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Dialysis Patient Education on the Prevention of Kidney Disease Prior to Patients Receiving Dialysis: A Retrospective Descriptive Study

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DIALYSIS PATIENT EDUCATION ON THE PREVENTION OF KIDNEY DISEASE PRIOR TO PATIENTS RECEIVING DIALYSIS: A RETROSPECTIVE DESCRIPTIVE STUDY

By

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Abstract

Fifty-two adult patients at an outpatient dialysis center in central Arkansas were surveyed regarding the education that was provided by medical professionals related to kidney disease and dialysis during treatment of hypertension and diabetes. The twenty-question survey inquired about demographic information, medical history, and the timing and perceived comprehension of education received. The researcher discovered that the majority of patients did not receive education that identified hypertension and diabetes as contributing factors of kidney disease until after diagnosis of kidney disease. The vast majority of participants reported that education regarding the life implications of dialysis, including fluid and dietary restrictions, daily medication requirements, and time requirements of treatments, did not occur until after diagnosis of ESRD and initiation of dialysis. This study identified a deficiency in education practices regarding kidney disease and dialysis during the medical treatment of hypertension and diabetes. Improvement of education practices would improve patient comprehension of the life implications of ESRD and dialysis and may help to prevent kidney disease or slow progression of existing disease in some patients. Limitations of the study include a small convenience sample, and potential for recall bias related to self-report by participants. Implications for future research include survey administration to patients currently undergoing medical treatment of hypertension and diabetes, and long-term studies to evaluate effectiveness in education materials in the prevention or slowed progression of kidney disease.

Key words: kidney disease, chronic kidney disease, ESRD, dialysis, hypertension, diabetes, education

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I. Introduction

Worldwide, over two million people are on dialysis, and 10% of the population have kidney disease (National Kidney Foundation Global Facts, 2021). While kidney disease cannot be reversed, it may be prevented or its progression may be slowed by modification of risk factors. Hypertension and diabetes are the two leading causes of kidney disease in adults (DaVita, 2021). The incidence of kidney disease has been on the rise due to an increased prevalence of obesity and resultant hypertension and diabetes over the last 30 years (Cook, 2021).

Kidney disease is a progressive, irreversible condition marked by an ongoing decline in kidney function that culminates in end-stage renal disease (ESRD). During ESRD, dialysis is required for survival if a kidney transplant is not readily available. Increasing side effects, including shortness of breath and edema, and resultant health restrictions contribute to a decrease in quality of life as kidney disease progresses.

Education programs lead to an increased understanding of disease processes, progression implications, disease prevention, and condition management. Benefits of education programs include improved compliance with treatment plans, improved control of modifiable risk factors and self-care, improved quality of life, and decreased morbidity and mortality (Magnezi, et al., 2013). Implementation of such programs in the control and prevention of kidney disease may lead to similar benefits among this patient population.

Statement of the Problem

There is ample research linking uncontrolled hypertension and diabetes with kidney disease, but very little research regarding efforts to prevent kidney disease. It is

unknown if patients are educated regarding the risk of kidney disease development and progression during medical treatment of hypertension and diabetes. Medicare costs for chronic kidney disease (CKD) treatment are 130 billion dollars annually (Cook, 2021). Initiatives focused on the prevention of kidney disease need to be identified to preserve the quality of life in the patient and family and decrease the economic impact of treatment costs.

Need for the Study

One in seven adults in the United States have kidney disease (Cook, 2021). An estimated 90% of people with early stages of kidney disease are unaware of the condition due to the asymptomatic presentation of stages one and two (National Kidney Foundation the Basics, 2021). Stages three and four are when most previously unaware people of impaired kidney function seek medical care related to edema and decreased urine output (American Kidney Fund, 2021). When progression reaches stage five, the kidneys are functioning at or below 15% (DaVita, 2021). At this point, a patient is diagnosed with ESRD, and dialysis is initiated (American Kidney Fund, 2021). The timeframe of progression is highly variable, related to specific patient comorbidities and other factors.

ESRD drastically impacts a patient's quality of life due to many restrictions and medical requirements for survival. Hemodialysis treatments generally take place over four hours, three times per week. Dialysis patients must adhere to travel and work restrictions related to the strict scheduling of these life-sustaining treatments (DaVita, 2021). In addition, these patients face stringent fluid and dietary restrictions (Nutrition Care Systems, 2021), as well as multiple daily medication requirements. Patients and families must also contend with a significant financial burden regarding travel costs to

and from treatment facilities, as well as the purchase of kidney-safe food and required medications (DaVita, 2021). Skipping or shortening treatments and nonadherence to fluid and dietary restrictions or medication regimens increase morbidity and mortality among dialysis patients. In addition, fluid overload and electrolyte imbalances can develop over a couple of days, leading to potentially fatal respiratory and cardiac complications (Cohen & Kimmel, 2018). Peritoneal dialysis treatments can be performed by the patient at home but must occur more frequently than hemodialysis treatments and have a high risk of peritoneal infection.

There is no existing research found in the literature regarding education initiatives directed towards the prevention or delayed progression of kidney disease during treatment of hypertension or diabetes. Research in this area is justified due to the evidence of successful educational programs among other disease processes. For example, education provided by nurses has improved safety, proper usage, and infection control among patients requiring long-term oxygen (Khaja, et al., 2018). Researchers in India have demonstrated that educational programs with mothers of children younger than five years old have increased the knowledge of the etiology, prevention, and treatment of diarrhea, thus decreasing morbidity and mortality among young children in this area (Salimath & Anjinamma, 2020). Researchers in Iran demonstrated that educational programs regarding self-care have reduced readmission rates among patients with congestive heart failure (Mesbahi, et al., 2020).

Assumptions

An assumption of this study was that adequate control of hypertension and diabetes would increase primary and tertiary prevention of kidney disease. While

prevention of a disease cannot be measured, incidence rates before an intervention can be compared with that post-intervention to determine effectiveness. Therefore, it was assumed that incidence rates of kidney disease would decrease in response to an educational intervention that improves control of hypertension and diabetes. It was assumed that participants answered all questions truthfully and to the best of their knowledge, thus contributing accurate data to this project.

Another assumption of this study was a correlation between the incidence of kidney disease and a lack of education regarding kidney disease. This study ascertained whether a deficiency in the education about the risk of kidney disease provided during the medical treatment of hypertension and diabetes existed. It was assumed that improvement in education could help to decrease the incidence of kidney disease in some patients.

Research Question

In current dialysis patients, to what extent was prior education on the associated risk of developing kidney disease and preventative measures provided to the patient by healthcare providers during treatment of hypertension or diabetes?

Limitations

One limitation of this study was the utilization of a small convenience sample from one dialysis clinic. This may present generalizability concerns to other geographic areas and populations. In addition, the external validity of the responses of current dialysis patients could have limited applicability to current patients undergoing medical treatment for hypertension or diabetes.

Another limitation of this study was the reliance on the accuracy of patient answers. Survey questions obtained information related to medical history, length of time

of disease progression, and factors of education provided. As a result, patients may have experienced difficulty remembering aspects of treatment or may not have recalled the time of education or treatment initiation accurately.

Definition of Terms

Kidney disease is a progressive disease marked by an ongoing decrease in kidney function. There are five stages leading up to ESRD in which the kidneys are no longer functioning at a high enough capacity to sustain life. While lost function cannot be replaced, the gradual decline in function can be halted or slowed.

Dialysis is a treatment that performs the function of the kidneys to sustain life. *Hemodialysis treatments* involve the blood being filtered through a machine that removes excess fluid and electrolytes before returning to the patient. *Peritoneal treatments* involve the placement of glucose-based fluid into the peritoneal cavity, in which excess fluid and electrolytes are pulled into the glucose solution and removed from the peritoneal cavity at the end of the treatment (DaVita, 2021).

Prevention of disease involves actions to maintain health and avert illness. Primary prevention includes initiatives to halt a disease process from starting. Tertiary prevention includes initiatives to treat chronic disease to prevent further decline in function or progression of disease (CDC Prevention, 2021).

Summary

During this retrospective quantitative study, the researcher surveyed current dialysis patients regarding the education on the risk of kidney disease provided during the medical treatment of hypertension and diabetes. The goal of this study was to identify deficiencies that existed in current patient education practices. Education programs have

decreased morbidity and mortality among patients diagnosed with various disease conditions. Implementation of education programs regarding the risk of kidney disease and preventative measures during treatment of hypertension and diabetes could prevent kidney disease or slow the progression of existing disease in some patients. Subsequent chapters will discuss current literature, methodology of the study, research findings, and conclusions of the study.

II. Literature Review

This literature review discussed research related to the contribution of hypertension and diabetes to the development and progression of kidney disease. Other research discussed the quality of life of dialysis patients and caregivers and the economic burden of kidney disease. An identified gap in the literature was the lack of information regarding education measures for patients prior to the development of kidney disease. Prevention of kidney disease or slowing the progression of any existing disease is paramount, as ESRD is irreversible.

A search was performed for peer-reviewed research within the past five years in the Cumulative Index to Nursing and Allied Health Literature (CINAHL) database. Keywords for the search included hypertension, diabetes, chronic kidney disease, dialysis, education, and disease prevention. In addition, combination keyword searches were performed for kidney disease and hypertension, kidney disease and diabetes, kidney disease and dialysis, education program and disease prevention, and education benefits and disease.

The literature was divided into three sections of relevance to the current study. The first section discusses literature related to hypertension and diabetes in regard to kidney disease. The second section discusses literature related to chronic kidney disease and its economic burden. Finally, the third section discusses literature related to dialysis and its impact on the patient's and caregiver's quality of life. Prior to the literature discussion is a description of the theoretical framework utilized to guide and organize the research study.

Theoretical Framework

The Health Belief Model focuses on health behaviors and is often utilized in disease prevention and health promotion initiatives (RHIhub, 2021). In the 1950s, scientists at the United States Public Health Service developed the Health Belief Model to aid in comprehending health behaviors or lack thereof (LaMorte, 2019). A central element in this model is based on the individual's belief regarding health conditions. These beliefs could influence health-related behaviors (RHIhub, 2021). Early examples of utilization of this model include participation in screening tests for early disease detection, engagement in disease prevention strategies, and compliance with medical treatment (LaMorte, 2019).

Health-related behaviors are measures that specifically impact health. The two major constituents of health-related behaviors are the aspiration to avoid or cure current illness and the confidence that specific actions will prevent or cure illness. Perception of the benefits and barriers will determine participation in the health behavior (LaMorte, 2019).

Implementation of a program that the Health Belief Model guides involve a needs assessment to identify target populations. The consequences of participation in high-risk behaviors as well as the benefits of participation in health behaviors should be communicated. Assistance and follow-up should be provided to reduce barriers, develop confidence and skills, and encourage continued participation in health behaviors (RHIhub, 2021).

The Health Belief Model is comprised of six constructs that formulate the basis of influence on individual health behaviors. Perceived susceptibility involves a person's

perception of vulnerability to an illness. Perceived severity involves a person’s perception of the medical and social consequences of contracting or not treating an illness. Perceived benefits involve a person's perception of the effectiveness of health behavior in reducing or preventing the threat of an illness. Perceived barriers involve a person's perception of the difficulty of performing a health action regarding sacrificing time, money, comfort, safety, or convenience. Cue to action is the stimulus that initiates the decision-making process and leads to acceptance or refusal of health action. This cue to action can occur due to symptoms of a health condition or advice in an article or from a person. Finally, self-efficacy is a person's confidence in performing or maintaining a healthy behavior (LaMorte, 2019).

Limitations of the Health Belief Model include a lack of accounting for social, environmental, and economic factors that are not related to health but influence health behaviors. In addition, it does not factor in a person's comprehension of information regarding illness and risks, nor does it account for lack of cues to action regarding educational material to which a person has access. Finally, the Health Belief Model does not account for habits that a person may encounter great difficulty overcoming (LaMorte, 2019), such as tobacco or drug use.

The Health Belief Model is applicable to the current study because of its focus on health-related behavior. Diabetes and hypertension, both modifiable risk factors, are the leading contributors to chronic kidney disease. Adequate control of diabetes and hypertension can decrease the risk of kidney disease or slow the progression of existing disease (National Kidney Foundation, 2021). Hypertension is often asymptomatic, as are the early stages of kidney disease (American Kidney Fund, 2021). Utilization of the

Health Belief Model would aid in educating patients about the risks of kidney disease and the negative impact on the quality of life that occurs with ESRD and dialysis (DaVita, 2021). This education could encourage patients to adopt healthy behaviors that include adequate control of hypertension and diabetes before developing or progressing kidney disease to late symptomatic stages. The Health Belief Model guides prevention programs by focusing on the patient's perception of the negative impacts of illness, the positive impact of health behavior, and the ability to perform the health behavior (SPH, 2019).

Literature Related to Hypertension and Diabetes

Hypertension is characterized by a systolic blood pressure that is consistently greater than 140 or a diastolic blood pressure consistently greater than 90. Risk factors for hypertension include smoking, inactivity, and poor diet. As of 2020, one billion people worldwide have hypertension; this number is expected to increase to 1.5 billion by 2025 (Rajabloo et al., 2021). Uncontrolled hypertension can lead to complications, including cardiovascular and kidney disease. This leads to increased dependency on providers and caregivers, decreased quality of life, and increased healthcare costs (Ho et al., 2016).

Rajabloo, et al. (2021) performed research to determine the outcomes of education formulated on Leventhal’s model for blood pressure control and treatment adherence in patients with hypertension. Leventhal's model is based on a patient's perception of the cause and consequence of disease and the impact of this perception on the treatment and management of the disease. A convenience sample was utilized from three urban centers in Gonabad. Inclusion criteria included a diagnosis of hypertension, age 20 to 60 years old, and language in Persian. Exclusion criteria included a history of

cognitive impairment, hearing or vision loss, or severe underlying disease. The sample consisted of 59 patients with an average age of 51.95 years; 21 patients were male, 38 were female. Almost 90% of the patients were married. Patients were randomly assigned to a control group or intervention group. The control group received routine treatment for hypertension. The intervention group received routine care in addition to an eight-week training program based on Leventhal's model of education. The program consisted of education sessions that lasted 45-minutes and occurred three times per week, which included written and verbal information and a ten-minute telephone follow-up every other week. The patients received pre-and-post-tests and blood pressure measurements. Patients completed a 14-item Hill-Bone Adherence questionnaire regarding home medications, amount of salt intake, and physician follow-up. Data were analyzed utilizing Statistical Package for the Social Sciences (SPSS) software. The Kolmogorov-Smirnov test was utilized to compare data with normal distribution. The Mann-Whitney test was utilized to compare diastolic blood pressure before and after the intervention. An independent T-test was performed to compare adherence scores, systolic blood pressure, and demographic numbers such as age and weight. A Chi-square test was utilized to compare demographic data such as education level and gender. Both groups demonstrated similar blood pressure measurements and adherence scores before intervention. The control group demonstrated similar adherence scores pre-and-post study and an increase in systolic blood pressure from beginning to end of the study. The intervention group demonstrated an increase in adherence score pre-and-post study and a decrease in systolic blood pressure post-intervention. This study concluded that the education program based on Leventhal's model did cause an improvement in treatment

adherence and a decrease in blood pressure among hypertension patients. One limitation of the study is both groups displayed adherence scores of 45 to 48; the test had a maximum score of 53, indicating relatively high adherence scores before the study. Another limitation is the study involved patients from one city, leading to generalizability concerns to other cultures and geographic areas. An additional limitation was the requirement for participants to have the ability to understand simple conversation in Persian; adequate comprehension of information would have been better ensured through a requirement of completion of a grade level or other concrete, measurable criterion. Finally, follow-up only took place for eight weeks. A long-term follow-up would be needed to assess the long-term effects and results of the intervention. This research is applicable to the current study because it demonstrates the positive effect of education on patient perception of disease, positively affecting blood pressure and treatment adherence. The authors stated that treatment adherence often stems from a lack of comprehension of disease implications and complications. Education has a positive effect on patient understanding, leading to improved blood pressure control and treatment adherence.

Researchers in Barcelona, Spain conducted a study to evaluate the effectiveness of an educational intervention on improving knowledge in patients with hypertension (Ho et al., 2016). The study participants included 62 patients from four primary care clinics and 58 patients from four specialized hypertension clinics. The total sample was comprised of 120 patients with a mean age of 61. The sample was 59% female. Exclusion criteria for the study included age under 18 years, cognitive dysfunction, or refusal to participate. About one-third of participants had secondary or university level education.

Duration of illness varied among participants; 36% had a diagnosis of hypertension for five years or less, 28% from six to ten years, and 36% greater than ten years. Before receiving verbal and written education, patients participated in a nine-section questionnaire with closed-ended and multiple-choice questions; a post-test was completed within a month of the educational intervention. Education focused on the causes and risks of hypertension, hypertension control methods, self-management of medication regimens, and physician follow-up. A Student t-test was utilized to compare the ages between the primary care and specialty hypertension clinic patients. Chi-square tests and Fisher exact tests were utilized to compare other pertinent variables. A McNemar test was utilized to assess knowledge improvement after the educational intervention. Participants were tested on knowledge prior to intervention, with repeat testing after education. The researchers reported that understanding the definition of hypertension improved from 48% before intervention to 99% post-intervention. Before the intervention, 54% of patients knew hypertension could lead to kidney damage, and 58% knew hypertension could damage the eyes; post-intervention, this knowledge was increased to 100%. Knowledge regarding hypertension medication improved from 51% pre-intervention to 87% post-intervention. In conclusion, the educational intervention positively impacted the patient's knowledge about hypertension and self-management. One limitation of this study is it took place in Barcelona, and the education pamphlet utilized in this study was not included for replication of the study in other geographic areas and cultures. Also, this study demonstrated short-term improvement in knowledge; long-term studies are needed to determine if this increase in knowledge leads to behavior changes regarding lifestyle, blood pressure control, and treatment adherence. The authors

questioned whether this education would lead to long-term prevention or delayed progression of kidney disease. This research is pertinent to the current study as it demonstrates a lack of knowledge regarding the risk of kidney disease related to hypertension. When questioned about their comprehension regarding hypertension as a risk factor for kidney disease, 17% of patients said no, and 29% reported no knowledge. This supports the hypothesis that patients newly diagnosed with hypertension are not adequately educated about the risk of kidney disease. It also demonstrates a gap in the literature on the long-term effects of educational intervention regarding hypertension and self-management in preventing kidney disease.

Hunegnaw, et al. (2021) researched the prevalence and related contributors of chronic kidney disease among hypertension patients in referral hospitals in northwest Ethiopia. A total of 581 adult patients from three hospitals were included in the study. Patients diagnosed with pregnancy-induced hypertension were excluded. The sample was 44.9% male, 55.1% female. Age-wise, 67.8% of patients were less than 60 years old. Almost 82% of the patients were married. No formal education had been received by 20.7% of the patients. Less than one-third of patients had a diploma or collegiate education. The researchers in this study defined a controlled systolic blood pressure in patients with a history of hypertension as less than 140 or less than 130 in patients diagnosed with chronic kidney disease and diabetes. Controlled diastolic blood pressure in patients with a history of hypertension was defined as less than 90, or less than 80 in patients diagnosed with chronic kidney disease and diabetes. Information for the study was obtained through questionnaires and a review of patients' medical records. Sociodemographic information included age, education, occupation, sex, marital status,

and family history of hypertension. Clinical characteristics included baseline blood pressure, duration, and type of home medications, comorbidities, obesity, and dyslipidemia. Lifestyle characteristics included alcohol use, tobacco use, and exercise. Bivariate and multiple logistic regression was utilized to analyze data in the EPI-Info Version 7.2.2.6, then transferred to SPSS. The researchers found that 17.6% of the hypertension patients had chronic kidney disease. Factors associated with increased prevalence of chronic kidney disease among hypertension patients included a creatinine greater than or equal to one, diastolic blood pressure greater than 90, proteinuria, comorbidities, dyslipidemia, or hypertension greater than ten years. Results demonstrated that 73.8% of patients had an average body mass index (BMI). Researchers noted that 11% had systolic blood pressure greater than 140, and 93% of patients had diastolic blood pressure greater than 90. Comorbidities were noted in 38% of patients. Alcohol use was reported by 20.5% of patients, and 3.1% reported tobacco use. Only 4.8% reported participation in regular exercise. Researchers found that patients with hypertension more than ten years were nine times more likely to develop chronic kidney disease than those with shorter disease duration. Patients with diabetes and congestive heart failure comorbidities were seven times more likely to develop chronic kidney disease. Patients with diastolic blood pressure greater than 90 were almost 8.65 times more likely to develop chronic kidney disease. A limitation of the study is patient self-reporting leads to a potential for recall bias. Regarding data collection, the researchers stated the tool was appropriate and standardized but did not give the name of the tool for research replication in other areas. A final limitation of this study is the limited generalizability of findings, as the patients included in the research were hospitalized and thus not representative of the

general population. This research is relevant to the current study because it demonstrates that the duration of hypertension is a highly contributable factor to the development of chronic kidney disease, as is the comorbidity of diabetes.

Diabetes is a condition characterized by the inability of the body to produce enough insulin or respond appropriately to insulin, which leads to elevated glucose levels in the bloodstream. As of 2020, 34.2 million adults in the United States have diabetes. In addition, diabetes is the leading cause of kidney failure, adult blindness, and lower-limb amputations (CDC, 2020). These complications lead to increased emergency room visits and hospitalizations, decreased quality of life, and increased strain on caregivers and healthcare systems.

Mott (2021) discussed the importance of self-management in the care of diabetes. Diabetes causes damage to small vessels in the kidneys over time, leading to the development and progression of chronic kidney disease. Self-management of diabetes, including monitoring glucose levels, healthy diet and exercise behaviors, and medication adherence, can decrease the risk of chronic kidney disease. In addition, continuity of care and the development of relationships with medical team members will help provide education and support for diabetic patients to improve their self-management skills. This information is of importance to the current study, as it demonstrates the effect of education on improving self-management, thus reducing the risk of kidney disease related to diabetes.

According to Chowdhury and Ali (2021), diabetes is the leading cause of chronic kidney disease. An estimated 40% of people diagnosed with Type II diabetes have diabetic kidney disease, defined as an estimated glomerular filtration rate (GFR) of less

than 60 with albumin present in the urine and no other known cause of renal impairment. Management of diabetic kidney disease must include control of blood pressure and glycemic control. In order to decrease the cardiovascular risk associated with diabetes, patients should be educated regarding medications, lifestyle choices, and smoking cessation. Diabetic patients should also receive routine screening for complications, including kidney function tests and vision tests. This information is relevant to the current study, as early detection and adequate management of diabetic kidney disease can prevent or delay the progression of the disease to ESRD.

Engelbrecht, Walker, and Monson (2020) performed research to learn more about the experiences of patients with diabetic kidney disease during care. Interview participants included adults with diabetic kidney disease who lived in New Zealand for over five years. Of the ten participants, one had Type I diabetes, and nine had Type II diabetes. Interviews took between 34 and 60 minutes in a face-to-face setting and were audio-taped and transcribed verbatim. The researchers developed interview prompts, which included open-ended questions. Each researcher coded transcripts of interviews independently, then compared them to other researchers to ensure consistency, similarities, and differences. The information was coded into themes and presented to participants for validation. The first theme identified was the value of education. Patients stated they did not receive adequate information regarding the implications of diagnosis and disease self-management, leading to unnecessary complications related to diabetes. Patients also stated that medical jargon in printed education materials made comprehension difficult, and most patients searched online for answers to questions related to fear of ridicule. All patients stated retrospective anger regarding lack of

adequate education regarding diagnosis and care. The second theme identified was relationships with healthcare providers. Patients stated different providers were seen at each visit, leading to a lack of continuity of care. Conflicting information from different providers led to confusion. Patients referred to specialist services stated improved relationships with caregivers and improved quality of education. The third theme identified was coping with the diagnosis. Many patients denied the severity of the disease due to lack of symptoms, which led to continued poor lifestyle choices and lack of medication adherence. When diagnosed with diabetic kidney disease, patients stated fear and guilt related to lack of self-care. Many stated not being aware of the risk of kidney disease associated with diabetes. The final theme identified was the importance of family. Patients stated a strong family history of diabetes and an urge to educate children and prevent disease development. Patients also stated a lack of community knowledge and awareness. In conclusion, the researchers deduced that patients need adequate education regarding diagnosis and self-care. Patients stated anger in regard to condescending communication from providers. Patients agreed on a need for continuity of care and relationships with healthcare providers built on trust and rapport that included support and encouragement. A limitation of the study is only three of the ten participants provided verbal feedback and agreement with the summary of findings from researchers; it is not stated if the other participants were not approached or were not in agreement. Also, one of the researchers was known to some of the participants, causing a potential influence on responses. A final limitation is the study took place in one area of New Zealand with prompts developed by researchers, which leads to a potential lack of generalizability nationally or internationally. This research is applicable to the current

study because it demonstrates inadequate education about diabetes and diabetic kidney disease at the time of diagnosis of diabetes. Patients reported an inability to manage diabetes related to a lack of understanding of risk and complications associated with diagnosis, which contributed to complications. Many patients stated a lack of awareness about the risk of kidney disease related to diabetes. This information supports the hypothesis that patients are not adequately educated about kidney disease during the treatment of diabetes.

Johnson, et al. (2016) researched group differences in activation and health-related quality of life across the five stages of chronic kidney disease. Chronic kidney disease negatively affects a patient's health-related quality of life over time due to worsening symptoms and increasing health restrictions. Improvement in patient engagement and activation was a predicted effect of educating patients on diagnosis, treatment, and prognosis during each visit. The researchers considered an activated patient to have the self-management skills, knowledge, and confidence to participate in self-care that would lead to improved outcomes and thus improved quality of life. Activation is a continuum, from passive and disengaged to modified health behaviors and engagement in healthcare. Patients were recruited by flyer placement in one dialysis center, three nephrology clinics, and five primary care clinics in two midwestern cities in the United States. The sample was composed of 85 patients diagnosed with hypertension, diabetes, and chronic kidney disease. All patients were at least 19 years old and could speak and read English. The sample was 50.58% female, with an age range of 28 to 93 years and a mean age of 63.2 years. The sample was 85% Caucasian, 12% African American, 2% Hispanic, and 1% Asian. A total of 38% of the patients had not graduated

high school. Researchers reported that 55% of patients were retired, 24% were employed, 21% were not employed. Distribution among the different stages of kidney disease included 4% of patients were in stage one, 15% in stage two, 37% in stage three, 19% in stage four, 2% were in stage five without dialysis initiation, and 23% were in stage five on dialysis. The research took place from September 2012 through January 2014. This descriptive correlational study involved phone interviews that lasted 45 to 60 minutes with all patients except the patients on dialysis; these patients received face-to-face interviews at the beginning of treatment. Questionnaires that were utilized included the 13-item Patient Activation Measure regarding skills and knowledge, the 29-item Patient-Reported Outcomes Measurement regarding fatigue and anxiety, and the 6-item Self Efficacy for Managing Chronic Disease Scale (SEMCDS) regarding confidence. Knowledge regarding specific diseases was rated using the 28-item Kidney Knowledge Survey (KiKs) and the 11-item Blood Pressure Knowledge Scale (BPKS). Self-management behaviors were rated by utilizing the 10-item Blood Pressure Self-Care Scale (BPSCS) and the 15-item Chronic Kidney Disease Self-Management Scale. Cronbach's alpha was utilized for internal consistency. Each survey that was at least 80% complete was included in the final calculations of findings. Demographic data were analyzed through the utilization of descriptive statistics. The Kruskal-Wallis H test and the Mann-Whitney test were utilized to analyze differences in survey results. The researchers noted a trend that patients in stage one had the lowest levels of activation and did not self-manage blood pressure well; this is likely because symptoms of kidney disease do not begin until a patient has reached stage three. Patients in stages three or four of kidney disease had the highest activation levels, likely due to the development of

symptoms and the realization of disease progression. Patients in stage five demonstrated declining activation scores, likely related to the overwhelming realization of the irreversibility of kidney failure and acknowledgment of restrictions and difficult health behaviors required to sustain life and prevent complications. The average length of kidney disease among patients was eight years. Patients across all stages exhibited limited knowledge regarding symptoms of kidney disease and risk factors for kidney impairment. The researchers stated patients with higher activation scores would be better prepared to manage diabetes, participate in healthy lifestyle behaviors, and thus experience fewer emergency department visits and hospitalizations due to the confidence, knowledge, and skill development resulting from activation. A limitation of the study is that there were only three patients in stage one. Results for patients in stage one was combined with stage two for score compilation, resulting in less specific information regarding the early stages of kidney disease. Another limitation is that all dialysis patients experienced face-to-face interviews, whereas all others received telephone interviews; a lack of uniform data collection leads to a potential for skewed data. Other potentials for skewed data include the replacement of missing data in surveys that were at least eighty percent complete and a lack of uniform group sizes in each stage of kidney disease. Information from patient self-report leads to a potential for bias in regard to social desirability responses. A final limitation is all patients had diagnoses of hypertension, diabetes, and chronic kidney disease, but knowledge of diabetes was not assessed in the disease-specific and self-management surveys. This research is relevant to the current study because diabetes and hypertension are the two leading causes of chronic kidney disease; as the prevalence of these two conditions increases, the incidence of chronic

kidney disease will increase. Providing early education regarding chronic kidney disease during treatment of hypertension or diabetes will improve self-care and patient knowledge, thus preserving kidney function and preventing or slowing the progression of kidney disease. Frequent education, support, encouragement, and follow-up will improve activation and engagement in a patient's self-management of care, improving health-related quality of life and reducing anxiety related to disease progression in patients with early kidney disease.

Researchers in Ethiopia performed a study regarding risk factors, prevalence, and patient awareness of chronic kidney disease among patients diagnosed with hypertension and diabetes (Goro et al., 2019). Researchers stated chronic kidney disease disproportionately affects low-income countries due to the increased prevalence of hypertension and diabetes in these areas. Poor education, hazardous work conditions, increased rate of infections, and lack of financial assistance for healthcare screening or treatment contribute to the increased prevalence of hypertension, diabetes, and chronic kidney disease. In middle and east Africa, over half of the people diagnosed with ESRD die due to lack of access to a dialysis center or transplant service. Inclusion criteria for this study included age over 18 years old, diagnosis of hypertension and diabetes with more than three months of follow-up regarding chronic kidney disease, and a complete medical record. Critically ill patients and pregnant women were excluded from the study. The sample included 208 patients with a mean age of 54.81 years and 52.9% male. Of the population, 68.3% lived in urban areas. Only 5.8% of the patients had attended college; 34.6% had no education, 46.2% had attended elementary school, and 13.5% had attended secondary school. Over half of the sample had a monthly income of less than 1,000

Ethiopian Birr, which is equivalent to 21.67 in United States dollars (USD). The study was performed with a cross-sectional design and consisted of patient interviews and chart reviews when patients came to Jimma University Medical Center for monthly check-ups. Demographic data were obtained, and a seven-part assessment of knowledge along with a six-part assessment of attitude were conducted. Chart review was performed for home medications, glucose levels, and blood pressure. Blood urea nitrogen and creatinine levels were measured from blood tests, and urine tests measured albumin levels. GFR was estimated through the utilization of the Chronic Kidney Disease Epidemiology Collaboration (CKD-EPI) equation. Multivariate logistics regression was utilized to identify predicting values of chronic kidney disease. Patients with abnormal results were informed and referred to a physician for further evaluation. Researchers considered four out of seven correct answers on knowledge questions to be average knowledge and a positive attitude to agree with three attitude statements. A patient with average knowledge and a positive attitude was considered aware of chronic kidney disease. SPSS was utilized for data analysis. Bivariate logistic regression was utilized to assess associations between chronic kidney disease and variables. The researchers found that 28.4% of patients were aware of chronic kidney disease. There was a 26% prevalence of chronic kidney disease among the sample. Mean systolic blood pressure was 136.6, plus or minus 15.7. Mean diastolic blood pressure was 85, plus or minus 8.9. Mean fasting glucose was 145.6, plus or minus 52. Of the patient population, 54.8% had a healthy weight. A positive attitude was scored by 41.3%, and average knowledge was scored by 36.5%. A total of 38.5% of patients knew hypertension was a risk factor for chronic kidney disease, and 44.2% of patients knew diabetes was a risk factor for chronic kidney

disease. Of the patients with hypertension, 44.2% had fewer than five years, 35.6% had a diagnosis of six to ten years, and 20.2% had a diagnosis of greater than ten years. Of the patients with diabetes, 43.3% had a duration of fewer than five years, 38.5% had a duration of six to ten years, and 18.3% had a diagnosis of greater than ten years. No family history of kidney disease was reported by 79.8% of the sample. The researchers established an overall low attitude score towards early detection of chronic kidney disease; 71.6% of patients believed that the cost of kidney function screening outweighed the risks. A limitation of this study is the lack of further research concerning this low attitude. Over 70% of the patient population stated no family history of kidney disease, but it is unknown if these people had normal kidney function or simply did not receive medical screening and care due to low income. It is also not known if the attitude of these patients towards kidney function screening would change if the screening were provided for free. A second limitation of the study is the questions were closed-ended, either a yes/no choice or an agree/disagree choice; limiting the answering of patients could potentially skew data. A final limitation is that Jimma University provided financial support for the study at their hospital, leading to a potential influence to bias researchers. This research is applicable to the current study as it confirmed that uncontrolled hypertension, long duration of hypertension, elevated fasting glucose, and poor knowledge regarding chronic kidney disease are risk factors associated with the development of chronic kidney disease. Implementing routine kidney function screening in patients diagnosed with hypertension and diabetes is paramount to diagnosing chronic kidney disease early before progression to ESRD. Providing education regarding chronic kidney disease during treatment of hypertension and diabetes will help raise patient

awareness and may help to prevent or slow the progression of chronic kidney disease among these high-risk patients.

Vieira, et al. (2017) performed research to develop a diagnosis model for kidney disease based on creatinine, urea, and glucose levels. Measurements were taken in patients with ESRD on dialysis, patients with a diagnosis of hypertension and diabetes, and patients with no diagnosis. Researchers asserted that elevated blood pressure and poor glycemic control contribute to a rapid decline in kidney function, leading to permanent damage and disease. A goal of the researchers was to identify a model of early diagnosis of acute renal failure, which would allow for improving the efficiency of treatment and a better prognosis in regard to declining into chronic kidney disease and progression to ESRD. The patient sample included 42 female and 30 male patients, age 50 to 80 years old. Of the 72 total patients, 18 had no diagnosis of diabetes or hypertension, and 54 had a previous diagnosis of hypertension and diabetes and were taking insulin and medication to control blood pressure. Of those 54 patients, 19 had a diagnosis of ESRD and were on dialysis. All patients fasted at least two hours before collection of first-morning urine stored by researchers at -80 degrees Celsius. Raman spectroscopy, which utilizes laser lights to assess vibrations and thus energy levels of molecules, was utilized to evaluate creatinine, urea, and glucose when dilated in water. A discrimination model based on Mahalanobis distance was developed, and data were analyzed in Origins and Matlab software. The average concentration of each measure was plotted, and analysis of variance (ANOVA) was utilized to determine differences in measurements. Researchers found the percentage of patients with lab values that supported their classification and medical history to be 89% of patients without a history

of diabetes or hypertension, 86% of patients with diabetes and hypertension, and 79% of patients with diabetes and hypertension on dialysis. In conclusion, the researchers did find the measurement of these biomarkers of renal impairment in patients with diabetes and hypertension can be correlated with other criteria for the diagnosis of chronic kidney disease. One concern from study results is glucose levels in urine of diabetic patients, indicating ineffective treatment and control of disease. Another concern is patients with a prior diagnosis of hypertension and diabetes had lower levels of creatinine and urea in their urine, indicating decreased function and potential damage to kidneys. A limitation of this study is the amount of urine collected from dialysis patients was inadequate for all biomarker testing, thus potentially skewing study results. Another limitation is the length of time since the last dialysis treatment was not disclosed, and this factor could potentially skew laboratory results and thus study findings. Finally, the residual kidney function of dialysis patients was not discussed, and this would significantly alter both urine volume and the amounts of biomarkers present in urine. This research is pertinent to the current study because it demonstrated renal impairment in patients with no diagnosis of kidney disease. Patient referral for abnormal biomarkers was noted to allow for further evaluation; in clinical practice, these patients would be asymptomatic and not seek medical care due to a lack of awareness of the condition. This emphasizes the need for routine screening during care of hypertension and diabetes to diagnose chronic kidney disease in early stages before progression to late symptomatic stages.

Research regarding hypertension and diabetes was comparable in that education regarding self-management and complications of the disease can help to decrease the risk of chronic kidney disease. Multiple studies stated patients had demonstrated a lack of

knowledge regarding the risk of kidney disease before the development of chronic kidney disease. As the prevalence of hypertension and diabetes continues to increase, chronic kidney disease prevalence will also increase. This information supports the hypothesis that educating patients during hypertension or diabetes treatment can help prevent or slow the progression of chronic kidney disease. Utilization of the Health Belief Model for implementation of education programs will help to focus on the patient's perception of the risk of complications and ability to perform self-care, thus improving patient confidence and motivation for self-management of disease; this will help to prevent or slow the progression of chronic kidney disease. One noted gap in the literature is a lack of research regarding the long-term effects on self-management and outcomes improvement concerning educational interventions during the treatment of hypertension or diabetes. A second gap in the literature is a noted lack of research with current dialysis patients regarding education received during treatment of hypertension or diabetes. This gap in the literature serves as a justification for the current study, as ESRD is an irreversible condition and identifying potential avenues of prevention is of great importance to patient health and outcomes.

Literature Related to Chronic Kidney Disease

Chronic kidney disease occurs in approximately 10% of the population worldwide. It is characterized by a gradual loss of kidney function that damages the kidneys and persists for greater than three months. Early stages of kidney disease are often asymptomatic, leading to most people not being diagnosed until hematuria and edema occur in later stages (Cheng et al., 2017). The highest percentage of patients with chronic kidney disease are in stage three. There is no cure for chronic kidney disease, but

adequate management of modifiable risk factors such as diabetes or hypertension can prevent or slow progression (Nguyen-Thi et al., 2020). There is a high degree of variability of progression of chronic kidney disease due to contributing factors of the disease and individual patient characteristics. Attempts have been made to develop linear regression models to estimate progression based on GFR accurately, but a high degree of variability between individual patients remains (Vesga et al., 2021). Risk factors for the progression of chronic kidney disease include a family history of kidney disease, advanced age, low socioeconomic status, analgesic use, unhealthy lifestyle, and chronic disease comorbidities such as diabetes, hypertension, cardiovascular disease, or hypercholesterolemia (Cheng et al., 2017).

Researchers in Vietnam conducted a study to learn more about the economic burden of chronic kidney disease (Nguyen-Thi et al., 2021). Researchers pulled information from medical records of 1,175 patients at District Two hospital in Ho Chi Minh City from January to December 2019. Selection criteria included a primary or secondary diagnosis code of the International Classification of Diseases (ICD) Ten N18 or sub-codes. Of the patient population, 41% had a diagnosis of stage three kidney disease. There was a high prevalence of comorbidities; 81.4% of patients had a diagnosis of hypertension, and 47.1% had a diagnosis of cardiovascular disease. Analysis of the hospital visit cost, including surgeries, medications, laboratory utilization, blood bank utilization, medical imaging, hospital beds, medical supplies, and transportation, were involved in this cross-sectional study. All expenses were converted to USD, using the January 2020 exchange rate 1 USD equals 23172.50 UND. Descriptive statistics were utilized to analyze demographic data. Stata Fifteen software was utilized for encoding

and analyzing information, and generalized linear regression was utilized to identify factors associated with cost. A link test was utilized to assess the accuracy of the model. Kullback-Leibler divergence was utilized to explain degrees of variation in data. Researchers found that healthcare costs increase as patient condition worsens. The total cost to care for patients with chronic kidney disease in this hospital in 2019 was 916,423,988.60 USD. The main factors affecting the cost of care were the stage of kidney disease, patient age and gender, and comorbidities of diabetes, cardiovascular disease, or anemia. Chronic kidney disease care costs exceeded the 2019 Vietnam per capita gross domestic product. On average, patients had nine outpatient visits and ten inpatient days of treatment annually. Medications accounted for the highest cost for inpatients, and surgery accounted for the highest percentage of the cost for outpatients. The researchers noted patients in stage one or two of kidney disease received the least medical treatment due to minor impairment in renal function. In conclusion, the researchers stated the most important factor affecting treatment costs of chronic kidney disease is the presence of comorbidities. It was noted that only 3.8% of patients with chronic kidney disease treated at the hospital were in stages one or two, leading researchers to believe that many patients in early stages of kidney disease are currently undetected. A limitation of this study was that 5,500 chronic kidney disease treatments took place at the hospital in 2019, but there was no detail regarding the basis of treatment. Another limitation of the study is that only one hospital in Vietnam was utilized, leading to generalizability concerns to other geographic areas or hospitals of differing sizes. This research is relevant to the current study because it demonstrates an increase in healthcare costs as kidney disease progresses. It also demonstrates higher costs of care with comorbidities of hypertension

and diabetes. Preventing the progression of kidney disease will help to decrease the economic burden.

Cheng, Hu, and Chiou (2017) performed research regarding the temporal abstraction technique to predict chronic kidney disease progression. The study aimed to develop a prediction model for patients in stage four kidney disease to determine if GFR levels decreased to ESRD classification of less than 15ml/min/1.73m squared within six months of laboratory analysis. The sample was comprised of 463 patients at a large dialysis center in southern Taiwan from January 2004 to December 2013. Patients received examinations every three months for a year; any patient with less than four examinations was eliminated from the study. Patients aged 65 years or older comprised 71.92% of the sample. Researchers extracted time-series data, including blood pressure and laboratory values, over time to assess for change utilizing temporal abstraction. Other information extracted from the patient chart included demographics, medical history, and education records. Data mining techniques, including classification and regression tree (CART), support vector machine, and adaptive boosting (Adaboost), were utilized to develop progression models for chronic kidney disease. Weka open-source machine learning software was utilized to construct the models. Researchers worked to input lab data into temporal abstraction algorithms and develop trends of changes over time. The researchers identified several factors that contribute to the progression of chronic kidney disease and combinations of factors that expedite progression. Researchers stated by identifying these factors in patients, many could receive an earlier diagnosis of the progression of the disease. Gender and age had a significant effect on the progression of chronic kidney disease. Progression to ESRD could be predicted within six months with

93% accuracy in patients with advanced age, elevated blood urea nitrogen, anemia, and elevated body mass index. Other contributing factors included low albumin levels, lack of exercise, cardiovascular disease, and smoking. Out of the total 463 patients, 132 progressed to ESRD within six months of the last exam for study, while 331 remained in stage four kidney disease. In conclusion, the development of prediction models can help identify high-risk patients and allow early detection of chronic kidney disease. Early detection will allow for more aggressive care to prevent or slow the progression of chronic kidney disease to ESRD. A limitation of this study is the stated fact of gender as a critical factor affecting the progression of chronic kidney disease, but the gender is not specified. Another limitation is researchers determined standard values of laboratory tests, as results for patients with chronic kidney disease will differ from normal parameters; this leads to a potential conflict of interest as the researchers are setting their own parameters on values obtained. Researchers stated that anemia could exacerbate symptoms of kidney disease without recognition of the role of the kidneys in the stimulation of red blood cells, and anemia often occurs as a result of kidney disease. Another limitation of the study is it occurred at one dialysis center in Taiwan, leading to generalizability concerns to other geographic areas. Finally, the factors were analyzed as isolated factors; in clinical practice, factors are complex. Further research is needed to assess environmental factors, education level, socioeconomic status, diet, medications, and geographic area concerning these contributing factors to the progression of chronic kidney disease. This research is applicable to the current study as it noted a 100% prediction of progression of chronic kidney disease to ESRD in patients with advanced age, elevated blood urea nitrogen, inactive lifestyle, hypertension, and diabetes. This

information signifies the importance of controlling glucose levels and blood pressure to prevent the progression of chronic kidney disease. Patients in this study were already in stage four kidney disease, but the factors that contribute to the progression of chronic kidney disease could be identified in patients in the early stages of kidney disease. Improving patients' awareness and education regarding kidney disease and contributing factors could prevent or slow the progression of kidney disease to ESRD.

Researchers in Columbia performed research regarding chronic kidney disease progression concerning changes in GFR and the probability of transition through the stages of chronic kidney disease over time (Vesga et al., 2021). The sample comprised 2,752 adult patients with stage three or four kidney disease enrolled in a chronic kidney disease prevention program in Bogota from January 1, 2009, until December 31, 2013, with follow-up until December 31, 2018. A prior diagnosis of hypertension existed in 60.3% of the patients, and 18.4 percent of patients had a prior diagnosis of diabetes. Patient years of follow-up, calculated by the number of patients multiplied by the years in the study, equaled 14,133. There were 200 dialysis initiation events throughout the study. The rate of progression was calculated by the least-squares method. Loss to follow-up was also calculated. This observational analytic retrospective cohort study involved at least four follow-up measurements per patient, with a report of the mean, standard deviation, median, 25^{th} percentile, and 75^{th} percentile of data. A project information engineer and a quality information assurance person built and validated the database. Heat maps were utilized to present the probability of chronic kidney disease stage transition over time. A survival model with competing risks was utilized to evaluate factors associated with dialysis initiation. Data was transferred from the electronic health

record to an Excel file, then exported to statistical data (STATA) for statistical analysis. The Fine and Gray approach was utilized to fit a survival model with the competing risks of death, palliative care, or kidney transplant. At the end of follow-up, 7.3% of patients had begun dialysis, 7.5% died, 20.8% had been referred to primary care, and 13.6% had been lost to follow-up. Researchers reported 1.4 events per 100 patient-years. The median change of GFR for the cohort was -0.47 and -1.55 for diabetic patients. Researchers stated a lower risk of progression to ESRD with dialysis initiation in older female patients with adequate albumin levels. Patients with a higher risk of dialysis initiation included a kidney disease etiology of diabetes, a history of cardiovascular disease, elevated blood urea nitrogen levels, abnormal cholesterol levels, or elevated systolic blood pressure. In conclusion, late referral to the prevention program and patients with a prior history of diabetes had a higher risk of progression of chronic kidney disease. A low rate of patients lost to follow-up was noted by researchers, with the majority of patients remaining in stage three or four kidney disease. This adherence to the program could indicate high self-care tendencies and healthy life habits in these patients, which could also be a factor in delayed disease progression. A limitation of this study is a lack of data related to micro-albuminuria, proteinuria, and serum bicarbonate, leading to the inability to analyze these factors of kidney disease progression. Another limitation of this study is a potential conflict of interest; three of the six researchers received funding for the study from Renal Therapy Services Columbia. This company provided the chronic kidney disease prevention program to the enrolled patients. This research is applicable to the current study because it describes a higher rate of progression of kidney disease in patients with a prior history of diabetes. The inclusion criteria for this study required diagnosis of

chronic kidney disease from a nephrologist, but it has been noted that many patients in the early stages of kidney disease are unaware of conditions related to lack of symptoms. Chronic kidney disease prevention programs initiated during treatment of hypertension or diabetes before the development of kidney disease would help prevent disease, rather than waiting for the diagnosis of existing disease when a patient has progressed to later stages and is referred to a nephrologist. Identifying patients at high risk of kidney disease progression, including those with uncontrolled hypertension or poor glycemic control, could allow for the initiation of support and education to prevent or slow kidney disease progression. It was noted the prevention program in this study provided nephrology, nursing, dietary, psychological, and social work services. Initiation of similar programs for patients in stage one or two of kidney disease would be incredibly beneficial in preventing or slowing the progression of the disease.

The research on chronic kidney disease demonstrated that healthcare costs increase as a patient progresses through the stages of kidney disease, and that of comorbidities, diabetes and hypertension also increase healthcare costs. Lifestyle factors, comorbidities, and age all factor into chronic kidney disease development and progression risk. Studies were comparable in findings that the prevention of chronic kidney disease will help to decrease the economic burden. Utilization of the Health Belief Model to implement educational interventions regarding disease management and risk factors of kidney disease will help improve patient outcomes. A gap in the literature and subsequent justification for the current study is a lack of research regarding the efficacy of current efforts that emphasize the prevention of kidney disease during the treatment of hypertension and diabetes.

Literature Related to Dialysis

Piccin, et al. (2018) performed research to identify sociodemographic and clinical characteristics of patients on dialysis to identify specific needs. Researchers stated the desire to utilize these needs to identify high-risk groups and prevent or delay chronic kidney disease progression to ESRD. A negative effect on a patient's quality of life and healthcare costs was noted in relation to dialysis. The sample consisted of 220 patients, 55.9% of whom were male, and a mean age of 58.9 years. Of the sample population, 67% were Caucasian, and 83.7% lived in an urban area. A low level of education was noted in 65.5% of patients. Data collection occurred at Clinica Renal de Santa Maria Ltda, the largest dialysis center in Rio Grande do Sul, from May until September 2016. This quantitative, cross-sectional study consisted of a questionnaire and chart review for demographic and clinical information from patients. Data analysis was performed with the SPSS system and organized in a Microsoft Excel spreadsheet. The variable analysis took place with absolute and relative frequencies. Researchers found that 11% of patients were less than 40 years old, 13.2% were between 40 and 49 years old, 23.6 percent were between 50 and 59 years old, 25% were between 60 and 69 years old, and 26.8% were 70 years or older. Illiteracy was noted in 6.8% of patients, 58.7% did not finish high school, and 11.4% had obtained a degree. Unemployment was noted in 90% of patients. The patient population represented varied family sizes; 45.9% of patients had up to two children, and 35.9% had three or more children. The most prevalent etiologies of kidney disease included 27.7% hypertension, 10.9% diabetes, and 20% had both hypertension and diabetes. Less frequent etiologies of kidney disease included pyelonephritis at 4.5%, lupus, history of renal toxicity due to medications, or hereditary conditions were observed

at 3.2% each. Length of time on dialysis included 5.9% of less than a year, 20% from one to three years, 14.5% from three to five years, and 56.4% greater than five years. Treatment complications were reported by 49.5% of patients, including hypotension, muscle cramps, hypoglycemia, and tremors. In conclusion, researchers stated early referral to a nephrologist at least six months before dialysis initiation led to increased survival rate, decreased hospitalizations, and improved metabolic control. A late referral was associated with increased morbidity and mortality. A limitation of this study is incomplete patient records, which led to difficulty obtaining all the needed information. A higher level of nonadherence was noted in male patients regarding preventative care related to cultural views on masculinity. Due to medical care as a sign of fragility in the culture, these patients tended to be in the late stages of chronic diseases before diagnosis. Similar research among differing cultures could determine the generalizability of this information. This research is pertinent to the current study because it identifies factors contributing to the deterioration of kidney function, including a history of diabetes or hypertension. A low level of education was identified as a factor related to restrictions on comprehension of disease, risks, treatment, and complication mitigation. Low socioeconomic status was also identified as a factor related to the inability to afford medications for hypertension or diabetes or effectively treat and control other comorbidities, inability to afford healthy food, and perhaps lack of access to safe exercise opportunities. Identifying these factors in patients during the treatment of hypertension and diabetes could allow for early self-management support and education regarding kidney disease and may help decrease the development and progression of chronic kidney disease.

Alnazly (2020) performed research regarding the perception of the burden of dialysis patients on caregivers, in both patients and caregivers. Caregiver depression was also assessed. The researcher stated healthcare focus is often on the dialysis patient, and the quality-of-life assessment on caregivers is often neglected despite the psychological, emotional, and financial strain. The study involved 190 patients and their caregivers from four large outpatient dialysis clinics in two cities in Jordan. Criteria for the study included age 21 years or older, receiving dialysis treatments for at least one year, ability to read and write, and the presence of an unpaid family caregiver. Volunteer nurses approached patients for non-probability sampling. The mean age of participants was 63.62 years, with a mean caregiver age of 42.44 years. The percentage of male patients and caregivers was 65% and 54%, respectively. Data collection activities for this cross-sectional study took place from January until August of 2017. Questionnaires with prior translation from English to Arabic were utilized. An initial pilot study on 12 patients identified some unclear items; these were amended, and a second pilot study was performed with another ten patients that demonstrated improvement in feasibility. The questionnaires took 20 to 30 minutes to complete, and a box was placed in each dialysis unit for caregivers to drop off completed forms. The surveys utilized were the 10-item Self-Perceived Burden scale for patients, the 15-item Oberst Caregivers Burden scale and Bakers caregiving outcomes scale, and the 9-item health questionnaire to assess caregiver depression. Mean scores and standard deviations were calculated, and multiple regression analysis was utilized to predict outcomes. Cronbach's alpha was utilized to score each scale. SPSS was utilized for data analysis. The researcher discovered a common patient perception of themselves as a moderate to severe burden on caregivers, and caregivers perceived themselves as

moderately burdened. Caregivers scored as moderately depressed. Caregiver outcomes were predicted by the self-perceived burden of the patient and the caregiver's perception of the difficulty of caregiving tasks. Positive outcomes were associated with personal care assistance and planning activities. Adverse outcomes were associated with transportation and medical or nursing treatments. The patient's worry of overextension from the caregiver led to adverse outcomes, but the patient's worry that things were made more difficult by the patient led to positive outcomes. In conclusion, the researcher found the self-perceived burden of the patient and caregiver burden are interrelated. For this reason, caregivers should be assessed for burden and depression during routine care of the dialysis patient. The caregiver's physical, emotional, and mental health should be included in the patient's plan of care. Exclusion of any patients with paid caregivers was noted, as this could bias patient and caregiver perception of burden. A limitation of this study is that cause and effect cannot be determined due to a cross-sectional study. We cannot determine the depression noted in caregivers is due to responsibilities or seeing family members suffer on dialysis or other factors. We do not know if all caregiving tasks are related to ESRD and dialysis or if other comorbidities leave the patient dependent on a caregiver. Another potential limitation of this study is the culture in Jordan involves a commitment to care for sick family members; this leads to skewed results due to a cultural responsibility. A final potential limitation is the generalizability of findings due to the study taking place in Jordan. This research is applicable to the current study because it signifies ESRD and dialysis affect the quality of life of caregivers and patients. Prevention of the development or progression of kidney disease would help maintain the quality of life of patients and caregivers.

Ravindran, et al. (2020) researched the quality of life in ESRD patients on dialysis. Quality of life was discussed based on a person's perception of culture and contained physical, social, and psychological domains. Quality of life is often used as a measurement of the effectiveness of chronic disease management. Dialysis is associated with decreased quality of life related to dependence on caregivers, loss of freedom, work, family life disruption, and financial strain. The study involved 503 patients from 11 dialysis centers in India that had been on dialysis for at least three months. Patient sample characteristics included 47.91% over 60 years old, 73.76% male, 379 were married, 447 were unemployed, and 55 were illiterate. This cross-sectional study utilized the 26-item World Health Organization Quality of Life (WHOQOL) questionnaire for quality-of-life assessment and demographic data. Statistical analysis was performed utilizing SPSS. Pearson's correlation coefficient was utilized to assess domain scores and the correlation of demographic data. Quality of life in social relationships was scored at 51.65. Environment quality of life was scored at 46.91. Psychological quality of life was scored at 41.07. Physical health quality of life was scored at 40.17. The physical domain demonstrated the lowest quality of life scores related to chronic progressive illness, pain, disrupted sleep, treatment dependence, and decreased work capacity. Researchers did note tertiary or higher education was associated with a higher quality of life scores. In conclusion, a higher quality of life was associated with young, unmarried, educated males. A decrease in quality of life with age was noted across all domains. The social domain was associated with the highest quality of life. Psychological quality of life was affected by dependency on caregivers, altered body image, and fear of death. Longer and more frequent treatments were associated with a lower quality of life related to increased

time sacrifices. This signifies a need for patient education regarding increased morbidity and mortality that occurs with missed and shortened treatments, as patients may be tempted to improve quality of life short-term through treatment nonadherence. A limitation of the study is the lack of generalizability of findings related to the study in south India. An association of marital status with a negative effect on the quality of life was noted. Replication studies in different geographic areas amid different cultures might yield different findings. Another limitation is patients filled out questionnaires based on their perception and understanding of questions. The length of time to fill out surveys was not considered. A final limitation is limited data. Lower quality of life scores in all domains was noted in elderly patients, but it is unknown if this perception is related to kidney disease and dialysis or other comorbidities. It is unknown if the environmental effects on quality of life are due to dialysis or living in crowded urban conditions. This research is relevant to the current study as it found a correlation of dialysis with a lower quality of life regarding physical, environmental, social, and psychological health. Chronic kidney disease is a progressive and irreversible illness, but development and progression can be prevented or delayed.

The research regarding dialysis has comparable findings regarding the adverse effects of dialysis on the quality of life of the patient and caregivers. Multiple studies have stated a history of hypertension and diabetes, and low education levels or low socioeconomic status contribute to the development and progression of chronic kidney disease. A gap in the literature and subsequent justification for the current study is a noted lack of research regarding preventative measures for chronic kidney disease progression to ESRD requiring dialysis. Research has found early education and support

could help prevent the development or progression of chronic kidney disease. Utilization of the Health Belief Model to implement such programs with a focus on hypertension and diabetes self-management would provide knowledge and support to patients and caregivers, thus decreasing the risk of chronic kidney disease and progression to ESRD requiring dialysis.

Summary

This literature review discussed current literature from the past five years regarding the contribution of hypertension and diabetes to kidney disease, chronic kidney disease, and dialysis. The Health Belief Model was incorporated into the review of research and justification for the current study due to its focus on a patient's perception of the pros and cons of participating in health behaviors and avoiding risk behaviors to help control chronic disease. This literature review has demonstrated that hypertension and diabetes are modifiable contributors to kidney disease. Chronic kidney disease is a progressive condition characterized by an ongoing deterioration of kidney function until ESRD occurs. At this point, dialysis is required for survival, and a patient's quality of life is adversely affected. This literature review identified a gap in the literature regarding efforts to prevent the development and progression of chronic kidney disease. The current study retrospectively investigated education provided to dialysis patients during hypertension and diabetes treatment. This study was justified through a need to identify preventative measures regarding chronic kidney disease, as ESRD is irreversible.

III. METHODOLOGY

The purpose of this study was to determine whether current dialysis patients were educated regarding the risk of kidney disease development and progression during medical treatment of hypertension and diabetes.

This study involved retrospective descriptive quantitative research. Quantitative research involved measuring the outcomes of the study. Descriptive research is nonexperimental research in which occurrences were observed and described. Retrospective research involved the linking of current occurrences with past occurrences (Polit & Beck, 2021). For this study, a potential link between current advanced kidney disease and past education deficiency was evaluated. This study involved cross-sectional evaluation, in which data on current and past occurrences were obtained simultaneously. A benefit of this design was that it allowed for information related to events that occurred over many years to be collected at one point in time. A potential limitation of this design involved recollection bias related to the timing of events and memory lapses (Polit & Beck, 2021). Current dialysis patients were surveyed regarding primary causes of kidney disease, the timeframe of diagnosis to the progression of the disease, and the education received during treatment of hypertension or diabetes. This research design allowed for the collection of measurable data regarding education provided to this patient population in relation to current medical status and for statistical analysis of findings.

Setting

The research study was conducted at an outpatient dialysis center in central Arkansas. This outpatient dialysis center contained a peritoneal department in which patients schedule follow-up care, laboratory testing, and physician evaluations monthly.

The center also contained a hemodialysis department in which patients reported to the clinic based on a treatment schedule, generally three times per week. Across both treatment modality departments in this clinic, approximately twenty employees provided care for an average of one hundred patients.

Population/Sample

The population of interest for this study was adult patients who received hemodialysis at the outpatient dialysis facility and patients that checked-in monthly related to home peritoneal dialysis. Inclusion criteria included adults 18 years of age or older with comorbidities of hypertension or diabetes and who made their own medical decisions. Exclusion criteria included patients deemed mentally incompetent by a medical diagnosis of dementia or by the inability to make their own medical decisions.

A convenience sample of hemodialysis and peritoneal dialysis patients was utilized. The hemodialysis patient sample included those who reported to the clinic for treatment on Monday and Tuesday each week. The peritoneal patient sample included those who checked in monthly for follow-up appointments. The sample was identified through communication with the facility administrator, who ran a report of ICD-10 diagnoses of dementia on clinic patients. Patients with an ICD-10 diagnosis were ineligible for study participation per exclusion criteria. The identification of these ineligible patients was not revealed to the researcher. A treatment schedule listing the appointment time and seat location of patients that both met the inclusion criteria and were exempt from exclusion criteria was utilized in the hemodialysis department. A list of appointment times of patients that both met the inclusion criteria and were exempt from exclusion criteria was utilized in the peritoneal department.

Human Subjects

Institutional Review Board approval for this study was obtained on December 2, 2021, from Arkansas Tech University. Information provided to the review board included the research question and study purpose, as well as all pertinent information regarding the sample population and study procedures. Length of involvement, risks, and benefits for participants was stated in the application and provided on the informed consent.

Appendices to the application included copies of the informed consent form and participant survey, as well as a script of verbal approach to participants. A letter of permission from the facility administrator to approach patients in the outpatient dialysis clinic was included with the application. Collaborative Institutional Training Initiative (CITI) certification in Social and Behavioral Research, valid through September 21, 2022, was included as a prerequisite of research with human participants.

Patients were approached in the outpatient dialysis clinic. The sample included participants that met inclusion criteria with the absence of exclusion criteria, completed the informed consent, and participated voluntarily. The study was explained both verbally and with the informed consent form.

Seven of the questions on the survey, discussed in further detail in the following section, pertained to the patient's medical history that may have contributed to current kidney disease and failure. Some patients may consider this information to be personal or sensitive. Participants were notified of the right to refuse to answer any question considered personal or sensitive or to withdraw from the survey at any time. Participants were informed that the survey is strictly voluntary and refusal to participate in the study would not result in any loss of services at the outpatient dialysis clinic.

Instrumentation

Participants voluntarily completed a researcher-created 20-question survey based on current literature. Questions one, two, three, and four were demographic inquiries that provided specific background information on each participant. Questions five, six, seven, eight, nine, ten, and eighteen were medical history inquiries that provided information regarding contributing factors and timeframe to advanced kidney disease. Questions eleven, twelve, thirteen, fourteen, fifteen, sixteen, seventeen, nineteen, and twenty were education questions that provided information about education taught to each participant regarding kidney disease and disease progression and implications of ESRD.

The information received from the survey allowed for an insight into a potential relationship between the education received during treatment of hypertension and diabetes and the development and progression of kidney disease in comparison with specific demographic information. Retrieval of this information was justified in the opportunity to develop educational programs to aid in the prevention or delayed progression of kidney disease and subsequent maintenance of the quality of life and reduction of economic burden. The survey was estimated to take approximately 20 minutes for participant completion.

Data Collection

The research study was explained to the participants through written informed consent. The researcher hand-delivered the form to the participant to read and also offered to read it to each participant. In this event, the informed consent form was read word-for-word to the participant. A privacy curtain was be utilized to protect patient privacy during the completion of the survey or explanation of informed consent.

Potential cultural and language barriers included vision impairment and those whose primary language was other than English. In order to aid communication with participants whose primary language is not English, a telephone language translation device that is available for patients at the facility was utilized to translate the consent form and survey in their primary language. Participants with vision impairment were offered the form in easy-to-read-large font or were given a choice to have the researcher read the form out loud.

Voluntary participation as stated in the informed consent and was verbally discussed when participants were approached for participation. After informed consent was completed, participants were handed the paper survey to complete. Accommodations for participants who experienced language or visual barriers were initiated, as discussed above. Upon completion, the surveys were collected in a sealed box located at the reception desk, monitored by the administrative assistant during hours of operation to protect participant confidentiality. The survey did not ask for any identifying information; the participant's identification remained anonymous once unsealed.

Data Analysis

Surveys were collected on paper as hard copies and were stored in a locked filing cabinet in the researcher's home office. Surveys will be shredded, and electronic data will be deleted from personal computer after a minimum of five years. Data was collected from paper surveys and entered into electronic format for organization and computation in Excel. Electronic data was saved on a personal computer that was password protected. Descriptive statistics, including totals, percentages, frequencies, and central

tendencies, were utilized to report information obtained during the survey process in table and figure format. Data was reported as combined aggregate.

Summary

The methodology utilized obtained information regarding the education provided to current dialysis patients of the associated risk of kidney disease during medical treatment of hypertension or diabetes. This retrospective quantitative study involved survey responses from 52 adult patients at an outpatient dialysis center in Central Arkansas. The 20-question survey obtained data regarding demographics, medical history, and education received. Patient privacy and confidentiality were protected throughout this research process.

IV. Findings

This retrospective quantitative study aimed to delve into the education by healthcare teams provided to patients during medical treatment of hypertension or diabetes regarding kidney disease and dialysis prior to kidney disease development. A sample of fifty-two (N=52) current dialysis patients were surveyed in the outpatient dialysis clinic after providing informed consent to the researcher. The 20-question survey included demographic data, medical history, and education received. This chapter presents the results of the data received from questions regarding demographics, medical history, and education received are discussed in the following sections.

Demographic Data

A total of four demographic questions were asked, which included age range, sex, ethnicity, and education level. Fifty-two (N=52) complete surveys were returned to the researcher. Twenty-five (48%) participants were male, and 27 (52%) were female.

There were zero participants in the 18 to 30 age range. Two (3.85%) participants were in the 31 to 40 age range. Twelve (23.1%) participants were in the 41 to 50 age range, 10 (19.2%) were in the 51 to 60 age range, 17 (32.7%) were in the 61 to 70 age range, and 11 (21.2%) were 71 years or older.

The reported ethnicity of participants (N=52) demonstrated a primary group with multiple minorities. Over half of the sample, 59.6% (31) of participants, were Caucasian. One (1.92%) participant was American Indian, four (7.69%) were Hispanic, eight (15.4%) were African American, and eight (15.4%) were Asian.

The education level of participants (N=52) demonstrated a majority of some high school through some college credit, with 23.08% (12) of participants receiving

trade/technical/vocational or college degrees. Seventeen (32.7%) participants attended some high school but did not graduate. Ten (19.2%) participants graduated high school or obtained a GED, 13 (25%) attended some college but did not obtain a degree, four (7.69%) had trade or technical training, four (7.69%) obtained an Associate degree, two (3.85%) obtained a bachelor's degree, and two (3.85%) obtained a Master's degree. Data from the four demographic survey questions are summarized in the table below.

Table 1

Demographic Data of Participants (N=52)

Variable	Number	Percentage
Age		
31-40 years old	2	3.85%
41-50 years old	12	23.08%
51-60 years old	10	19.23%
61-70 years old	17	32.69%
71 years or older	11	21.15%
Gender		
Male	25	48.08%
Female	27	51.92%
Ethnicity		
African American	8	15.38%
Hispanic or Latino	4	7.69%
American Indian	1	1.92%
Asian	8	15.38%
Caucasian	31	59.62%
Education Level		
Some high school	17	32.69%
High school grad/GED	10	19.23%
Some college credit	13	25%
Trade/tech/vocational	4	7.69%
Associate degree	4	7.69%
Bachelor’s degree	2	3.85%
Master’s degree	2	3.85%

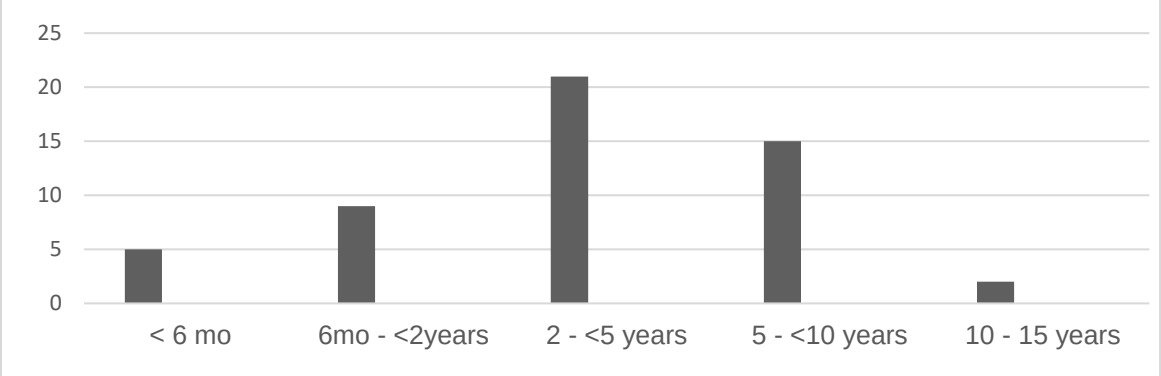
Medical History

This section in the survey inquired about the participant's medical history in regard to kidney disease. Three questions were type and cause of kidney disease and length of time on dialysis. The remaining three questions in this section were only for participants with a primary cause of renal failure as hypertension or diabetes. Questions included age range at time of diagnosis of hypertension or diabetes, length of time between diagnosis of hypertension or diabetes and diagnosis of kidney disease, and length of time of progression from diagnosis of kidney disease to initiation of dialysis.

Of the N=52 participants, four (7.69%) had a primary diagnosis of acute renal failure, while 48 (92.3%) had a primary diagnosis of chronic kidney disease. The length of time of dialysis is depicted in Figure 1 below. Five (9.62%) participants had been on dialysis less than six months at the time of the survey, nine (17.3%) had been on dialysis between six months and less than two years, 21 (40.4%) had been on dialysis two years to less than five years, 15 (28.8%) had been on dialysis from five years to less than ten years, and two (3.85%) had been on dialysis from 10 to 15 years. None of the participants had been on dialysis greater than 15 years.

Figure 1

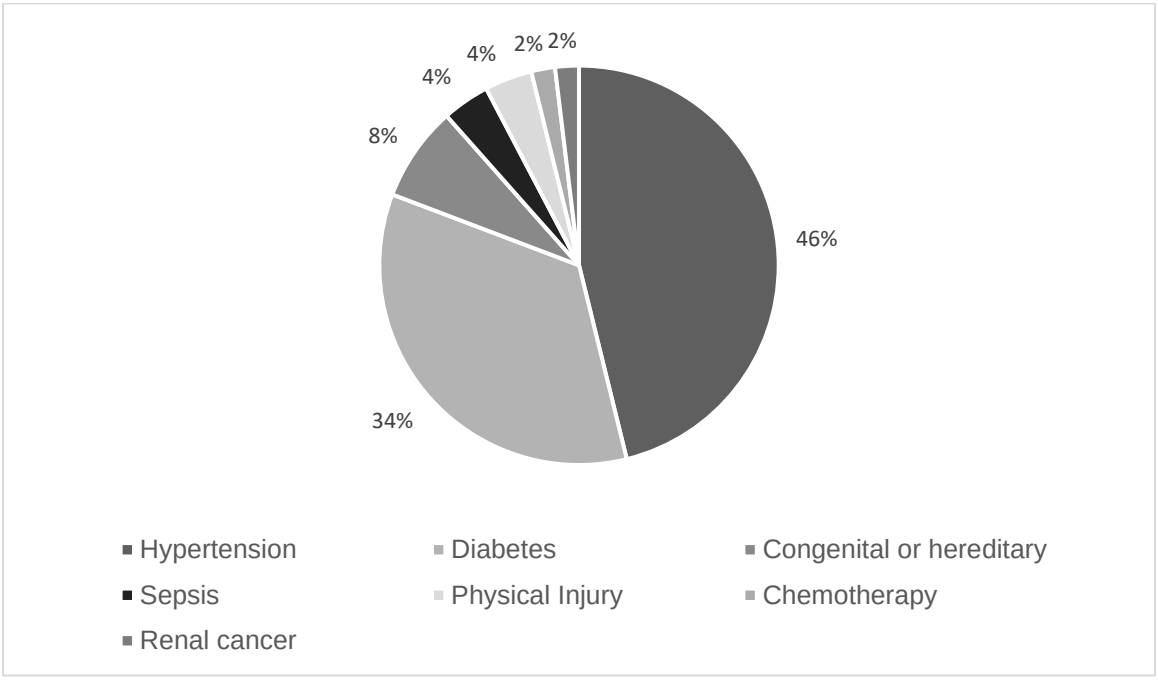
Participants Length of Time on Dialysis (N=52)



The primary cause of renal failure is depicted in Figure 2 below. Ten (19.2%) of N=52 participants had a primary cause of kidney disease other than hypertension or diabetes; one (1.92%) participant had a primary cause of renal cancer, one (1.92%) had a primary cause of chemotherapy, two (3.85%) had a primary cause of physical injury, two (3.85%) had a primary cause of sepsis, and four (7.69%) had a primary cause of congenital or hereditary kidney disease. Eighteen (34.6%) participants had a primary cause of diabetes, and 24 (46.2%) had a primary cause of hypertension. As can be seen by the chart below, 80.8% (42) of participants reported a primary cause of kidney disease as hypertension or diabetes.

Figure 2

Primary Cause of Renal Disease (N=42)

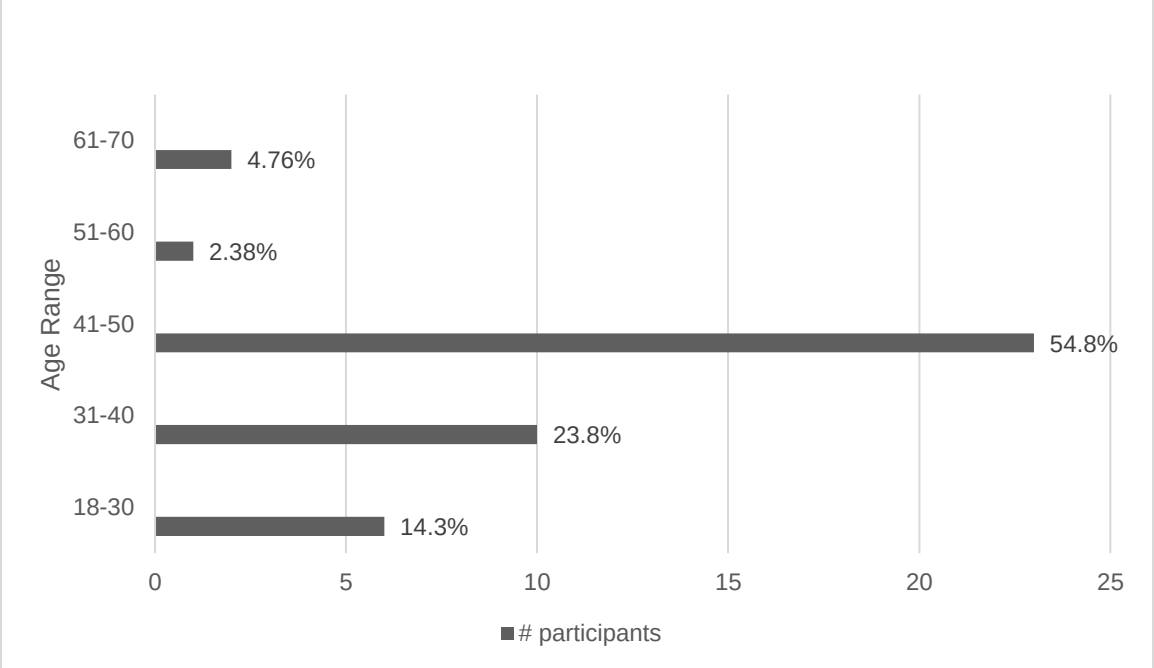


Of the N=52 participants, 42 (80.8%) had a primary cause of kidney disease as hypertension or diabetes. The remaining questions regarding medical history and education provided during treatment prior to the development of kidney disease were administered to these participants. None of the participants reported a prior diagnosis of kidney disease or decreased functioning of kidneys at the diagnosis of hypertension or diabetes.

The age range at the time of diagnosis of hypertension or diabetes is depicted in Figure 3 below. Six (14.3%) participants were 18 to 30 years old at the time of diagnosis, 10 (23.8%) were 31 to 40 at diagnosis, 23 (54.8%) were 41 to 50 at diagnosis, one (2.38%) was 51-60 at diagnosis, and two (4.76%) were 61 to 70 at time of diagnosis. No participants reported 71 years or older at the time of diagnosis of hypertension or diabetes.

Figure 3

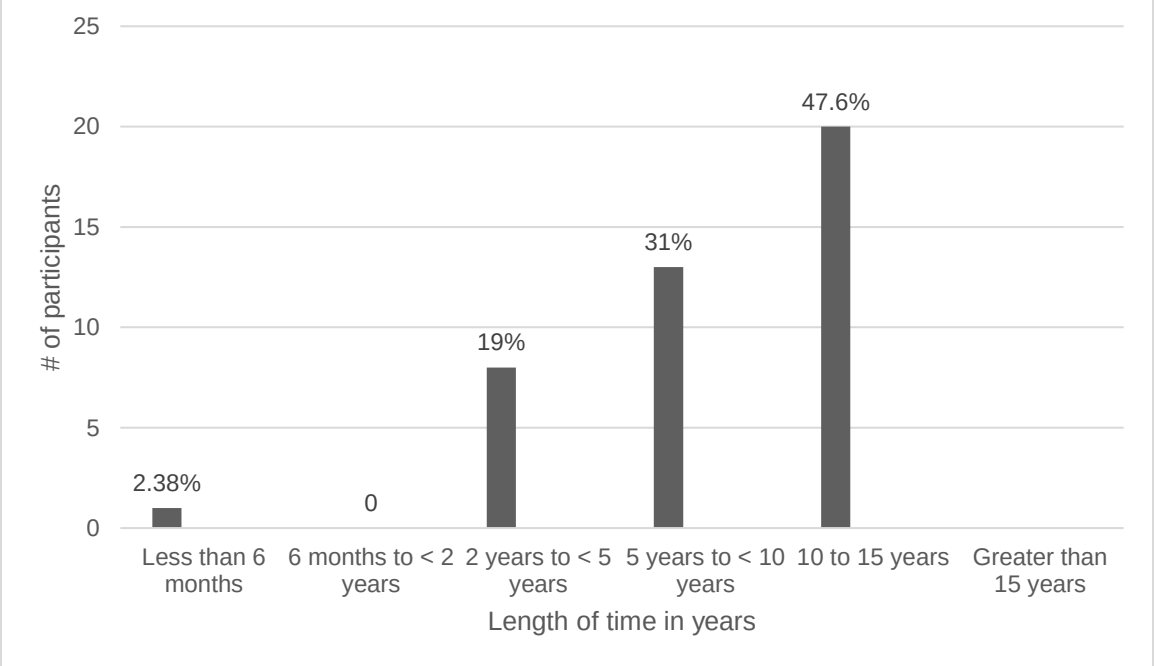
Age Range of Participants at Time of Diagnosis of Hypertension or Diabetes (N=42)



The length of time from diagnosis of hypertension or diabetes to the diagnosis of kidney disease is depicted in Figure 4. One (2.38%) participant indicated a length of time of fewer than six months, eight (19%) indicated a length of time of two years to less than five years, 13 (31%) indicated a length of time of five years to less than ten years, and 20 (47.6%) indicated a length of time of 10 to 15 years. No participants indicated a length of time from diagnosis of hypertension or diabetes to diagnosis of kidney disease of six months to less than two years or greater than 15 years.

Figure 4

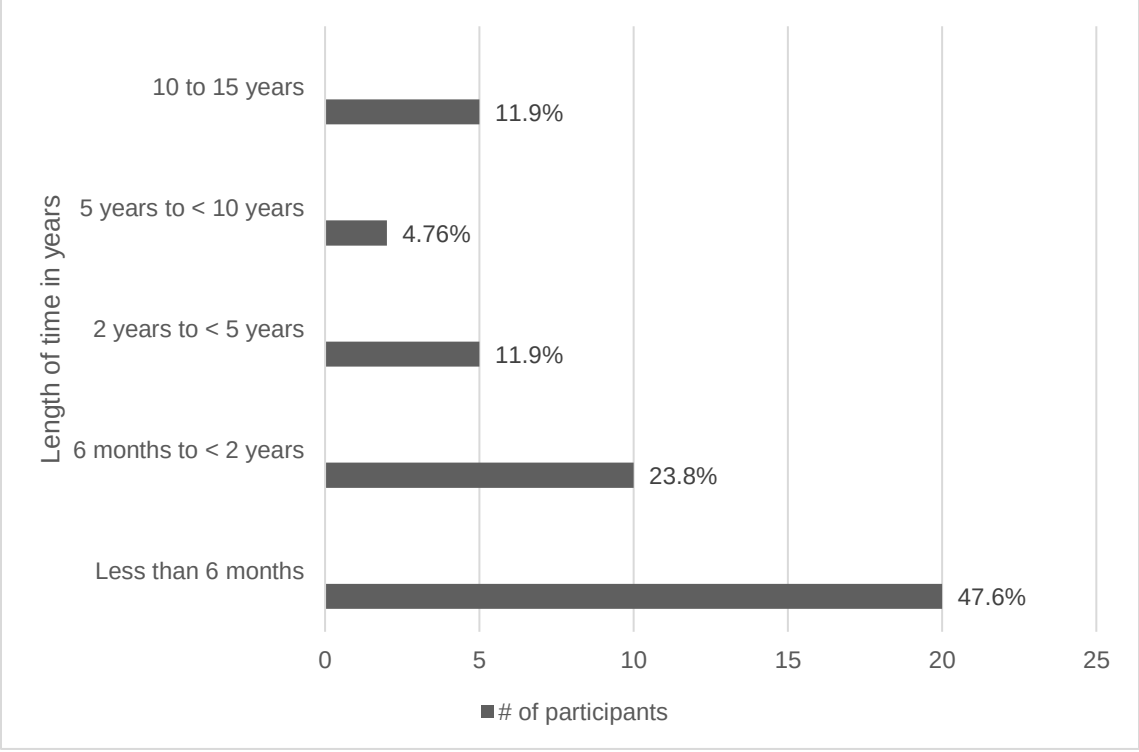
Length of Time Between Diagnosis of Hypertension or Diabetes to Diagnosis of Kidney Disease (N=42)



The length of time from diagnosis of kidney disease to the beginning of dialysis is depicted in Figure 5 below. As demonstrated in the chart, 47.6% (20) of participants indicated this period as less than six months. Twenty (47.6%) participants indicated less than six months, 10 (23.8%) indicated six months to less than two years, five (11.9%) indicated two to less than five years, two (4.76%) indicated five to less than ten years, and five (11.9%) indicated 10 to 15 years. No participants indicated a period of diagnosis of kidney disease to initiation of dialysis as greater than 15 years.

Figure 5

Length of Time Between Diagnosis of Kidney Disease and Initiation of Dialysis (N=42)



Education Received

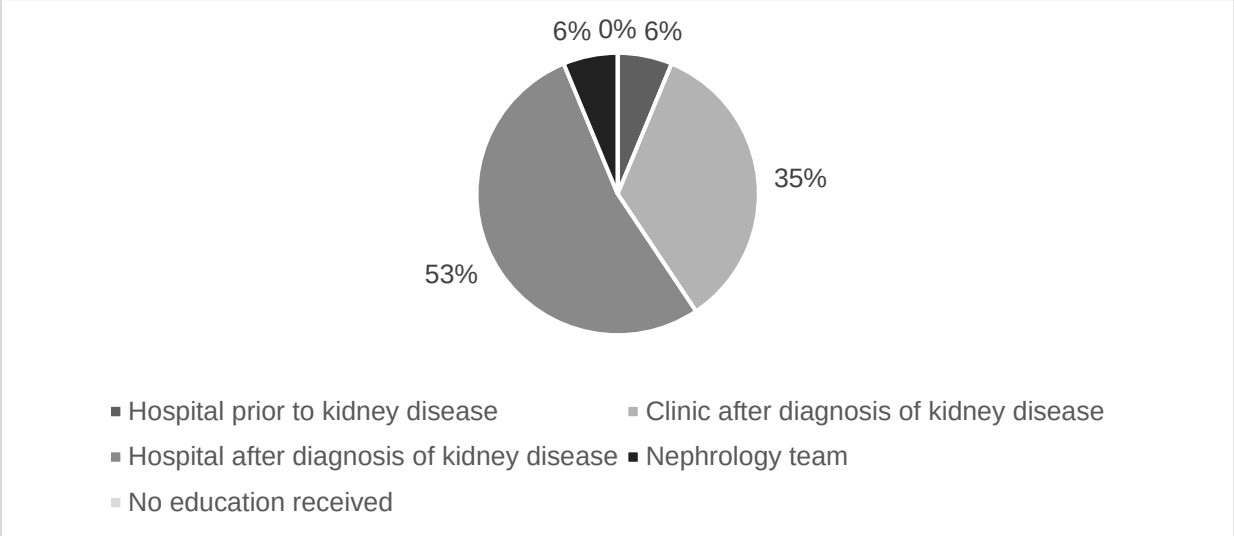
This section inquired about education provided to participants. The nine questions included the identification of hypertension and diabetes as contributing factors to kidney disease and the discussion of the life implications of ESRD as dialysis. Inquiry also included the point that this education first took place and the perceived comprehension of education received.

Only two (4.76%) participants stated that the medical team explained hypertension or diabetes as a contributing factor to kidney disease. The other 40 participants, 95.2% of the sample, stated that the medical team did not explain that hypertension or diabetes could lead to kidney disease during treatment of these contributing factors. In addition, all participants stated that no education regarding the progression of kidney disease to ESRD, which requires dialysis or a kidney transplant, was provided during the treatment of hypertension or diabetes.

The first point of education regarding kidney disease is depicted in Figure 6 below. The two (4.76%) participants who received education regarding hypertension or diabetes as a contributing factor reported that education took place in the hospital setting prior to diagnosing kidney disease. Eleven (26.2%) participants stated initial education in the clinic setting after diagnosis of kidney disease. Seventeen (40.5%) participants reported initial education in the hospital setting after diagnosis of kidney disease. Two (4.76%) participants stated initial education by the nephrologist or nephrology staff. Ten (23.8%) participants stated that no education was received.

Figure 6

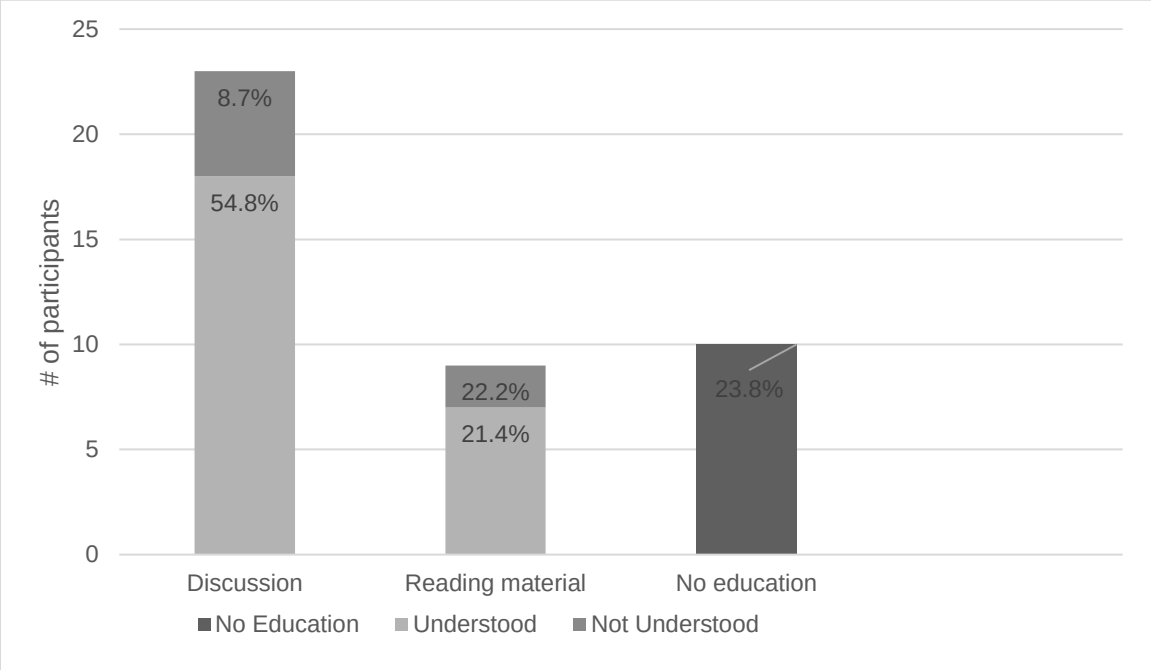
First Point of Education Regarding Kidney Disease (N=42)



The type of education received and participant's perceived comprehension of the material is depicted in Figure 7 below. Twenty-three (54.8%) participants reported medical team face-to-face discussion, nine (21.4%) reported education via handouts or pamphlets, and 10 (23.8%) stated no education was received. No participants reported education via phone conversations, videos, or referrals to a website. Two (22.2%) of the nine participants that received education from reading material reported that they could not read and understand it. Of the 23 participants that received education via face-to-face conversations, five (8.7%) reported that the information was not presented in a way that was easy to understand.

Figure 7

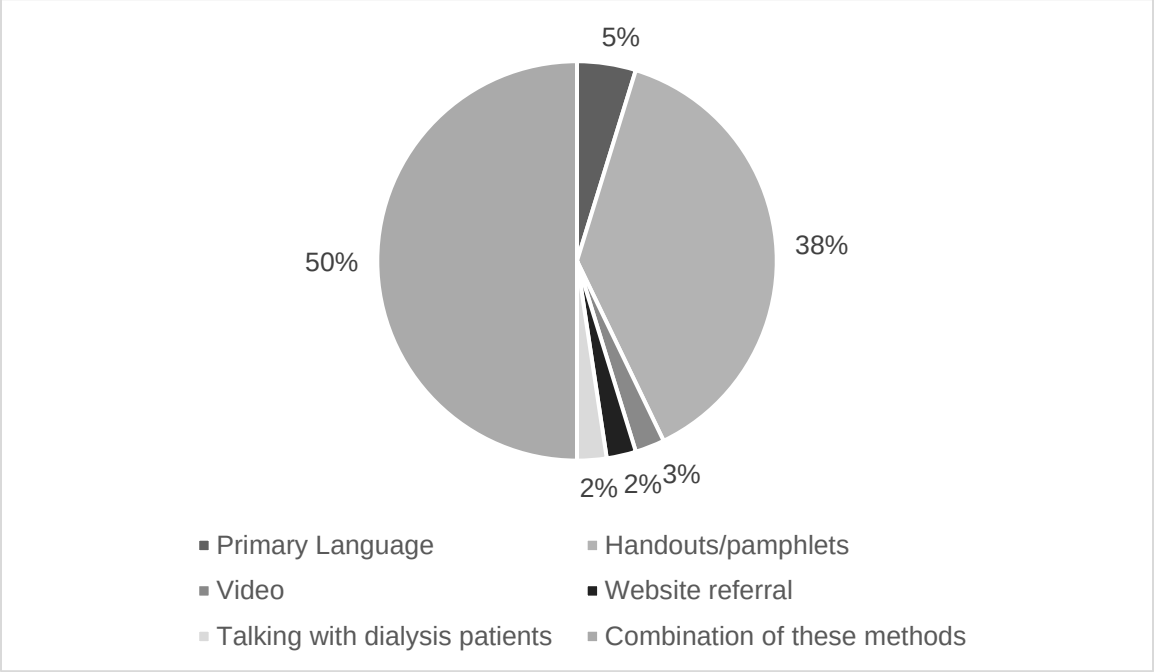
Type of Educational Material Received and Participant's Perceived Comprehension of Material (N=42)



Each participant's type of education that would have been most beneficial is depicted below in Figure 8. Two (4.76%) participants reported that education in their primary language would have been most beneficial. Sixteen (38.1%) participants reported that handouts or pamphlets would have been most beneficial, one (2.38%) reported that a video would have been most beneficial, one (2.38%) reported that referral to a website would have been most beneficial. In addition, one (2.38%) reported that the opportunity to talk to dialysis patients would have been most beneficial. Finally, 21 participants, 50% of the sample, reported that a combination of the methods would have been most beneficial.

Figure 8

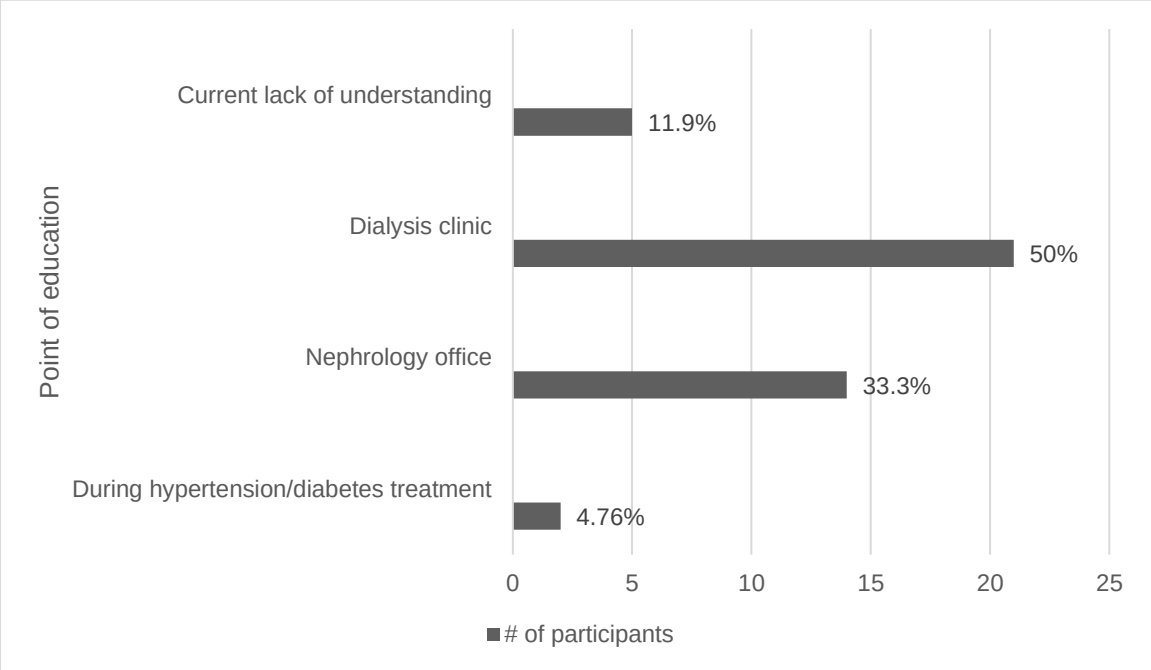
Type of Education That Would Have Been Most Beneficial (N=42)



The point that kidney disease was identified as a risk factor of hypertension or diabetes is depicted in Figure 9 below. Two (4.76%) participants reported this point during treatment of hypertension or diabetes, 14 (33.3%) reported this point in the nephrology clinic, and 21 (50%) participants reported this point during treatment at the dialysis clinic. In addition, five (11.9%) participants reported a current lack of understanding of kidney disease as a risk factor of hypertension or diabetes.

Figure 9

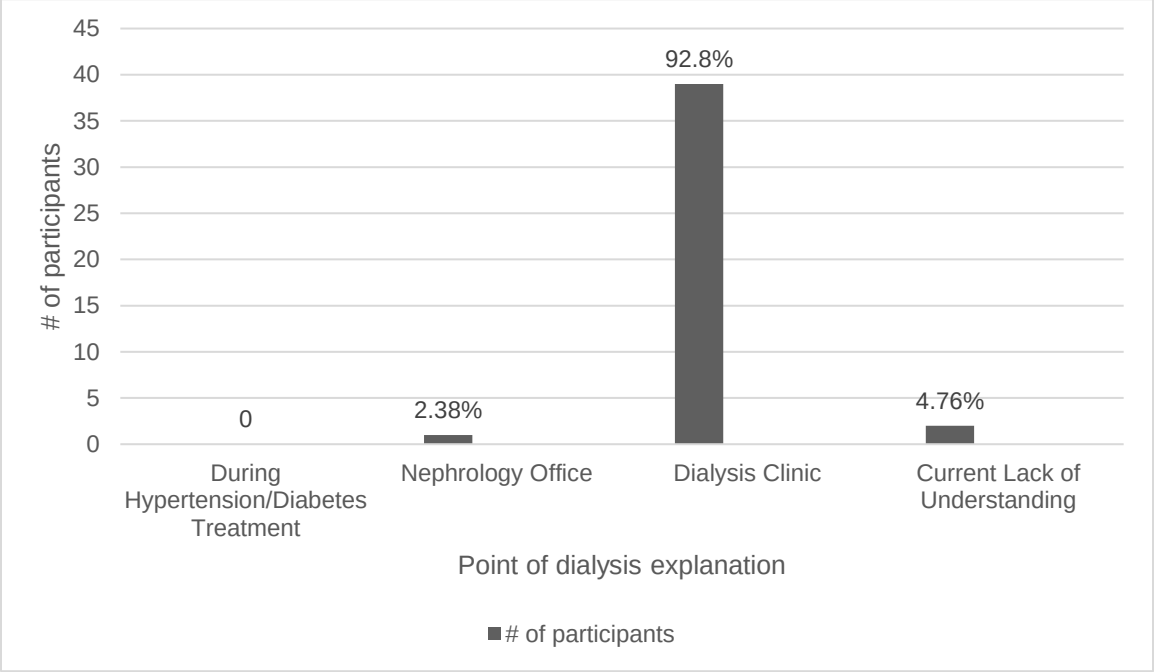
Point That Kidney Disease was First Identified as a Risk Factor of Hypertension or Diabetes (N=42)



The point that dialysis, including time spent each week for treatment, fluid and dietary restrictions, and daily medication requirements, was first explained to participants, is depicted in Figure 10 below. No participants reported this initial explanation during treatment of hypertension or diabetes. One (2.38%) participant initial explanation in the nephrology clinic, and two (4.76%) stated a current lack of understanding of this information. Thirty-nine participants, 92.8% of the sample, reported that this explanation initially occurred during treatment in the dialysis clinic.

Figure 10

Point of Initial Dialysis Explanation (N=42)



Summary

The 20-question survey administered to current dialysis patients provided an insight into the education provided for patients prior to ESRD. It was noted that 73.08% (N=38) of the sample were aged 51 years or older, and 80.77% (N=42) of the sample had a primary contributing factor of hypertension or diabetes to the development of kidney disease. Education level inquiry on the survey demonstrated 76.92% (N=40) of the sample did not have a trade/technical/vocational certificate or college degree. The results demonstrated that 92.86% (N=39) of the sample with a main contributing factor of hypertension or diabetes to the development of kidney disease (N=42) were fifty years or younger at the time of diagnosis of hypertension or diabetes. The results also

demonstrated that 97.62% (N=41) of the sample developed kidney disease during a period of two to 15 years.

Further study findings demonstrated that the majority of participants were not educated about kidney disease as a potential complication of hypertension or diabetes, nor were they educated about the life implications of dialysis after kidney disease progression to ESRD. Most education that was received regarding kidney disease causation occurred after diagnosis of kidney disease, and the vast majority of education regarding life implications of dialysis occurred after dialysis initiation. The education received was in the form of face-to-face-discussion or handouts, and not all participants who received education reported comprehension of material.

V. Conclusions

This retrospective quantitative study aimed to investigate the education regarding kidney disease and dialysis provided to patients during the medical treatment of hypertension and diabetes. Fifty-two (N=52) current dialysis patients were surveyed about demographic data, medical history, and education. The goal of the study was to identify areas of deficiency in current education practices in which improvement could lead to optimal patient outcomes regarding the development and progression of kidney disease.

Discussion

Findings related to age of participants and primary cause of kidney disease support literature findings of an extended length of time of development and progression of kidney disease related to ongoing damage from chronic conditions. Previous research has found that diabetes and hypertension lead to kidney disease over a period of time, as renal vessels are progressively damaged through these chronic disease processes (Ho. et al., 2016; Mott, 2021). Seventy-three percent of the sample in this study were aged over 50 years, and 80.7% of the sample reported causative factors as hypertension or diabetes.

The study results showed in relation to gender representation of participants was equally represented and not considered a limitation. The sample was 48% male and 52% female. It was noted that the sample was 59.6% Caucasian, with significantly smaller percentages of people of African American, Hispanic, American Indian, and Asian ethnicity. Over half of the participants were of Caucasian ethnicity; it is unknown if these percentage findings indicate the broader ethnicity of the area or if similar ethnic findings would be present at other dialysis facilities in other geographic areas.

Findings regarding the education levels of participants suggest that education could contribute to a lack of control of chronic conditions and resultant kidney disease. College degrees had been obtained by 15.3% of the sample, whereas all others had some high school, high school graduate or GED, some college credit, or vocational training. Previous research has found a positive impact of educational interventions on the knowledge base and self-management of chronic conditions in patients diagnosed with hypertension and diabetes (Ho et al., 2016; Mott, 2021). The findings of this study reflect general education levels, but along with previous research support the hypothesis that improving educational practices could contribute to improved outcomes through better control of hypertension and diabetes in some patients. Initiatives developed for populations of varying education levels will help to improve comprehension of material and lead to optimal patient outcomes.

Findings of this study correlates with literature findings that state hypertension and diabetes as leading causes of kidney disease (DaVita, 2021). Chronic kidney disease, rather than acute kidney disease, was reported by 92.3% of the sample. These conditions cause permanent and irreversible damage that lead to the development and progression of kidney disease (Nguyen-Thi et al., 2021). A large degree of variability across patients in regard to kidney disease progression has been identified (Vesga et al., 2021), related to comorbidities and other patient characteristics. A period of development of kidney disease after diagnosis of hypertension or diabetes as five to 15 years was reported by 78.5% of the sample. These findings further support literature reports that kidney disease is a progressive disease that can be caused by hypertension or diabetes. Educational interventions could be provided during the treatment phase of hypertension or diabetes,

prior to the development of kidney disease, and may help to decrease the development and progression of kidney disease.

Further support of the causative nature of hypertension and diabetes to the development of kidney disease is that none of the participants reported existing kidney disease or dysfunction at the time of diagnosis of hypertension and diabetes. An age of 50 or younger at initial diagnosis of hypertension or diabetes was reported by 92.8% of the sample. Of the total sample, 69.2% reported receiving dialysis treatments between two and 10 years. This correlates with survey findings of the majority of the sample being age 51 or older. This data supports literature findings that hypertension and diabetes contribute to the development and progression of kidney disease over a period of time (Hunegnaw et al., 2021). Educational interventions provided during this time period may lead to improved control of these chronic conditions, and subsequent preservation of kidney function.

Findings of this study further support literature findings of the asymptomatic presentation of early kidney disease, and the irreversibility of kidney damage associated with later stages of disease (Vieira et al., 2017). A time period of fewer than six months from diagnosis of kidney disease and beginning of dialysis was reported by 47.6% of the sample. A period of six months to under two years was reported by 23.8% of the sample. Of the total sample, 83.3% underwent dialysis initiation within five years of diagnosis of kidney disease.

The Health Belief model discusses disease prevention as dependent upon the patient's perception of ability to take steps that would successfully improve outcomes (RHIhub, 2021). Improvement in education practices regarding the progression of kidney

disease and the life implications of dialysis may help improve control of hypertension and diabetes. An increased motivation to avoid the negative impact on quality of life associated with ESRD and dialysis could contribute to activities that help to control hypertension and diabetes, such as healthy diet, exercise, and medication adherence.

A significant finding from this study was the lack of initial education regarding kidney disease and dialysis received during medical treatment of hypertension and diabetes. Of the participants with a primary causative agent of kidney disease as hypertension or diabetes, 95.2% denied receiving any education regarding the causative relationship between hypertension and diabetes to kidney disease. All participants denied receiving education regarding the progression of kidney disease to ESRD, which requires transplant or dialysis for survival. Initial education regarding kidney disease was reported by 71.4% of the sample as after diagnosis of kidney disease, either in the primary care clinic, hospital, or nephrology office. Of the total sample, 23.8% denied receiving any education regarding kidney disease in relation to hypertension and diabetes at all. These findings support the hypothesis that patients are not receiving adequate education regarding kidney disease and dialysis during medical treatment of hypertension and diabetes. Only two of the participants received education regarding kidney disease prior to diagnosis of kidney disease, which took place in the hospital setting. Improvement of education practices and subsequent improved control of these chronic conditions could prevent or slow the progression of kidney disease in some patients.

Study findings supports the hypothesis that improvement in current education practices could improve patient outcomes, as participants reported a variety of methods that would have been beneficial. Of the 32 total educated participants, 28.1% reported

receiving handouts or pamphlets, and 71.9% reported face-to-face discussions with the medical team; no other educational medium was utilized by the medical team. Of the 32 total educated participants, 21.8% reported that they were not able to understand and therefore utilized the information provided. Participants reported a variety of educational medium that would have been most beneficial to each, including primary language consideration, websites, reading material, and the opportunity to speak to current dialysis patients. Fifty percent of the sample reported that a combination of methods would have been the most beneficial education. Providing the most beneficial form of education to each patient would improve their comprehension of the material (RHIhub, 2021) and may subsequently improve control of chronic conditions and long-term outcomes related to kidney disease.

Findings of this study support the hypothesis that patients are not adequately educated during the treatment of hypertension and diabetes. Fifty percent of the sample reported that they were not educated regarding kidney disease as a risk factor for hypertension or diabetes until after initiation of dialysis. Initial education in the nephrology office was reported by 33.3% of the sample. Of the total sample, 92.8% reported that education regarding dialysis, including fluid and dietary restrictions and medication requirements, did not occur until after dialysis initiation. Improved understanding of kidney disease and dialysis concepts during the treatment of hypertension or diabetes may help prevent kidney disease or slow progression of existing disease in some patients, thus improving patient outcomes and easing economic burden (Nguyen-Thi et al., 2021).

Conclusions

Several conclusions can be made based on the results from this study. The first is that the majority of dialysis patients have chronic kidney disease, in which the kidneys steadily decline in function until ESRD is reached and dialysis is initiated. The second is that a large percentage of kidney disease is caused by hypertension and diabetes, in which progressive and irreversible damage to the kidneys occurs over a period of time. Progression of these chronic conditions to kidney disease trended from two to 15 years, and progression of kidney disease to dialysis initiation less than two years. This supported literature findings that state that many people with kidney disease are not diagnosed until they have reached later stages of disease and begin to suffer symptoms (Cheng et al, 2017). At the point of late-stage kidney disease, preventative measures are ineffective as irreversible damage has already occurred.

A final conclusion of this study is that the initial point of education for most patients was after the diagnosis of kidney disease, and some of these patients stated that the educational medium provided was not easily understandable. Many participants reported that a variety of forms of education would have been most beneficial. It was noted that half of the participants received initial education regarding kidney disease concerning hypertension and diabetes in the dialysis clinic, and the vast majority of patients received initial education regarding the implications of dialysis in the dialysis clinic. Existing literature and this study support the conclusion that patients are not consistently or effectively educated regarding kidney disease and dialysis implications during medical treatment of hypertension and diabetes.

Implications and Limitations

This study found that participants were not adequately educated about kidney disease and dialysis during the treatment of hypertension and diabetes. The majority of education provided took place at the dialysis clinic when the participant already had a diagnosis of ESRD. While education provided in the dialysis clinic is beneficial to the patient, the patient's condition has already progressed to ESRD. Therefore, increasing patient awareness of kidney disease as a complication of hypertension and diabetes through education may help patients to improve control of these chronic conditions. Education provided during the medical treatment of hypertension and diabetes may help prevent kidney disease or slow the progression of existing disease in some patients.

ESRD contributes to decreased quality of life for the patient, financial and emotional strain for the caregivers, and increased economic burden. Explaining the implications of dialysis, including fluid and dietary restrictions, time requirements of treatments, and daily medication regimens, may help to improve patient comprehension of the life implications of ESRD. An understanding of these life implications may increase the motivation of some patients to avoid the unpleasant factors (RHIhub, 2021) associated with ESRD and dialysis. While caution is needed to not present information in an intimidating or threatening way, this improved comprehension could lead to improved control of chronic conditions and subsequent prevention of kidney disease in some patients.

One limitation of this study was the utilization of a small convenience sample, leading to generalizability concerns to other geographic areas. Factors such as culture, population, and location could potentially influence each patient’s experience and

perspective, and different factors could contribute to different study findings. Another limitation of this study is the reliance on self-report from current dialysis patients, leading to recall bias. Participant's responses to medical history and education questions are impacted by their perceptions and experiences and could potentially not accurately represent timelines and events as they occurred.

Recommendations

This study could be replicated at other clinics in other geographic areas to assess the validity of the results. Future research could involve a similar study with the addition of access to medical records that provide documented timelines of health occurrences in participants. Patients undergoing treatment for hypertension and diabetes could be surveyed for education received regarding kidney disease and dialysis. These patients could be followed for 10 to 15 years to assess the development and progression of kidney disease.

Future research could involve the development of education material regarding kidney disease and the life implications of dialysis to be provided to patients during the treatment of hypertension and diabetes. A study could be performed over 15 to 20 years to follow control of hypertension and diabetes and the development or progression of kidney disease at specific intervals, such as annually. This would evaluate the effectiveness of the educational materials and ascertain the effectiveness of educational interventions in the prevention or delayed progression of kidney disease.

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Appendix A

Institutional Review Board Approval Letter

ARKANSAS TECH UNIVERSITY

OFFICE OF RESEARCH AND SPONSORED PROGRAMS

1509 North Boulder Avenue
Administration, Room 207
Russellville, AR 72801

479-880-4327
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November 30, 2021

To Whom It May Concern:

The Arkansas Tech University Institutional Review Board has approved the IRB application for Jamie Jones' proposed research, entitled "Dialysis Patient Education on the Prevention of Kidney disease Prior to Patients Receiving Dialysis: A Retrospective Descriptive Study." The Institutional Review Board used an expedited review procedure under 45 CFR 46.110 (7).

Please note that in the event that any of the parameters of the study change, the researcher may be required to submit an amended application.

Please proceed with your research. We wish you success with this endeavor.

Sincerely,

Melissa Darnell

Melissa Darnell, Ph.D.
Institutional Review Board
Arkansas Tech University