the best answer that applies to you.

In addition to this survey, the researchers plan to hold focus group sessions. Please indicate if you would be willing to be contacted about potentially participating.

Yes ☐

No ☐

Sociodemographic data

1. Age in years_____
2. Sex
   2.1 Male ☐
   2.2 Female ☐
3. To which ethnic group do you belong? _____
4. What is your current marital status?
   4.1 Informal / living together ☐
   4.2 Married ☐
   4.3 Single / never married ☐
   4.4 Divorced ☐
   4.5 Separated ☐
   4.6 Widowed ☐
5. What is your level of education?
   5.1 No formal education ☐

5.2 Primary school ☐
5.3 Secondary school ☐
5.4 Tertiary (College or University) ☐
5.5 Other (Specify) _____

6. What is your religious affiliation?
   6.1 Christianity ☐
   6.2 Muslim ☐
   6.3 Non – denominational ☐
   6.4 Not religious / No religion ☐
   6.5 Traditional ☐
   6.6 Other (specify)_____
7. What is your employment status?
   7.1 Unemployed ☐
   7.2 Public employee ☐
   7.3 Private employee ☐
   7.4 Self-employed ☐
   7.5 Retired ☐
   7.6 Other _____
8. What is your monthly family income?
   8.1 Zero ☐
   8.2 1000 Ghana cedis or less ☐
   8.3 More than 1001 to 3000 Ghana cedis ☐
   8.4 More than 3001 to 5000 Ghana cedis ☐
   8.5 More than 5001 to 7000 Ghana cedis ☐
   8.6 Over 7000 Ghana cedis ☐
9. Area of residence
   9.1 Rural ☐
   9.2 Urban ☐
   9.3 Other (Please Specify) _____
10. Number of children
    10.1 None ☐
    10.2 One ☐
    10.3 Two ☐
    10.4 Three or more ☐
11. What is the main source of water for your household?
    11.1 Bottled or sachet water ☐
    11.2 Tap water ☐

11.3 Borehole water ☐
11.4 Water from open well ☐
11.5 River/stream ☐
11.6 Other (Specify)_____

12. What is the main method of sewerage disposal?
    12.1 Refuse dump ☐
    12.2 Burned ☐
    12.3 Pit latrines ☐
    12.4 Bush system ☐
    12.5 Flushing system ☐
    12.6 Other (Specify)_____

13. Which hospital are you receiving your hemodialysis and kidney disease care from?
    13.1 Korle-Bu Teaching Hospital ☐
    13.2 Tamale Teaching Hospital ☐
    13.3 Other (Specify)_____
14. What is your main mode of transport to and from the hospital?
    14.1 Public buses ☐
    14.2 Taxis ☐
    14.3 My car ☐
    14.4 Family member or friend's car ☐
    14.5 Other (Please Specify) _____

15. Distance from the hospital
    15.1 0 to 20kms ☐
    15.2 21 – 40kms ☐
    15.3 41 – 60kms ☐
    15.4 61 – 80kms ☐
    15.5 Greater than 80 km ☐

16. Do you need financial support for your end-stage kidney disease care and dialysis treatment?
    16.1 Yes ☐
    16.2 No ☐
17. From whom do you get financial support for your end-stage kidney disease care and dialysis treatment?
    17.1 No one ☐
    17.2 Family support ☐
    17.3 Friends ☐
    17.4 Donations ☐
    17.5 Government Health Insurance ☐
    17.6 Private Health Insurance ☐
    17.7 Other (Specify)_____

18. How long have you had end-stage kidney disease?
    18.1 Less than 3 months ☐
    18.2 Between 3 months to 1 year ☐
    18.3 Between 1 to 2 years ☐
    18.4 Between 2 to 3 years ☐
    18.5 Between 3 to 5 years ☐
    18.6 More than 5 years ☐
19. What was the cause of your end-stage kidney disease? Tick all that apply
    19.1 Hypertension ☐
    19.2 Diabetes ☐
    19.3 Glomerulonephritis (Kidney infection) ☐
    19.4 Genetic ☐
    19.5 I was not told the cause ☐
    19.6 Unknown ☐
    19.7 Other (Specify)_____
20. Are you receiving the information you need about end-stage kidney disease?
    20.1 Yes ☐
    20.2 No ☐
    20.3 Don't know ☐
    20.4 Don't know ☐
21. Are you receiving hemodialysis for your kidney disease?
    21.1 Yes ☐ If yes, go to question 22.
    21.2 No ☐ If no, skip to question 33.
22. How long have you been receiving hemodialysis treatment?
    22.1 Less than 3 months ☐
    22.2 Between 3 months to 1 year ☐
    22.3 Between 1 to 2 years ☐
    22.4 Between 2 to 3 years ☐
    22.5 Between 3 to 5 years ☐
    22.6 More than five years ☐
    22.7 Other (Specify)_____
23. How many days a week does your doctor recommend you go for dialysis treatment?
    23.1 2 days or less ☐
    23.2 3 days ☐
    23.3 4 days ☐
    23.4 More than 4 days ☐
24. Are you able to attend all your prescribed dialysis sessions in the last 4 weeks?
    24.1 Yes ☐
    24.2 No ☐
25. Did you miss any dialysis sessions in the last week?
    25.1 Yes … ☐ If yes, go to question 26.

25.2 No…. ☐ if no, go to question 27.

26. How many of your prescribed weekly dialysis sessions did you miss last week?
    26.1 Missed 1 ☐
    26.2 Missed 2 ☐
    26.3 Missed 3 ☐
    26.4 Missed 4 ☐
27. How many hours are you treated for each dialysis session?
    27.1 3 hours ☐
    27.2 4 hours ☐
    27.3 5 hours ☐
    27.4 More than 5 hours ☐

28. Has a healthcare worker talked to you about the importance of not missing dialysis sessions?
    28.1 Yes ☐
    28.2 No ☐
29. Are you receiving the information you need about your hemodialysis?
    29.1 Yes ☐
    29.2 No ☐
    29.3 Don't Know ☐
30. How important is it to follow your dialysis schedule?
    30.1 Not important ☐
    30.2 Moderate important ☐
    30.3 Very important ☐
    30.4 Highly important ☐

31. In the past 30 days, when was the last time a healthcare worker talked to you about the importance of not missing dialysis sessions?
    31.1 One week ago ☐
    31.2 Two weeks ago ☐
    31.3 Three weeks ago ☐
    31.4 Four weeks ago ☐
    31.5 Never ☐

32. Do you have difficulty attending all your prescribed weekly dialysis sessions?
    32.1 Yes, a lot of difficulties ☐
    32.2 Yes, Moderate difficulty ☐
    32.3 Yes, a little difficulty ☐
    32.4 No difficulty ☐
33. The last time you needed but did not get hemodialysis, what was the main reason? **(Tick all that apply)**
    33.1 Could not afford care ☐

33.2 Did not know where to find care ☐
33.3 Could not get an appointment anywhere ☐
33.4 None available ☐
33.5 Did not think it was necessary ☐
33.6 Thought it was necessary, but never tried to get care ☐
33.7 Did not know where to find a regular doctor who speaks the same language as me ☐
33.8 Other (Specify)_____

SOCIAL SUPPORT NEEDS

34. People sometimes look to others for companionship, assistance, or other types of support. How often were each of the following kinds of support available to you if you needed it during the past four weeks? Would you say none of the time = 1, a little of the time = 2, some of the time =, most of the time =4, or all of the time =5?

	None of the time	**A little of the time**	**Some of the time**	**Most of the time**	**All of the time**
34.1 Someone to give you money if you need it	1	2	3	4	5
34.2 Someone to help with daily chores if you were sick?	1	2	3	4	5
34.3 Someone to love and make you feel wanted?	1	2	3	4	5

35. How often do you see or hear from (GROUP)? Would you say less than once a month = 1, about once a month = 2, a few times a month = 3, a few times a week = 4, or every day = 5?

	Less than once a month	**About once a month**	**A few times a month**	**A few times a week**	**Every day**
35.1 Relatives	1	2	3	4	5
35.2 Close friends	1	2	3	4	5

36. How many close friends do you have with whom you feel at ease, can talk to about private matters, or can call on for help? **Tick one**
36.1 None ☐
36.2 One ☐
36.3 Two ☐
36.4 Three or four ☐
36.5 Five to eight ☐
36.6 Nine or more ☐

37. During the past four weeks, to what extent have your physical health or emotional problems interfered with your normal social activities with family, friends, neighbors, or groups? Would you say: **(Tick One)**
    - 37.1 All of the time ☐
    - 37.2 Most of the time ☐
    - 37.3 A good bit of the time ☐
    - 37.4 Some of the time ☐
    - 37.5 A little of the time ☐
    - 37.6 None of the time ☐

38. During the past four weeks, how much of the time have your physical health or emotional problems interfered with your social activities (like visiting with friends, relatives, etc.)? These answer choices are a little different. Would you say: **(Tick One)**
    - 38.1 All of the time ☐
    - 38.2 Most of the time ☐
    - 38.3 Some of the time ☐
    - 38.4 A little of the time ☐
    - 38.5 None of the time ☐

39. During the past 4 weeks, has your health kept you from working at a job, doing work around the house, or going to school? (ROLE) (Circle One)
    - 39.1 Yes, for all of the time ☐
    - 39.2 Yes, for some of the time ☐
    - 39.3 No ☐

Healthcare needs

40. I am going to read you some statements. Please tell me if you 1 = strongly agree, 2 = somewhat agree, 3 = are uncertain, 4 = somewhat disagree, or 5 = strongly disagree with each statement. (Circle One on Each Line)

	Strongly agree	**Somewhat agree**	**Uncertain**	**Somewhat disagree**	**Strongly disagree**
40.1 If I need hospital care for my kidney disease, I can get admitted without any trouble	1	2	3	4	5
40.2 It is hard for me to get medical care for my kidney disease in an emergency	1	2	3	4	5
40.3 Sometimes I go without the medical care I need for my kidney disease because it is too expensive	1	2	3	4	5
40.4 I have easy access to the medical specialists I need for my kidney disease.	1	2	3	4	5
40.5 Places, where I can get medical care, for my kidney	1	2	3	4	5

disease are very conveniently located					
40.6 I can get medical care for my kidney disease care whenever I need it.	1	2	3	4	5
40.7 At times I do not have access to my kidney disease treatment because of the distance I have to travel to the hospital.	1	2	3	4	5

Sometimes people have difficulties getting medical care when they need it.

41. During the last month, did you ever need medical care but could not get it? (**Circle One)**

41.1 Yes ☐

41.2 No ☐

Health Service Utilization

42. Please consider the following when you received health care for kidney disease and or hemodialysis the last time in the hospital. Circle one, Yes =1, No = 2

	Yes	No
42.1 Did you have enough say about your treatment in the hospital?	1	2
42.2 Was there one particular doctor or nurse who was in charge of your care in the hospital?	1	2
42.3 Was it easy for you to find someone on the hospital staff to talk to about your personal concerns?	1	2
42.4 When you needed help with things like eating, bathing, or getting to the bathroom, did you usually get it in time?	1	2
42.5 When you had important questions to ask a doctor or nurse, did you always get answers you could understand?	1	2
42.6 Did you feel you were treated with respect and dignity while you were in the hospital?	1	2
42.7 Do you think that much of your pain could have been eliminated if the hospital staff had acted more promptly?	1	2

42.8 Sometimes in the hospital, one doctor or nurse will say one thing, and another will say something quite different. Did this ever happen to you during your hospital stay?	1	2
42.9 If you had any anxieties or fears about your condition or treatment, did a doctor or nurse discuss them with you?	1	2
42.10 After the major tests were done, did a doctor or nurse always explain the results in a way you could understand?	1	2

43. How much do you trust your doctor to offer you high-quality medical care? Would you say…… **Tick one.**

43.1 Completely ☐
43.2 Mostly ☐
43.3 Somewhat ☐
43.4 A little ☐
43.5 Not at all ☐

44. How much do you trust your nurse to offer you high-quality nursing care? Would you say…… **Tick one**

44.1 Completely ☐
44.2 Mostly ☐
44.3 Somewhat ☐
44.4 A little ☐
44.5 Not at all ☐

45. Overall, how would you rate the kidney disease care and or hemodialysis care you received at the hospital? **Tick one**

45.1 Poor ☐
45.2 Fair ☐
45.3 Good ☐
45.4 Very good ☐
45.5 Excellent ☐
45.6 Other (Specify)

End of survey: We thank you for your time spent taking this survey.

Appendix H: Semi-Structured Interview Guide- Patients with ESKD receiving dialysis.

Date March 2024 to June 2024

Introduction

I. Welcome the participants and explain the purpose of the study.
II. Assure confidentiality and anonymity
III. Seek verbal consent for recording.
IV. Emphasize that the study aims to understand their experiences and perspectives on hemodialysis care in Ghana

Sociodemographic characteristics

1. Age in years_____
2. Sex
   2.1 Male ☐
   2.2 Female ☐
3. To which ethnic group do you belong? _____
4. What is your current marital status?
   4.1 Informal / living together ☐
   4.2 Married ☐
   4.3 Single / never married ☐
   4.4 Divorced ☐
   4.5 Separated ☐
   4.6 Widowed ☐
5. What is your religious affiliation?
   5.1 Christianity ☐
   5.2 Muslim ☐
   5.3 Non – denominational ☐
   5.4 Not religious / No religion ☐
   5.5 Traditional ☐
   5.6 Other (specify)_____
6. Who do you live with? (Check all that apply)
   5.1 Spouse/Partner ☐
   5.2 Children ☐
   5.3 Parents ☐
   5.4 Siblings ☐
   5.5 Other relatives (please specify) _____

5.6 Alone ☐

5.7 Roommates ☐

7. Do you have children? ☐ Yes ☐ No
   If yes, please specify the age(s) of your child(ren): _____
8. Tribe / Ethnicity _____
9. What is your area of residence_____
10. What is your level of education?
    10.1 No formal education ☐
    10.2 Primary school ☐
    10.3 Secondary school ☐
    10.4 Tertiary (College or University) ☐ (Specify) _____

11. Are you currently employed? ☐ Yes ☐ No
    a. If yes, what is/was your job title or position? _____
    b. Socio-professional category: _____

12. What is your monthly family income? (income ranges)
    12.1 Zero ☐
    12.2 1000 Ghana cedis or less ☐
    12.3 More than 1001 to 3000 Ghana cedis ☐
    12.4 More than 3001 to 5000 Ghana cedis ☐
    12.5 More than 5001 to 7000 Ghana cedis ☐
    12.6 Over 7000 Ghana cedis ☐

13. Do you have any other health problems? **(Check all that apply)**
    12.1 Diabetes ☐
    12.2 Hypertension ☐
    12.3 Mental health issues ☐
    12.4 Past surgeries ☐
    12.5 None ☐
    12.6 Other (please specify) _____

Semi-structured interview guide: Examining the perspectives of patients with ESKD on the barriers to receiving hemodialysis.

1. I would now like to learn about your experience with ESKD.
   a. Tell me how you felt when you realized you had ESRD.
   b. Tell me how you felt when you found out you needed dialysis.

c. How long have you been on dialysis? **(**When were you first told that you needed dialysis)?
d. How many times per week did your doctor recommend you go for dialysis?
e. What is it like being on dialysis for the time required for each session**?**

2. What are some of the challenges you face in getting (accessing and receiving) your hemodialysis (HD) treatment?
    a. (Probe: Financial constraints, availability of dialysis facilities, geographical barriers, transportation issues, cultural or religious beliefs, lack of awareness about available treatment, and stigma)
3. Tell me about how living with ESKD on dialysis is affecting your emotional well-being (Psychological)
4. Tell me how living with ESKD on dialysis is affecting your social well-being (Social). (Probe on emotional well-being, impact on family relationships, coping mechanisms, social support etc)
5. Tell me about how living with ESKD on dialysis is affecting your Physical well-being
6. Tell me, how do you cope with the challenges of living with ESKD on dialysis? Probe: Is there somebody or an agency that can help you overcome these challenges? If yes, who/what?
7. How important is the support of your family members or friends to your HD treatment? Probe: Explore the role of family, friends, and community in supporting participants through their hemodialysis journey. Inquire about any support groups or networks they are part of.
8. How is your relationship with the healthcare providers?
9. How do people relate to you now compared to before the diagnosis?
10. So, considering all your challenges, how does it make you feel?
11. How does dialysis interfere with your daily activities?
12. In the midst of these challenges, how do you continue to be on dialysis treatment?
9. Based on your experience, what would you tell someone new to dialysis about the challenges of their treatment?
10. What is your perception of the quality of hemodialysis care they receive? Inquire about participants' overall satisfaction with hemodialysis care in Ghana.
11. In your opinion, how do we improve the delivery of hemodialysis care in Ghana?

Conclusion of the Interview Process

1. This is the end of the interview, is there anything you would like to add or share at this time?
2. Thank you for your participation.
3. Reiterate the importance of their input in enhancing hemodialysis care in Ghana.

Appendix I: Semi-Structured Interview Guide- Patients with ESKD prescribed but not receiving dial

Date March 2024 to April 2024

Introduction

V. Welcome the participants and explain the purpose of the study.
VI. Assure confidentiality and anonymity
VII. Seek verbal consent for recording.
VIII. Emphasize that the study aims to understand their experiences and perspectives on hemodialysis care in Ghana.

Sociodemographic characteristics

1. Age in years_____
2. Sex
   2.1 Male ☐
   2.2 Female ☐
3. To which ethnic group do you belong? _____

4. What is your current marital status?
   4.1 Informal / living together ☐
   4.2 Married ☐
   4.3 Single / never married ☐
   4.4 Divorced ☐
   4.5 Separated ☐
   4.6 Widowed ☐

5. What is your religious affiliation?
   5.1 Christianity ☐
   5.2 Muslim ☐
   5.3 Non – denominational ☐
   5.4 Not religious / No religion ☐
   5.5 Traditional ☐
   5.6 Other (specify)_____

6. Who do you live with? **(Check all that apply)**
   5.1 Spouse/Partner ☐
   5.2 Children ☐
   5.3 Parents ☐

5.4 Siblings ☐
5.5 Other relatives (please specify) _____
5.6 Alone ☐
5.7 Roommates ☐

7. Do you have children? ☐ Yes ☐ No
   If yes, please specify the age(s) of your child(ren): _____
8. Tribe / Ethnicity _____
9. What is your area of residence_____
10. What is your level of education?
    10.1 No formal education ☐
    10.2 Primary school ☐
    10.3 Secondary school ☐
    10.4 Tertiary (College or University) ☐ (Specify) _____

11. Are you currently employed? ☐ Yes ☐ No
    c. If yes, what is/was your job title or position? _____
    d. Socio-professional category: _____

12. What is your monthly family income? (income ranges)
    12.1 Zero ☐
    12.2 1000 Ghana cedis or less ☐
    12.3 More than 1001 to 3000 Ghana cedis ☐
    12.4 More than 3001 to 5000 Ghana cedis ☐
    12.5 More than 5001 to 7000 Ghana cedis ☐
    12.6 Over 7000 Ghana cedis ☐

13. Do you have any other health problems? **(Check all that apply)**
    13.1 Diabetes ☐
    13.2 Hypertension ☐
    13.3 Mental health issues ☐
    13.4 Past surgeries ☐
    13.5 None ☐
    13.6 Other (please specify) _____

Semi-structured interview guide: Examining the perspectives of patients with ESKD prescribed but not receiving dialysis on factors affecting (barriers) their access and use of hemodialysis in Ghana.

1. I would now like to learn about your experience with ESKD.

a. When were you first diagnosed with ESKD?
b. Tell me how you felt when you realized you had ESRD.
c. When were you first told that you needed dialysis?
d. Tell me how you felt when you found out you needed dialysis.
e. How many times per week did your doctor recommend you go for dialysis?

2. What are some of the challenges or reasons why you are currently not receiving hemodialysis treatment?
    a. (Probe: Financial constraints, availability of dialysis facilities, geographical barriers, transportation issues, cultural or religious beliefs, lack of awareness about available treatment, and stigma)
3. Tell me about how living with ESKD without dialysis is affecting your emotional well-being (Psychological)?
4. Tell me how living with ESKD without dialysis is affecting your social well-being (Social). (Probe on emotional well-being, impact on family relationships, coping mechanisms, social support, etc)
5. Tell me about how living with ESKD without dialysis is affecting your Physical well-being
6. How do people relate to you now compared to before the diagnosis?
7. Tell me, how do you cope with the challenges of living with ESKD without dialysis? Probe: Is there somebody or an agency that can help you overcome these challenges? If yes, who/what?
8. Do you have family members or friends who can help you access and receive dialysis or pay for your dialysis treatment?
9. How does ESKD interfere with your daily activities?
10. How do you feel now that you are not able to afford dialysis treatment? Probe: What is next for you? What are the risks? (What is the feeling like for not being able to attend your dialysis session?)
11. Based on your experience and opinion, how do we improve the access and use of dialysis for people like you in Ghana? (In your opinion, how do we improve the delivery of hemodialysis care in Ghana)?

Conclusion of the Interview Process

1. This is the end of the interview, is there anything you would like to add or share at this time?

2. Thank you for your participation.
3. Reiterate the importance of their input in enhancing hemodialysis care in Ghana.

Appendix J: Semi-structured interview guide for healthcare workers (Nurses and Doctors)

Date March 2024 to June 2024

Introduction

I. Welcome the participants and explain the purpose of the study.
II. Assure confidentiality and anonymity
III. Seek verbal consent for recording.
IV. Emphasize the focus on understanding healthcare professionals' perspectives regarding hemodialysis care in Ghana.

Sociodemographic characteristics

1. Age in years_____
2. Sex
   2.1 Male ☐
   2.2 Female ☐
3. What is your current marital status?

   3.1 Informal / living together ☐
   3.2 Married ☐
   3.3 Single / never married ☐
   3.4 Divorced ☐
   3.5 Separated ☐
   3.6 Widowed ☐

4. What is your religious affiliation?
   4.1 Christianity ☐
   4.2 Muslim ☐
   4.3 Non – denominational ☐
   4.4 Not religious / No religion ☐
   4.5 Traditional ☐
   4.6 Other (specify)_____
5. What is your level of education?
   5.1 Diploma ☐
   5.2 Bachelor's degree ☐
   5.3 Master's degree
   5.4 Doctorate ☐
   5.5 Secondary school ☐
   5.6 Other (Specify) _____
6. What is your job title or position? _____

7. Socio-professional category: _____

Examining the perspectives of healthcare providers (nurses and doctors) on the barriers to providing hemodialysis

1. Participants' background and experience

I would now like to learn about your experience working with patients with ESKD and dialysis.

a. What is your role and experience in providing dialysis at KBTH?
b. How long have you been involved in hemodialysis care?
c. In your view, what is lifelike for people with ESRD on HD?

2. Understanding of Hemodialysis in Ghana

a. How would you describe the current state of hemodialysis services in KBTH- Ghana?
b. What are some of the key challenges you perceive in providing hemodialysis treatment here?

3. Barriers to Providing Hemodialysis

a. In your experience, what are the primary barriers that hinder the provision of hemodialysis treatment?
b. What logistical difficulties do you encounter in delivering hemodialysis services?
c. Are there specific resource limitations that affect the delivery of hemodialysis care?
    • (Probe: availability of trained staff, equipment, consumables, and funding for patients)
d. How do patient-related factors such as income, education, transportation, or geographic location impact hemodialysis access?
e. Are there any cultural, social, or belief-related factors that hinder hemodialysis access or delivery?
f. What administrative or policy-level barriers affect the provision of hemodialysis care at your facility?
g. Are there broader systemic issues, such as financing or national-level policies, that limit effective hemodialysis service delivery?

4. Patient Perspectives and Engagement

a. How do patients typically respond to the challenges of hemodialysis treatment?
b. What strategies or interventions do you employ to engage patients in their hemodialysis treatment despite these barriers?

5. Healthcare Provider Support and Training

a. Do you feel adequately trained and supported in providing hemodialysis treatment?

b. What additional support or training do you think would benefit healthcare providers involved in hemodialysis care?

6. Personal Experiences and Insights

a. From your perspective, what changes or improvements would have the most significant impact on enhancing hemodialysis services in KBTH?

7. What is the relationship like between professionals and patients with ESKD and their families?
8. How do you ensure there are no disparities in health information from healthcare workers to patients? Probe on protocols for managing ESKD and dialysis
9. What is your view on peritoneal dialysis?
10. Are there any differences in uptake or use of HD between men and women in KBTH? Explore what might account for the varied differences or prevalence.

Conclusion

In your opinion, how do we improve the delivery of hemodialysis care in your unit? **Or** is there anything else you would like to add regarding the barriers to providing hemodialysis in Ghana?

Appendix K: Semi-Structured Interview Guide for Health Service Administrators.

Date March 2024 to June 2024

Introduction

I. Welcome the participants and explain the purpose of the study.
II. Assure of confidentiality and anonymity
III. Seek verbal consent for recording.
IV. Emphasize the focus on understanding healthcare professionals' perspectives regarding hemodialysis care in Ghana.

Sociodemographic characteristics

1. Age in years_____
2. Sex

2.1 Male ☐

2.2 Female ☐

3. What is your current marital status?

3.1 Informal / living together ☐
3.2 Married ☐
3.3 Single / never married ☐
3.4 Divorced ☐
3.5 Separated ☐
3.6 Widowed ☐

4. What is your religious affiliation?

4.1 Christianity ☐

4.2 Muslim ☐

4.3 Non – denominational ☐

4.4 Not religious / No religion ☐

4.5 Traditional ☐

4.6 Other (specify)_____

5. What is your level of education?

5.1 Diploma ☐
5.2 Bachelor's degree ☐
5.3 Master's degree
5.4 Doctorate ☐
5.5 Secondary school ☐
5.6 Other (Specify) _____

6. What is your job title or position? _____

7. Socio-professional category: _____

Examining the perspectives of healthcare providers (Health Service Administrators) on the barriers to providing hemodialysis in Ghana.

Participants' background and experience

1. **I would now like to learn about your experience working with patients with ESKD and dialysis**.

d. How long have you been involved in hemodialysis care/management?

e. What is your role and experience in providing dialysis at KBTH? (roles in hospital administration and experience in managing hemodialysis services).

f. In your view, what is lifelike for people with ESRD on HD?

2. **Understanding of Hemodialysis in Ghana**

c. How would you describe the current state of hemodialysis services in KBTH- Ghana?

d. What are some of the key challenges you perceive in providing hemodialysis treatment here?

3. **Barriers to Providing Hemodialysis**

    a. In your experience, what are the primary barriers that hinder the provision of hemodialysis treatment?

    b. Can you describe any logistical challenges encountered in delivering hemodialysis services?

    c. Are there specific resource limitations that affect hemodialysis provision? (e.g., probe about trained staff, resource allocation (equipment), any funding for patients on HD, and any systemic issues - financial).

4. What do you think are the barriers to coordinating care provided in the hospital to patients on HD?

5. Are there any regulatory and policy issues affecting hemodialysis care?

6. How do hospital administrators collaborate with healthcare providers and staff involved in hemodialysis care?

7. Are there any training and professional development opportunities for staff involved in hemodialysis care? (What additional support or training do you think would benefit healthcare providers involved in hemodialysis care)?

8. In your opinion, how do we improve the delivery of hemodialysis care within the hospital? (From your perspective, what changes or improvements would have the most significant impact on enhancing hemodialysis services in KBTH?

Conclusion of the Interview Process

1. This is the end of the interview, is there anything you would like to add or share at this time? **Or** is there anything else you would like to add regarding the barriers to providing hemodialysis in Ghana?
2. Thank you for your participation.
3. Reiterate the importance of their input in enhancing hemodialysis care in Ghana.