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# Effects of Nurse-Led Hemodialysis Education Intervention on Hospital Readmission Rates

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**Effects of Nurse-Led Hemodialysis Education Intervention on Hospital  
Readmission Rates**

by

Kristi L. Keller

A project submitted to the faculty of  
Gardner-Webb University Hunt School of Nursing  
in partial fulfillment of the requirements for the  
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### **Abstract**

Patients on maintenance hemodialysis have high rates of 30-day hospital readmissions. This causes a high burden on the Medicare budget as well as a high burden on hospitals, and the number of hemodialysis patients is only expected to increase. The readmission rate for maintenance hemodialysis patients in the project facility is higher than the United States average. Current education in the project facility is for patients to receive some printed booklets, pamphlets, and internet materials to read after discharge from the hospital. The proposed change to practice is to receive one-on-one education designed by hemodialysis nurses and to develop an internet presentation patients can access after hospital discharge to review common complications in this patient population. After receiving the education, nurses will ask patients if they found it helpful, and nurses in surrounding outpatient dialysis units will ask patients if they found it helpful after they went home. Readmission rates will be measured to determine if the project has had an impact.

*Keywords:* hemodialysis, maintenance hemodialysis hospital readmission, hemodialysis patient education, nurse-led education of hemodialysis patients.

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## CHAPTER I

### Introduction

End-stage renal disease (ESRD) is on the rise in the United States and all over the world. A projected 5.439 million people worldwide will require renal replacement therapy by the year 2030 (Liyanage et al., 2015). Current available renal replacement therapies include in-center hemodialysis, home hemodialysis, peritoneal dialysis, and kidney transplant. A kidney transplant is widely considered to be the best treatment for ESRD. Kidney transplant recipients have overall higher survival rates and increased quality of life. However, the number of patients with ESRD far outweighs the number of kidney donors, and as of 2019, 78,690 people in the United States were on the waiting list for kidney transplants with 9,236 of them in North Carolina alone (Organ Procurement and Transplantation Network (OPTN), 2022).

Thus, the most expensive and the most predominant renal replacement therapy used in the U.S. and around the world remains in-center hemodialysis. In 2019, Medicare spent \$51 billion, or 7.2% of the entire Medicare budget, on the 1% of Americans with ESRD (United States Renal Data System [USRDS], 2021). Part of the large cost is the vast amount of hospital readmissions in ESRD patients. Thirty-five percent of patients in the U.S. with ESRD who are hospitalized are readmitted within 30 days of discharge (United States Renal Data System [USRDS], 2017).

In addition to its vast expense, in-center hemodialysis comes with many debilitating symptoms including pruritis, fatigue, anorexia, nausea, vomiting, diarrhea, anxiety, and depression (Hou et al., 2022). To combat these symptoms, hemodialysis (HD) patients must follow a strict regimen that includes attending in-center treatments



several times a week, meticulous diet and fluid intake, and an often-extensive medication regimen (Li et al., 2014). A high degree of self-compliance is necessary to manage such drastic lifestyle changes and cope with ESRD.

Noncompliance with ESRD management regimens can be fatal. Excessive fluid intake can cause cardiovascular burden, hypertension, and pulmonary edema. Failing to stick to a diet regimen and noncompliance with phosphate binders can lead to high phosphate levels, with a subsequent increased mortality rate (Block et al., 2012). Parvan et al. (2015) found a higher level of adherence is associated with higher levels of knowledge of the disease and its treatment. With the use of nurse-led, patient-centered educational strategies, patients experience increased independence, improved self-care education, and improved lifespan (Shi et al., 2013).

### **Problem Statement**

Dialysis patients have a significantly higher risk of preventable hospital readmission, morbidity, and mortality than patients with other chronic conditions, creating a high burden on the healthcare system (Ross et al., 2019). Patient empowerment and health literacy through nurse-led, patient-centered education may impact the self-management of dialysis patients and thereby reduce preventable hospital readmissions.

### **Significance**

By the end of 2019, there were 809,103 ESRD patients in the United States, 85% of whom were on in-center hemodialysis (USRDS, 2021). Due to population changes and the prevalence of obesity and diabetes, it is predicted that the number of ESRD patients in the United States will increase by 29%-68% (McCullough et al., 2019). As of December 2020, there were 19,547 dialysis patients in North Carolina, with 298 of them dialyzing

in one county in the Piedmont region of North Carolina (N.C. Division of Health Service Regulation, 2022).

With over a third of dialysis patients in the United States being readmitted to the hospital within 30 days of discharge, 40% of the 51-billion-dollar Medicare dialysis expenditure is used for dialysis patients while in the hospital. For one local healthcare system in North Carolina, 41% of hemodialysis patients were readmitted within 30 days of discharge in 2019, averaging higher than the U.S. standard.

Educational interventions of ESRD processes and recommended treatment are helpful for patients to adapt to their disease, its treatment, and the behavioral changes needed to live well with ESRD. Patient support and patient involvement in the treatment of their disease can increase self-care, defined in this context as the competence, knowledge, and activities needed for optimum day-to-day living with ESRD (Pagels et al., 2008). Some previous studies have demonstrated that educational interventions can even change some patients' attitudes toward their disease, giving rise to a more collaborative attitude toward the therapeutic treatment regimen (Arad et al., 2021). Studies show the majority of patients believe the nurse-patient relationship is important in dialysis, and a positive relationship between the patient and the nurse can lead to a feeling of security, learning to cope with difficult situations, and can increase the quality of their care (Hreńczuk, 2021). Patients trust nurses and spend the majority of their time on in-center dialysis with their nurses and dialysis technicians, who get to know the patient and are in a prime position to develop therapeutic relationships. This encourages trust and puts nurses in the prime position to lead education regarding dialysis treatment regimens.

### **Purpose**

By providing nurse-led, patient-centered education to patients on in-center hemodialysis, patients can increase disease-related knowledge leading to greater adherence to dialysis treatment regimens, improved quality of life, and self-empowerment, and in turn, decrease preventable hospital readmission rates.

### **Summary**

The rates of ESRD continue to rise around the world. Currently, the most widely available therapy is hemodialysis, and while it is a life-saving therapy, it is also expensive and requires a great deal of patient compliance to be successful. Hospital readmission within 30 days of hospital discharge remains a large problem for these patients, with national rates of 35% and a rate of 41% at one healthcare facility in 2019. Nurse-led education has been shown to encourage patient independence and improve mortality rates.

## CHAPTER II

### Review of Literature

A review of the literature gives insight into the complexity of the problem and gives clarity to the depth of exploration of the existing research. A comprehensive electronic search utilizing ProQuest, PubMed, Central, Google Scholar, and Wiley Online Library was used to examine the current literature. Search terms included: hemodialysis and hospital readmission, hemodialysis and nurse-led education, ESRD and hospital readmission, and hemodialysis and compliance. While the literature review revealed that the problem of readmission among hemodialysis patients has long been identified, there are no clear strategies effective in reducing those readmissions.

#### **Literature Related to Hospital Readmission in Hemodialysis Patients**

To investigate the high readmission rates amongst chronic hemodialysis patients in the U.S., Paulus et al. (2022) used a descriptive, retrospective approach to look into relationships between outpatient dialysis facilities, characteristics of their patients who have less than 30-day readmissions, and the standardized readmission ratio (SRR) used for The Centers for Medicare and Medicaid in the U.S. The SRR is calculated annually and reflects the number of unplanned hospital readmissions that occur 4-30 days after the index hospitalization. Using a hierarchical logistic model, facilities are scored with 1.0 considered the expected number of readmissions. This number accounts for a patient's length of time with ESRD, diagnoses that are considered high risk, the duration of the hospital stay, comorbidities within the year, a diagnosis of diabetes, body mass index, sex, and age. Facilities that score below 1.0 have less than the predicted number of readmissions and are considered high performing. Facilities that score above 1.0 have

more than the predicted number of readmissions and are considered low performing. The number of patients new to starting dialysis a facility had was associated with higher SRRs, as were patients who received less than 6 months of pre-dialysis nephrology care. Patients starting hemodialysis with a central venous catheter, as opposed to an arteriovenous fistula, were linked to higher SSRs. The most important relationship in this study was found between high registered nurse-to-patient ratios with worse SRRs and high patient care technician (PCT) to patient ratios with better SSRs, emphasizing the importance of utilizing registered nurses to assess and execute crucial interventions in dialysis facilities. A strength of this research is that the authors analyzed data over 4 years using 5,419 dialysis facilities. Forty-three percent of the facilities analyzed were in the southeastern United States. The study does have limitations, however. As it is an observational study of dialysis facilities, the association should not be interpreted as causation. The study is also retrospective and assumes the data provided by the Dialysis Facility Report is accurate without means to verify it after the fact.

Plantinga et al. (2018a) aimed to explore the national burden of readmissions due to pulmonary edema in hemodialysis patients in the U.S. within 30 days of the index hospitalization. The authors reviewed data from the United States Renal Data System (USRDS) from January 31, 2011-November 30, 2013. They limited the data to adults 18-99 years of age who had been diagnosed with ESRD more than 120 days from the date of the index admission to ensure Medicare was the primary payor source for the subjects. Additionally, they excluded patients who did not survive 30 days after the index admission, those who switched modalities to peritoneal dialysis, and any patient who had a kidney transplant before or after the index admission. They also eliminated patients

who were discharged to another acute facility or left against medical advice. Criteria were further narrowed to index admissions that took place > 30 days with no hospital admissions to avoid overestimation of readmission rates amongst patients who are frequently readmitted. This left a sample size of 215,251. Overall, researchers found that 23% of patients were readmitted within 30 days of index admission and 44% of those admissions were related to pulmonary edema. Seventy percent of readmissions were due to pulmonary edema when the index admission was pulmonary edema. Patients on hemodialysis for less than 1 year, preexisting congestive heart failure (CHF), preexisting chronic obstructive pulmonary disease (COPD), and a history of non-compliance with hemodialysis were associated with a higher risk of pulmonary edema readmission. Patient race, sex, age, and primary cause of ESRD were not found to have a significant correlation with pulmonary edema-related hospital readmission. This study had the strength of capturing data from all Medicare-primary hemodialysis patients in the U.S. as well as all the claims data after the initiation of hemodialysis from both the inpatient and outpatient sectors. Limitations include the exclusion of patients without Medicare as a primary payor, those with frequent readmissions, and those who did not survive 30 days after index admission. Additionally, patient characteristics that are difficult to capture in data such as poverty level, education, mental illness, level of social support, and housing situation were not used but could potentially affect the risk of pulmonary edema-related readmissions.

Hall et al. (2015) found that emergency room visits and hospital readmissions after discharge from skilled nursing facilities are similar to the significance of hospital readmissions in hemodialysis patients in North and South Carolina. Using a subgroup

analysis of Medicare claims, Hall et al. (2015) found that amongst 1,223 ESRD patients discharged home from a skilled nursing facility, 43% had at least one emergency room visit or hospitalization within 30 days of discharge from the skilled nursing facility. Patients with a history of frequent hospitalization prior to their skilled nursing facility stay, a higher comorbidity score, black race, or dual insurance coverage with Medicare/Medicaid were independently associated with recurrent emergency room visits and hospitalizations. They also noted that patients who were hospitalized with abscesses, cellulitis, or chronic skin ulcers prior to their skilled facility stay were more likely to visit the emergency room or be readmitted to the hospital than patients with other discharge diagnoses. Their study also found that patients who received home health visits after discharge from skilled facilities were less likely to visit the emergency room or be hospitalized. This study sampled 1,223 ESRD patients who were discharged from 392 different skilled nursing facilities between January 2010 and August 2011. To be eligible, patients had to be 65 or older, a North or South Carolina resident, and a Medicare beneficiary. While the sample size is large and includes patients from varying geographical locations in North and South Carolina, no information on the education provided to the patients, quality of discharge planning, or reasons for the hospital readmissions were studied.

In 2018, Daniels et al. used an exploratory, descriptive study to examine the adherence of African American patients with ESRD undergoing HD. African Americans are 3.7 times more likely than whites to have ESRD (USRDS, 2017). One hundred and twenty patients undergoing HD at two outpatient hemodialysis centers in the southwestern United States were used for this study. Using a non-randomized

convenience sample, patients asked to be in the study were African American adults over the age of 18. Other criteria included an ESRD diagnosis being currently managed with hemodialysis and orientation to person, place, and time. To collect the data for the study, participants were first given a demographic questionnaire inquiring into sex, age, ethnicity, educational background, household income, marital status, number of people living in the household, height, weight, and comorbidities. To measure adherence behaviors, a 46-item self-report called the ESRD Adherence Questionnaire (ESRD-AQ) was used. The ESRD-AQ was developed in 2010 by Kim et al. and contains five sections. The first section asks for the patient's medical history, length of time on hemodialysis, and asks about any history of a previous kidney transplant. The remaining four sections measure the patients' knowledge of hemodialysis, adherence behaviors, and perceptions regarding their treatment. The ESRD-AQ uses a combination of yes/no, multiple choice, and Likert scale items. There are 14 questions about hemodialysis treatment, 10 questions regarding fluid restriction, 9 questions regarding medications, and 8 questions about diet. After giving informed consent, participants answered both the demographic and ESRD-AQ questionnaires while they completed their scheduled hemodialysis treatments. After both questionnaires were completed and returned, participants received a \$25 gift card. Eighty-point-eight percent of respondents adhered to their hemodialysis treatment schedules. Seventy-nine-point-two percent of participants reported taking all their medications as prescribed. Only 37% of participants reported adhering to their fluid restriction all the time, and 24.2% reported adhering to their diet all the time. Patients were asked about how often a healthcare professional spoke with them about important aspects of their treatment regimens. Thirty-six percent of participants stated that a healthcare professional



rarely or never discussed the importance of staying on hemodialysis for the full duration of prescribed treatment. Fifty-eight percent reported that a healthcare professional discussed their medications with them a minimum of once every 2 weeks. Thirty-eight percent stated that a medical professional talked to them about the significance of fluid restrictions at least once a week, while 18% stated that a healthcare professional only discussed fluid restrictions with them when their weight gain was too high. Patients responded that medical professionals discussed the importance of following their proper diets on a weekly basis 32% of the time. The strength of this study was the inclusion of the patient's own perceptions of their treatments and their perceptions of education by their healthcare team. Weaknesses include the small sample size, in one region of the U.S. and the measure of adherence being largely measured by self-report.

Plantinga et al. (2018b) aimed to scrutinize the post-hospitalization care processes performed in outpatient hemodialysis facilities with 30-day hospital readmissions in patients undergoing hemodialysis. The authors used a retrospective cohort study by examining the electronic medical records (EMR) of 19 non-profit outpatient dialysis centers in the southeastern United States linked with national data from the USRDS from February 1, 2010-July 31, 2015. Ultimately, 1056 index hospitalizations were included in the study with 17.7% followed by 30-day hospital readmission. Pulmonary edema was the related cause in 44.9% of those readmitted within 30 days. The documentation of the index hospital admission in the outpatient dialysis EMR was associated with a two-fold risk for pulmonary edema-related readmission compared to no readmission. When congestive heart failure (CHF) was identified in the patient's problem list, they were 1.9% more likely to be readmitted with pulmonary edema-related criteria than those for

which CHF was not identified. When home medications were discontinued after hospital discharge, the risk for pulmonary edema-related readmission increased by 81% versus no readmission. When home medications were either added or discontinued after hospital discharge, pulmonary edema-related readmission increased by 69% versus no readmission. Patients discharged from the hospital with a decrease in target weight of  $\geq 0.5$  kg were associated with a 40% decrease in pulmonary edema-related readmission but showed no difference in any other cause of readmission. Limitations include the potential for misclassification from national and EMR data. The sample itself could also be a limitation, as it encompasses only patients within 19 facilities of the same ownership, all located in the Southeast. A major strength of this study is the access to detailed EMR data with the link to national data for a more complete capture of hospitalization.

### **Literature Related to Nurse-Led Education for Hemodialysis Patients**

In 2021, Yangöz et al. performed a systematic review and meta-analysis to determine if educational and self-management interventions aided in patient adherence to hemodialysis treatments. Twenty-six studies performed between 1981 and 2020 were reviewed. Self-management strategies and educational interventions showed a small beneficial effect on diet and fluid intake adherence. The use of self-management and educational interventions had a moderate effect on patient adherence to the medication regimen. It was noted in the study that leaflets, booklets, videos, and brochures enriched patient education and that individualized education had the most effect on adherence to fluid intake, diet, and medication adherence. A strength of this study is that the authors looked at multiple areas of adherence to the maintenance hemodialysis regimen.

However, findings may not reflect the general population of patients receiving hemodialysis treatments.

In 2015, Parvan et al. performed a clinical trial research study of all chronic kidney disease (CKD) patients undergoing maintenance hemodialysis treatments at Shahid Rahnemun Teaching Hospital in Iran in 2012. They sought to compare the effects of face-to-face education versus the use of a training pamphlet on compliance with hemodialysis treatment. To be included in the study, patients were required to be over the age of 18, have been a patient in Shahid Rahnemun Teaching Hospital in 2012, and have been on maintenance hemodialysis for a minimum of twice a week for at least 1 year. Patients diagnosed with advanced forms of chronic diseases (e.g., advanced heart failure) and those with diagnosed psychological illnesses were also excluded due to self-care limitations and the burden of severe illness. Seventy patients out of 160 were eligible to participate in the study, and 60 patients were selected to participate and divided into three randomly selected groups. One group was given face-to-face training, one training with the pamphlet, and one served as a control group. To determine the patient's knowledge prior to intervention, a three-part questionnaire was given to all participants. The first part asked for demographic information (age, sex, educational level, employment status, marital status, diagnosed diseases, and hemodialysis years). The second part was a 23-question chronic hemodialysis knowledge survey using multiple-choice questions with only one correct answer. The third section used a 5-question survey about adherence to hemodialysis treatment. Participants were asked to rate their own compliance using a Likert scale ranging from 1-6, with 1 being never to 6 being always. The scores on the five questions could range from 5-30 with a higher number representing more compliance

with treatment. The researcher visited all three groups while they were on hemodialysis at differing times of the day. For the face-to-face group, the researcher provided two 20-minute sessions where participants were taught about the function of the kidneys, the principles of hemodialysis, the meaning of laboratory values (hemoglobin, potassium, hematocrit, phosphorus, and creatinine), the renal diet, fluid restrictions, and the appropriate method for taking phosphate binders. The second group was presented with a pamphlet containing the same information given to the first group with no discussion. The third group received nothing else besides the original questionnaire used to assess patients' knowledge of hemodialysis. After the education was completed, one patient moved to another dialysis facility and another received a kidney transplant, reducing the number of patients to 58. The mean pretest scores on the 23-question chronic hemodialysis knowledge questions were 6.89 for the control group, 10.10 for the pamphlet group, and 9.20 for the face-to-face group. As the highest possible score was 23, all three groups had low scores before intervention. After the educational intervention, the mean score for the control group was 7.78, the pamphlet group had a mean score of 16.57, and the face-to-face group had a mean score of 19.45. In adherence scores, the control group went from 17 before the study to 17.1 after the study. The pamphlet group went from 18.1 to 20.26. The face-to-face group increased from 16.35 to 20.55. Both the pamphlet and face-to-face groups had statistically significant results, with the face-to-face group receiving the largest increase in scores. The main strength of this study is administering questions before and after the educational intervention for comparison. The weaknesses are the small sample size, and the sample consisting of only

Iranian dialysis patients in one hospital may not be representative of all hemodialysis patients.

Parker (2019) conducted a study that aimed to increase patient adherence to fluid restriction in ESRD patients on maintenance hemodialysis. In an outpatient dialysis center in the southwestern United States, 17 patients aged 18 and over on maintenance hemodialysis 3 times a week for at least 6 months were given a 23-question survey to determine their baseline knowledge of hemodialysis. Participants had a mean score of 14.71 on the survey before education was performed. The educational intervention was performed by the primary researcher in the form of 1-hour long classes given to participants after their scheduled hemodialysis treatments. All participants were given four classes in total. The researcher used educational materials regarding fluid restriction, strategies to maintain fluid adherence, healthy food choices, low-potassium dietary choices, and basic hemodialysis knowledge relevant to adherence to treatment regimens. All material used in the educational sessions was obtained from the Texas ESRD Network website. Beginning on the treatment day following the education session, patients' weights were obtained from the patient's electronic medical records before and after the hemodialysis session. The intradialytic weight gain (IDWG) was determined by subtracting the post-dialysis weight from the previous treatment from the pre-dialysis weight of the current treatment. The researcher measured eight IDWGs over the course of 3 weeks, with the first weight measured the day after the first education session. The target was an IDWG of less than or equal to 2 kilograms. The mean rate of adherence to IDWG amongst the measured treatments was 72.05%. When the first four treatments were compared to the last four treatments, compliance increased from 69.12% to 75.00%.

The original 23-question survey was given again after the educational sessions and the improvement in scores was found to be statistically significant, with participants averaging 17.94 correct answers compared to 14.71 correct answers on the initial survey. The strengths of this study include the use of face-to-face educational interventions and measuring IDWG along with measuring survey question results. This gives a better picture of whether or not patients are able to apply the learned information to their own lives and treatment regimens. The limitations of the study include the small sample size and the limited sample of one outpatient dialysis clinic. The short duration of this study was another limitation. A longer length of study time may provide more insight into whether the educational interventions impact the participant long term.

A 600-bed hospital looked at patients who had at least one hemodialysis treatment in their acute unit from July 1, 2016-September 31, 2016 (Briscoe et al., 2018). Using a scripted, 9-question interview, nephrology nurses called patients at home 48 hours after hospital discharge. The purpose of this study was to see if post-discharge phone calls by the nephrology nurse reduced post-discharge complications and prevented 30-day readmissions of patients on hemodialysis. The study used a convenience sample of patients over the age of 18 on chronic maintenance hemodialysis who received at least one inpatient hemodialysis treatment at the acute care hospital. Patients under the age of 17; those with acute kidney injury; patients receiving radiation, chemotherapy, or rehabilitation; those admitted for 24-hour observation only; and patients on peritoneal dialysis were excluded from the sample. The pre-intervention group was made up of 149 patients with 197 hospital admissions during the 3-month timeframe. Fifty-six of the 197 admissions (28.4%) were within 30 days of hospital discharge. The post-intervention

group consisted of 171 patients with 231 hospital readmissions. Fifty-seven of the 231(24.6%) admissions were within 30 days of hospital discharge. Nephrology nurses were given a scripted set of questions to ask the patient when they performed a follow-up phone call 48 hours after discharge. Nurses attempted to call the patient at least twice. The questions asked were “Have there been any unexpected changes in your condition since discharge?”, “Did the dialysis nurse or nephrologist talk to you about your dialysis care and the reason you were in the hospital?”, “Do you have any questions about your dialysis care or discharge instructions?”, “Were you able to make it to your scheduled outpatient dialysis treatment?”, “Were you able to fill your discharge medications?”, “Will/did you take your medications to your dialysis center?”, “Have you fallen since your discharge from the hospital?”, “Are you expecting any medical supplies to be delivered to your home?”, and “How would you rate your experience with your hospital care?” Of the post-intervention group, 87% denied unexpected changes in condition, 84% said they talked to a nephrologist or nephrology nurse about their hospitalization, 86% denied having any questions related to their dialysis or discharge instructions, 85% reported going to their outpatient dialysis appointment, 74% were able to fill their post-discharge medications, 68% reported taking their medications to their dialysis center, no patients reported falls, and only 5% reported awaiting medical supplies to be delivered. Forty-seven percent perceived their hospital care as “very good.” Overall, there was a 3.8% reduction in 30-day readmissions after the interventions, although due to the blending of data, statistical significance could not be determined. A strength of this study is the interview was limited to only five nephrology nurses conducting the telephone interviews which helped maintain the reliability of those giving the survey. Limitations

are the small sample size limited to one acute care hospital which may not represent the hemodialysis population at large.

### **Literature Related to Patient Knowledge of Fluid Management**

In 2021, Keane et al. endeavored to examine ultrafiltration and target weight management from the patient's perspective. A cross-sectional, 38-question survey was developed after a review of the literature and the input of five renal experts, including one who was a hemodialysis patient. The survey consisted of 10 demographic questions, 19 Likert scale questions, eight close-ended questions, and one free text box. Question topics included target weight understanding, the effect of poor fluid management, the impact of past bad experiences on subsequent decisions regarding fluid removal, the level of involvement in making decisions, and the patient's perception of how staff understands their fluid management. Participants in the study were adults over the age of 18 who could read and fill out the survey that was only available in English. Ultimately, 1,077 patients from 10 different hemodialysis units in the United Kingdom completed the questionnaire between May 2018 and December 2019. Seventy-nine percent of patients who filled out the survey reported that they felt in control of their fluid management. A majority (85%) of respondents said they were asked by the nurse about fluid removal and 82% felt they had the final say in how much fluid would be removed. Sixty-six percent of participants reported they had experienced a previous bad experience during hemodialysis caused by having too much fluid removed, and 66% of these patients felt that the bad experience would influence the amount of fluid they were willing to have removed in the future. Fifty-one percent of respondents felt they took an active role in their ESRD treatment. Despite the overwhelming 79% of patients who felt in control of



their fluid management, 20% of those same patients stated they did not know what their target weight was. Furthermore, while 70% of patients stated they would be willing to remove extra fluid if they were fluid volume overloaded, 30% said they would rather their dialysis session end early than stay longer to remove the fluid. Fifty-six percent of respondents said that having flexibility in their diet and fluid management was more important than achieving their target weight each dialysis session. While most respondents felt their hemodialysis staff understood their fluid management, Caucasian patients were more likely than non-Caucasian patients to feel this way. The strength of this study is the aim to discover the patients' perspectives on ultrafiltration and fluid management. This study shows that while the participants felt they are included in decisions about their fluid management, it highlighted the gaps in their knowledge and understanding of ultrafiltration volumes and fluid management. It was also a fairly large sample size of 1,077 patients in 10 differing hemodialysis units. Limitations include the study only being conducted in the United Kingdom and excluding patients without a good understanding of the English language. Selection bias is a possibility because the study's researchers may have approached patients more willing to participate in the study.

## **CHAPTER III**

### **Needs Assessment**

More than a third of hemodialysis patients in the United States are readmitted to the hospital within 30 days of discharge, costing 40% of the Medicare dialysis expenditure for the hospitalization of hemodialysis patients. Empowering patients through nurse-led education may reduce preventable hospital readmissions by increasing the self-management of hemodialysis patients.

### **Target Population**

For this project, a community hospital in the Piedmont region of North Carolina was selected. The target population for this project will be all ESRD patients on maintenance hemodialysis over the age of 18 admitted to the hospital, regardless of admitting diagnosis. The education related to this project will be available to all hemodialysis nursing staff, clinical coordinators for all hospital floors and the emergency department, and hospital educators.

### **Setting**

A nonprofit community hospital in the North Carolina Piedmont region was chosen as the setting for this project. The mission of this acute care facility is to improve the health of the community while enhancing the patient experience, taking care of the caregiver, and providing cost-effective care. As this hospital is owned by the community, this organization strives to promote optimal health among its residents. Displaying compassion, treating others with dignity and respect, collaborating with team members, and showing honesty are values of the organization.

## **Sponsors and Stakeholders**

Project sponsors include the director of hemodialysis, the hospital pharmacy department, and case management. Internal stakeholders were identified as staff nurses, the chief nursing officer, and the finance department. Collaboration between the patient's floor nurse and the dialysis team is essential to ensure observations or risk factors by both departments are communicated effectively. The chief nursing officer can offer support and generate interest in the project, as well as update the board of directors and secure funding if needed. The finance department can also generate support and enthusiasm for the project, as decreasing readmission rates reduce the facility's SRR and reduce financial penalties. Key external stakeholders were identified as the patients' nephrologists, outpatient dialysis centers, and patients and their families. As their physicians, nephrologists have a vested interest in the optimal health and quality of life of their patients. Family members and primary caregivers of patients have a keen interest in easing the disease burden and enhancing the quality of life. The outpatient dialysis centers that serve maintenance hemodialysis patients will also decrease financial penalties if readmission rates are reduced.

## **Desired Outcomes**

The overall desired outcome is to provide patients with maintenance hemodialysis education regarding ESRD, dialysis access, and fluid and diet restrictions in order to improve knowledge of their disease process and decrease their 30-day readmission rates. Taking on an active role in their own care has a direct effect on patient health outcomes and quality of life (Hou et al., 2022). Previous studies have shown there are significant gaps in patients' understanding of fluid management (Keane et al., 2021) and that lack of

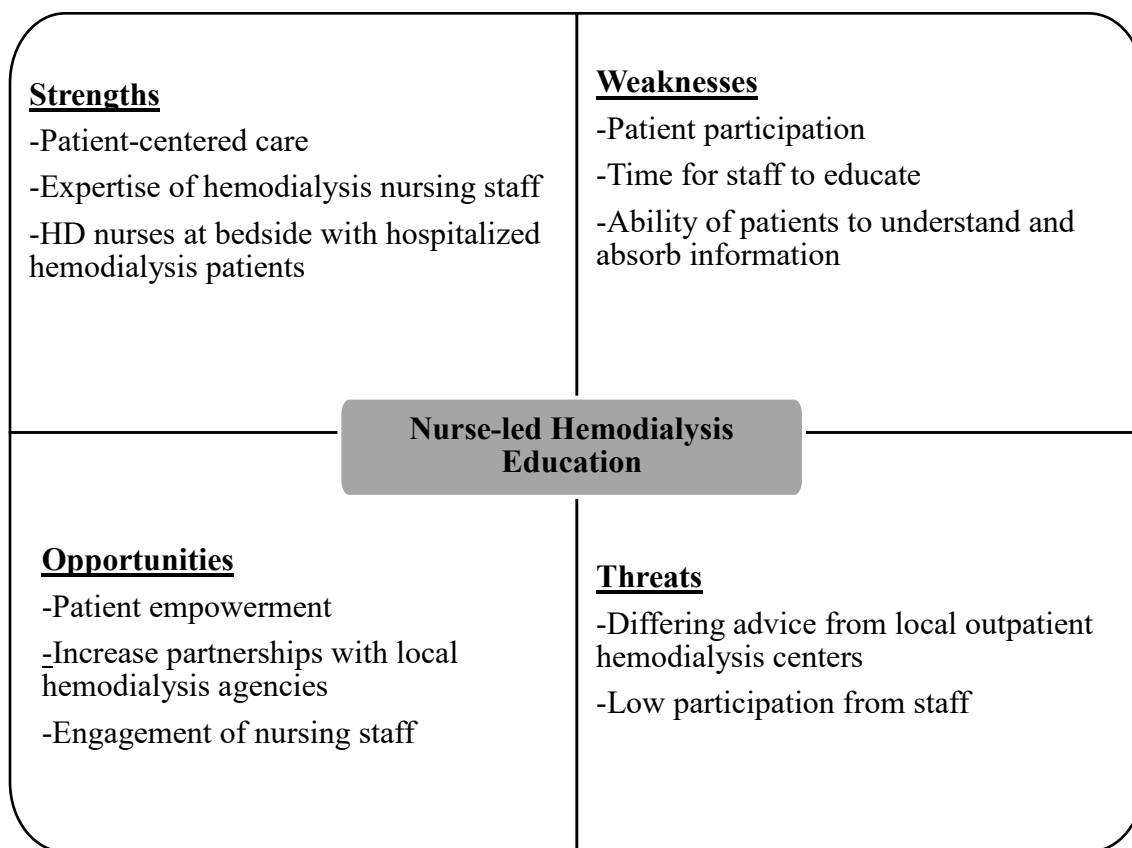
understanding of indications for medication therapy are barriers to treatment adherence (Nielsen et al., 2021). Hemodialysis nurses often spend 3-4 hours with the patient in the acute setting, making them crucial in patient-centered education.

### SWOT Analysis

To identify the strengths, weaknesses, opportunities, and threats of this project, a SWOT analysis (Figure 1) was performed. Strengths and weaknesses were derived from internal components, while opportunities and threats were taken from external components.

**Figure 1**

*SWOT Model*



**Strengths**

Providing nurse-led education tailored to patients' needs increases adherence to the treatment regimen and knowledge about the disease process, and improves the quality of life (Alikari et al., 2015). As hemodialysis nurses in the acute setting are typically at the bedside with patients during their hemodialysis treatments, they are in a prime position to educate the patients and answer questions. Hemodialysis nurses take 3 to 6 months of initial training to qualify as entry-level nephrology nurses due to the complexity of the renal patient. Expert hemodialysis nurses significantly contribute to the quality and care of their patients and make a substantial impact on patient outcomes (Gaietto et al., 2019).

**Weaknesses**

Weaknesses include a lack of patient participation, a lack of time for staff to educate, and the ability of patients to understand or retain the presented information. Patients may not be interested in receiving education from the nurse, and if the patient is not engaged, it is likely they will not retain or try to use the teaching given to them. Another potential weakness is the lack of time. While the acute hemodialysis nurse is typically at the bedside with the patient, they may have multiple patients at one time or may have another patient requiring the care of very high acuity. This could leave very little time for the nurse to be able to educate the patient. Yet another potential weakness is that in the acute setting, patients are often acutely ill, and may be too sick to understand or retain information.

## **Opportunities**

Patient education can lead to enhanced motivation, leading to self-management, and behavioral change. Including the patient in decisions regarding their own care increases patients' sense of empowerment (Yangöz et al., 2021). Providing education also provides an opportunity to partner with local hemodialysis agencies that have an equally vested interest in reducing hospitalizations and increasing compliance. Finally, seeking input and asking for expertise from hemodialysis nurses can help increase staff engagement.

## **Threats**

A potential threat to this project is conflicting advice that may be given by local outpatient hemodialysis agencies. The majority of outpatient hemodialysis staff are not registered nurses and may lack the training to give appropriate education to patients. Another potential threat to this project is low participation from staff nurses.

## **Resources**

Resources needed for this project are permission from the facility to provide online PowerPoint education and time for hemodialysis nursing staff to perform the one-on-one education. The PowerPoint can be placed on the hospital website and will require assistance from the information technology department and marketing department. If hemodialysis nurses are unable to provide education during hemodialysis treatment due to their workloads, extra time may need to be allotted in order for the nurse to go to the patient's room at a different time to perform one-on-one education. Nurses will develop a standardized education plan about the general disease process of ESRD, general dietary

guidelines, and fluid restriction before further detailing their education session to the patient's individual needs based on assessment, patient feedback, and expertise.

### **Team Members**

Team members necessary for this project are the project leader, registered nurses from the hemodialysis department, staff from the information technology department, and the manager of the marketing department. The project leader will lead the hemodialysis registered nurses in developing the educational content and creating the PowerPoint. Obtaining input and ideas from the staff will help engage them in the project. Staff from the information technology department will be needed to assist with getting the PowerPoint on the hospital's website and can assist with any difficulties encountered with developing it. The manager of the marketing department will approve the final PowerPoint to put on the website and ensure that the logos used are the current ones allowed. They will approve the standardized education materials and print them as well. They can also assist in advertising the information to interested parties via the hospital website and social media accounts. Additionally, the project leader will send the website information to the local outpatient hemodialysis agencies and ask them to recommend the content to patients.

### **Cost-Benefit Analysis**

Costs for this project will be minimal. Hourly pay for the hemodialysis nursing staff to design the content for the project will be the largest cost. The project leader estimates 6 total hours of nursing time will be required to develop the content. If all registered nurses in the hemodialysis unit agree to participate, that will equal 36 hours of nursing time, in which they will be paid their hourly rate. The information technology

staff will also have to be paid their hourly rates to contribute to the project. The project leader estimates 3 hours of information technology time from one staff member will be required. The manager of the marketing department is salary paid, and the project leader estimates only 1-2 hours of her time will be needed, making the cost negligible. The potential benefit of reducing hospital readmission rates greatly exceeds the minimal cost of this project. In 2021, the facility received a 1.99% payment reduction from CMS due to excess hospital readmissions (Rau, 2022), making the minimal costs associated with this project drastically preferable to the high cost of heavy penalties to the organization.



## **CHAPTER IV**

### **Project Design**

Current patient education at the project facility includes a packet of pamphlets, booklets, and internet materials printed out and given to the patient at discharge to read when they return home. There is no one-on-one education or additional resources given to patients in the event they have questions or problems that are not addressed in the printed materials. By providing verbal one-on-one education with the patient at the bedside in addition to printed materials along with access to an internet-based PowerPoint discussing common questions and issues, the goal of this project is to provide education and support to patients and families on chronic maintenance hemodialysis.

### **Goals and Objectives**

The goals of this project were to provide patient-centered education to in-center hemodialysis patients and thereby increase patient knowledge related to their disease. This knowledge will empower patients and potentially have the effect of improved adherence to their dialysis treatment regimen and hopefully impact their quality of life. Augmented adherence could potentially lead to reduced hospital readmissions. In addition, another goal of this project is to engage the nursing staff by having them design standardized patient education. Teamwork improves when staff is engaged in their work. Better quality of care as well as increases in patient and job satisfaction are linked with effectual teamwork (Sohal, 2020). Table 1.

**Table 1***Goals and Objectives*

<b>Goal</b>	<b>Objective</b>
Provide one-on-one hemodialysis education to patients during hemodialysis treatment while hospitalized consisting of verbal and printed materials	Patients will receive one-on-one education from a hemodialysis nurse within 72 hours of hospital admission
Patients will be encouraged to view PowerPoint on the facility website after discharge to reinforce education	Patients will verbalize where to find the hemodialysis educational PowerPoint on the facility website
Staff engagement will be increased after designing educational content for patients	Staff will take an engagement survey before and after they design educational content

**Plan and Material Development**

The review of the literature shows that hemodialysis patients are nonadherent to their recommended fluid intake 22%-77% of the time and nonadherent to their diet 41%-84% of the time (Daniels et al., 2018; Yangöz et al., 2021). The literature also suggests that educational interventions conducted by healthcare personnel facilitate behavioral changes in hemodialysis patients. This education is effective in patients' adherence to hemodialysis treatments. Individualized education tailored to meet the needs of the individualized patient was shown to have the greatest effect on fluid and diet

management, and this education was enriched with the addition of pamphlets, brochures, and videos (Yangöz et al., 2021).

The five dialysis registered nurses in the hemodialysis department will have three meetings of approximately 1 hour each to develop the standardized content and an outline of education for the one-on-one education sessions. Nurses will develop a standardized education plan for the patients that is applicable to all hemodialysis patients and then give more individualized education based on the patient's response to the standardized education, patient assessment, and feedback from the patient. The nurses will discuss common gaps in education they see in their patient population and identify issues they feel they need to discuss with every patient and develop generalized open-ended questions to ask patients to identify areas needed for further education.

The project leader developed a PowerPoint presentation to go on the facility's webpage. The presentation gives the basic principles of hemodialysis and information on fluid restriction, diet education, and dry weight calculation. As patients in the hospital can often feel overwhelmed with a large amount of information given at once, the PowerPoint is meant to function as a reference to reinforce much of the one-on-one education given by the hemodialysis staff. The hemodialysis nurses will give verbal as well as written instructions to the patients on how to access the presentation at the end of their hemodialysis session.

### **Timeline**

The projected total timeline for this project is 6 months. The first week will be spent meeting with the five hemodialysis nurses who staff the unit. A meeting will be held to outline the objectives and goals for this project. The nurses will be instructed to

develop general one-on-one education ideas for their patients. They will develop a standardized education plan to discuss some general gaps in education seen by the nurses and ideas for the education they deem appropriate. Nurses will also be given the nurse engagement survey to take prior to beginning the project to determine their baseline level of engagement in their unit. The nurse engagement survey is a 7-question survey utilizing a 5-point Likert scale. The anonymous survey is adapted from the 2020 NDNQI RN Survey with Practice Environment Scale© (National Database of Nursing Quality Indicators, 2020) and permission will be obtained prior to its use.

In weeks 2-4, the nurses will have the opportunity to hold three 1-hour long meetings to develop materials for educational needs. They will also be shown the online PowerPoint to ensure they give the website information and encourage patients and families to refer to it after discharge. They will send the finalized materials to the managers of three surrounding outpatient dialysis facilities in the county and ask them to give them to their nurses and provide feedback. At the beginning of the second month, the nurses will begin giving one-on-one education to patients during their dialysis treatments. This will be documented in the progress notes in the EHR to ensure the education is completed.

Also, at the beginning of the second month, the project leader will collaborate with the information technology department to get the PowerPoint up and running on the facility's website, and the marketing manager to give the final permission for the finished PowerPoint and advertise it via the facility's social media accounts.

At the beginning of the third month, the project leader will reach out to the outpatient dialysis units in the surrounding areas to notify them that the standardized

education and the PowerPoint are completed and available and ask them to recommend it to their patients.

During the fourth and fifth months of the project, the project leader will meet with the hemodialysis nurses once a month to discuss how the one-on-one education is going and discuss their thoughts on the strengths and opportunities of the project.

At the end of the sixth month, the project leader will again meet with the hemodialysis nurses to discuss their thoughts on its success or failure. The same nurse engagement survey given to them at the beginning of the project will be administered again and the scores compared to evaluate if the project increased nurse engagement.

### **Budget**

The cost-benefit analysis for this project determined that the costs of this project will be low and financially viable. The direct costs associated with this project include a computer, printer, and paper supplies which are already on hand and will not affect the budget. The highest direct cost for this project is paying staff for their time to develop the project and meet to review it. It will cost \$1,000.00 for the research and creation of the printed educational materials and an additional \$1000.00 for meetings to discuss and review the project after it has been launched. Indirect costs include office space for meetings to develop the project but space is already available for use without incurring extra expense.

### **Evaluation Plan**

To evaluate the effectiveness of this project, several measures will be used. Both qualitative and quantitative measures will be utilized in order to determine whether the project has its intended effects.

To evaluate if maintenance hemodialysis patients feel they have received education on their dialysis access, diet, and fluid management, the nurses conducting the education sessions will ask the patients after the session if they found the session to be valuable. By asking the patients directly if they find the session to be helpful, staff can use patient feedback to tailor their individual education in ways that the patient will find useful. The project leader will ask the managers of the outpatient units to talk to the patients when they return to the outpatient clinic and ask them if they received the education and if it improved their knowledge to determine if they retained information from the information session.

The project leader will measure all admissions of maintenance of hemodialysis patients as well as their admitting diagnoses for the full six months of the project duration. This method will allow the project leader to look for readmissions within 30 days and compare index diagnoses to readmission diagnoses. While an increase or reduction in 30-day readmissions of hemodialysis patients will not prove the success or failure of the project, patterns may emerge that indicate the project is beneficial or needs improvements.

Nurses involved in the project will take a nurse engagement survey before the project begins and again at the end of 6 months. Results will be compared to see if the project is useful in increasing nurse engagement in the unit.

## **CHAPTER V**

### **Dissemination**

This project would aim to reduce 30-day readmissions in patients on maintenance hemodialysis for a nonprofit hospital in western North Carolina. This chapter will review the dissemination, project limitations, implications for nursing, and recommendations for the future.

#### **Dissemination Activity**

This project was presented to a registered nurse in the hemodialysis department of the project facility via PowerPoint on zoom, and the recorded zoom session was also emailed to the nurse managers of two outpatient dialysis units in the same community as the project facility. The problem was outlined, and the online PowerPoint was shared during the Zoom meeting.

The project manager requested feedback after the plan was presented. The nurse from the facility's hemodialysis department suggested calling the patient at home within the first 3 days after discharge to ask if they had any follow-up questions and ensure they attend their hemodialysis sessions as prescribed. The nurse also expressed concern over the time needed to provide education on the busy unit. The nurse managers of the outpatient hemodialysis facilities both shared positive feedback, particularly about the PowerPoint to be put on the facility website. Both nurse managers stated they felt it would be helpful to have collaboration between the hospital and outpatient dialysis nurses to ensure continuity of care.

### **Limitations**

One limitation of this project was that it is being proposed when the hospital census is at an all-time high, and nurses are understaffed and overwhelmed. Attempting one-on-one education with patients may not be supported by all the hemodialysis nurses due to lack of time and staffing. Achieving the desired results may not be achieved if the project is not supported fully by the hemodialysis staff.

Another limitation of this project was the small sample size of using one project facility, as results may not be indicative of the maintenance hemodialysis population as a whole.

### **Implications for Nursing**

Increasing the education and self-empowerment of patients on maintenance hemodialysis is of utmost importance to the nursing profession in order to lead to increased compliance and higher quality of life amongst this patient population. From the standpoint of nursing administration, reducing the number of readmissions within 30 days in this high-risk population can have a great impact on facility financials, as well as Medicare financials as a whole in the U.S.

### **Recommendations**

Further research into what strategies are most effective in preventing 30-day hospital readmissions in maintenance hemodialysis patients is recommended. Additionally, further research is warranted regarding the impact of nurse-led education on this patient population. Social determinants are undoubtedly an element in this multifactorial issue, and more research is warranted into the social elements facing maintenance hemodialysis patients and their effect on treatment adherence.



## **Conclusion**

As the rates of ESRD continue to rise worldwide, the number of patients on maintenance hemodialysis will only continue to grow. In the U.S., the Medicare budget cannot continue to sustain the current financial strain of the ESRD population as it increases. A review of the currently available literature afforded evidence as to the readmission rates and related diagnoses, the effects of nurse-led education, and the knowledge of maintenance hemodialysis patients concerning their management of fluid intake. Providing one-on-one nurse-led education along with furnishing patients with online education along with printed materials has the potential to decrease 30-day hospital readmissions while simultaneously empowering patients and improving health literacy.

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