THE USE OF SCREENING TOOL IN PATIENT SELECTION FOR HOME DIALYSIS

by

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The Use of Screening Tool in Patient Selection for Home Dialysis

Presented in Partial Fulfillment

of the Requirements for the Degree

Doctor of Nursing Practice

Aspen University

September 2022

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has been approved

December 2021

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Abstract

Patients with kidney failure have a poorer health-related quality of life than those with other chronic conditions and have a higher mortality rate from the build-up of toxins, fluids, and blood infections from dialysis catheters. The cost of services related to kidney failure and maintenance dialysis has been an upward trend adding to the healthcare system's financial burden. Home dialysis has many benefits, such as improving the health-related quality of life and survival advantages. One strategy for increasing home dialysis referrals is patient selection. This project involved teaching the nurses in a freestanding clinic about a screening tool for home dialysis called Method to Assess Treatment Choices for Home Dialysis (MATCH-D). Fifty-nine patients were evaluated using the standard pre-survey assessment and post-survey, applying MATCH-D as a screening tool. Using the three criteria in MATCH-D, fourteen patients were "Strongly Encouraged" to do home dialysis, thirty-two were "Encouraged After Assessing and Eliminating Barriers," and thirteen were "May Not Be Able to Do Home Dialysis." Twelve patients were selected to be more appropriate for home dialysis upon discussion with the patient's provider. Twelve patients were identified as more appropriate candidates after the secondary assessment, and after discussion of home dialysis with patients, seven of the twelve patients agreed to proceed with referral to home dialysis. The findings in this project answered the clinical questions that using MATCH-D can increase the referral to home dialysis. Additionally, all nurses were proficient in MATCH-D using the grading system.

Keywords: dialysis, home dialysis, screening tools for home dialysis, and MATCH-D

The Use of Screening Tool in Patient Selection for Home Dialysis

Chapter One: Introduction and Overview

Patients with end-stage renal disease (ESRD) who are on dialysis have a poorer health-related quality of life and higher mortality rates than patients with other chronic conditions. The cost of dialysis is not just affecting national healthcare spending but causes severe financial strain on patients. Home dialysis can offset the health-related and financial burdens more prominent in patients dialyzing in clinics.

Home dialysis is a treatment option for patients who require dialysis. Home dialysis improves patients' quality of life, reduces mortality, and is more cost-effective; however, the number of patients choosing home dialysis is much less than those going to dialysis clinics. Among the reasons for low utilization are the lack of awareness of home dialysis, the complexity of education provided, lack of screening tools in patient selection, and particular bias towards or against a specific renal replacement therapy. Nurses have a vital role in educating patients about home dialysis, and therefore, identifying their knowledge of screening tools for patient selection is important. This Doctor of Nursing Practice (DNP) project will measure the proficiency of hemodialysis nurses in clinics in applying the MATCH-D screening tool, allowing patients to explore their candidacy dialyze at home.

Background of the Project

Chronic kidney disease (CKD) is the gradual loss of kidney function over time. CKD means having less than 60 milliliter/minute (mL/min) kidney function or estimated glomerular filtration rate (eGFR) for at least three months (Benjamin & Lappin, 2021). The continuous progression of loss of kidney function leads to end-stage renal disease (ESRD). ESRD is the continuous and irreversible decline of kidney function and is defined as having a 15% or less eGFR (Scott et al., 2020). ESRD has been associated with speeding up oxidative stress and chronic inflammation that alters cardiovascular dynamics (Vadakedath & Kandi, 2017). Atherogenic changes occur in the blood vessels from the interruption in the cross-linking of collagen and poorly controlled calcium phosphorous (Weber et al., 2016). Dialysis

has also been associated with multiple health problems from the build-up of wastes, fluids, and other solutes. As the kidney function worsens, treatment is needed to replace what the kidneys can no longer do.

Dialysis is a treatment option that prolongs life. Dialysis is an intermittent procedure that removes toxins, excess fluids, and solutes from the body and aims to maintain homeostasis (Murdeshwar & Anjum, 2021). The procedure can be performed in an outpatient clinic or at home. Outpatient clinics are staffed with nurses, patient-care technicians, dietitians, social workers, and other auxiliary personnel. Patients are assigned on a Monday/Wednesday/Friday or Tuesday/Thursday/Saturday schedule, from three to four hours, depending on remaining eGFR, fluid gains, weight, and dialysis access, such as arteriovenous fistula, graft, or catheter. Patients who wish to travel will need a prior arrangement to another dialysis clinic closest to where the patient will stay. Changes to the schedule are often not possible. The dialysis process involves a pre-assessment, mid run, and post-assessment. Pre-assessment starts with the patient washing the dialysis access arm and measuring weight. Vital signs are checked, and assessments are done before cannulating the access and connecting the needles to a tube that connects to the dialysis machine. The patient is asked to avoid moving or bending the dialysis arm to avoid infiltration or dislodged needles. Since arm movement is limited, the patient often sleeps or watches television during dialysis. After dialysis time is completed, post-assessment includes disconnecting the patient from the machine and removing the needles. This process repeats for two to three days until they receive a kidney transplant or until they choose hospice care.

The other way of performing dialysis is at home. The patient who chooses home dialysis undergoes comprehensive training programs until the required knowledge and skills are learned. The two types of home dialysis are peritoneal dialysis (PD) and home hemodialysis (HHD). PD involves the surgical implant of the catheter in the peritoneal space. The peritoneum is used as the semipermeable membrane to excrete toxins. PD solution is

instilled in the abdominal cavity in several "exchanges" based on the patient's dialysis prescription and lifestyle. PD can be done manually in the daytime or at night using a machine for uninterrupted sleep. The other type of home dialysis is HHD. HHD follows the same principles of excreting toxins and excess fluids with a smaller machine. However, scheduling the treatment is not a concern since the patient does it at home at the time most convenient to them on that day. Because of flexibility, HHD can be done more often and longer if needed. Like PD, HHD training involves a clear understanding of dialysis principles, self-cannulation techniques, caring for dialysis access, and how to address simple machine problems. There are many advantages of doing home dialysis. Studies have shown that frequent dialysis provides similar benefits to kidney transplantation in volume control, solute clearance, and better nutrition status (Walker et al., 2017). Home dialysis is economical because it requires less staff and fewer overhead expenses, which helps ease the financial burden of managing ESRD (Hager et al., 2019). Doing home dialysis is more convenient and comfortable for patients since dialysis is done in their homes. However, despite the advantages of in-home dialysis, most patients with kidney failure in the United States (US) choose to go to dialysis clinics. The incidence of patients choosing to go to clinics is two to three folds more than home modalities in current practice.

With the staggering healthcare costs in the US, healthcare leaders are challenged to create models of care that reduce cost while promoting quality of care and reducing mortality rates. Several successful initiatives helped improve home dialysis incidence and prevalence in other countries. The increased incidence of PD in Canada resulted from universal access to chronic kidney disease clinics. In New Zealand, community housing helped patients continue in-home programs (Walker et al., 2019). In Denmark, France, and some parts of Canada, assisted PD programs were successful (Oliver & Salenger, 2020). In the US, one significant improvement in increasing accessibility to home dialysis was the creation of the Advancing American Kidney Health Initiative (AAKHI). The initiative was signed as part of the

Executive Order in July 2019, with the primary objectives of increasing home dialysis utilization and sustaining the practice, and analyzing areas of strengths and weaknesses of home dialysis programs (Ahmad et al., 2020).

One strategy for improving home dialysis is through nurse engagement. Nurses historically have played an essential role in patients' decisions about their health. Critical objectives for nursing are to increase the patient's health and well-being, prevent death, and obtain the best possible physical and social rehabilitation for patients (Castro et al., 2002). This has been obvious since the inception of the ESRD program in 1972; nurses have developed new roles and assumed greater responsibilities from mere assessment, monitoring, and medication administration to being an educator, facilitator, and advocate for patients and their caregivers. However, these responsibilities require new or enhanced knowledge, skills, and attitudes (Salmond & Echevarria, 2017), for instance, in screening tools. Screening tools have the potential to identify conditions or high-risk populations and help detect problems early on so complications or issues can be minimized or avoided. In the current place of work, there is no standardized screening tool for in-center hemodialysis nurses to use to objectively assess the potential candidates for home dialysis or those at risk. This can be challenging in promoting home dialysis as a better treatment option, particularly for nurses and patients with a more passive attitude. Tennankore et al. (2013) conducted a survey involving 129 nephrology nurses and concluded that their prevailing views about modality selection were strongly determined by their area of experience and expertise. These prevailing views can create implicit bias and unknowingly or unintentionally influence a patient's decision despite the evidence-based advantages seen in-home dialysis. Phillips et al. (2015) concluded that although general perceptions favored home dialysis, the in-center HD nurses did not feel comfortable discussing home dialysis, were unaware of the benefits of home therapies, and lacked the confidence and active role in home dialysis promotion. This project will explore the use of MATCH-D as a screening tool for home dialysis.

Statement of the Problem

Patients on dialysis have a higher mortality rate (Murdeshwar & Anjum, 2021) and poorer health-related quality of life than those with diabetes and hypertension (Chen et al., 2016). In addition, a central venous catheter commonly seen in hemodialysis carries a high risk for a blood infection, which can be omitted in PD. The healthcare-related expenses in maintaining patients on dialysis, particularly in-center hemodialysis clinics, are staggering, adding to the healthcare system's financial burden (Wang et al., 2016). Medicare alone reports a $35 billion per year cost on related ESRD services for their beneficiaries (Saran et al., 2019). AAKHI established a goal that 80% of ESRD patients will be treated with either home dialysis or a kidney transplant by 2025. This initiative was supported by financial incentives provided by the ESRD Prospective Payment System (PPS), launched in 2011 (Flanagin et al., 2020). Creating a treatment plan that is sustainable and with an excellent outcome is essential in managing the care of patients with kidney failure.

Home dialysis can reduce the mortality rates of patients on dialysis and improve the quality of their lives while being more economical; however, the current trend shows that most patients are going to dialysis clinics and not home (Robinson et al., 2016). According to Jacquet & Trinh (2019), patient selection is one strategy for improving home dialysis. Patient selection and training are crucial to building a successful home hemodialysis program. However, few resources have focused on the importance of patient selection, education, and training for complex medical procedures such as home dialysis (Rioux et al., 2015). Screening tools are not being used to help identify better candidates, making home education referrals inconsistent.

Purpose of the Project

This project aimed to help nurses select home dialysis patients by educating them about MATCH-D. MATCH-D is a screening tool developed by a group of medical practitioners at the Medical Education Institute (MEI) to increase the awareness of suitable

conditions of patients for home dialysis. In this project, nurses at a hemodialysis clinic have completed pre and post-surveys. The pre-survey asked the nurses if patients were candidates for home dialysis. The post-class survey identified if the same list of patients are candidates for home dialysis using MATCH-D. This project assessed the nurses' proficiency using MATCH-D through a grading system. A nursing workflow consisting of six steps was developed to guide the nurses through the screening process and transitioning patients dialyzing in clinics to home.

PICOT Question

Will the use of screening tool, such as MATCH-D, increase home dialysis referrals?

P – Hemodialysis nurses

I – Use of MATCH-D

C – Standard assessment

O – Nurses using the screening tool in patient selection for home dialysis

T - four weeks

Theoretical Framework

Nurses are frontline healthcare providers who spend a reasonable amount of time with patients. Their knowledge about home dialysis plays a considerable role in promoting this type of dialysis therapy. Their individual decision to promote home dialysis can be predicted by their intention to engage in that behavior, which is reflected in the Theory of Planned Behavior (TPB) theoretical framework. Icek Ajzen (1991) developed TPB to predict human behavior. This theory proposes that the intentions presented by perceived behavior could lead to goal-specific actions.

TPB is a behavioral theory that explains behavior and analyzes factors affecting behavioral intentions. In the TPB, changing the behavioral intentions depends on three factors: (a) attitude of the individual of specific behavior, (b) subjective norms regarding the behavior, and (c) perceived behavioral control (Wang et al., 2021). Attitudes are the

perceived processes that can be positive or negative that determine what is reasonable, relevant, appropriate, or important (Price, 2015). Attitude consists of cognition, affect, and conation (Ajzen, 2005). Cognitive is the person's knowledge of something, which is this project's screening tool for home dialysis selection. Affect is the feeling towards who can do home dialysis, and conative response is the will, intent, or purposefully acting on it. Therefore, attitude reflects a person's beliefs and how the outcome of the behavior is valued.

Subjective norms are the individual's perception of the social expectations needed for particular behavior (Peters & Templin, 2010). Subjective norms are influenced by a person's normative beliefs, behaviors that others will approve of or disapprove of, and the motivation to comply. Subjective norms are the attitudes relevant toward behavior and motivation. Perceived behavior is the perception or belief of an individual that he or she can perform the behavior (Shamblen et al., 2018). Perceived behavioral control reflects a person's beliefs about how easy or difficult to perform a behavior (Peters & Templin, 2010). Using a peer-reviewed screening tool for home dialysis reflects the use of available resources versus the barriers preventing the behavior from being performed. The perceived behavioral control is that hemodialysis nurses in clinics can promote home dialysis based on its evidence-based benefits despite their limited experience in the home setting. Using TPB as the theoretical framework will identify if the chosen perceived behavioral control, a screening tool, can determine the patient's candidacy for home dialysis, implying that attitude, subjective norms, and perceived behavior influence intentions.

Significance of the Project

The highest mortality rate in patients starting on dialysis is within the first three months, especially among older patients (Murdeshwar & Anjum, 2021). Cardiovascular disease is primarily the cause of death, particularly among younger age groups, because of chronic inflammation, significant changes in extracellular volume, dystrophic vascular calcification, and altered cardiovascular dynamics during dialysis (Murdeshwar & Anjum,

2021). At the same time, frailty is commonly prevalent among elderly patients with CKD and ESRD, observed in the study by Zhang et al. (2020), which concluded that frailty could be an independent and significant mortality risk, especially in dialysis patients. Health-related quality of life, which is much lower in hemodialysis patients, has been strongly associated with higher hospital admission and risk of death (Ishiwatari et al., 2020) and is poorer when compared with other patients with chronic conditions such as diabetes and hypertension (Chen et al., 2016). Therefore, it is necessary to identify strategies to reduce mortality rates and improve the quality of life in patients on dialysis while creating cost-effective health-related services.

Home dialysis has been able to keep patients live independently, allowing a life-sustaining treatment in the comfort of their home, and having a cost-effective treatment with evidence-based improved clinical outcomes. The AAKHI established a goal for 80% of patients with kidney failure to be on home dialysis or a kidney transplant by 2025 (Flanagin et al., 2020). The ESRD Prospective Payment System and Centers for Medicare and Medicaid Services (CMS) supported this initiative, incentivizing kidney health, home dialysis, and kidney transplantation practitioners (Flanagin et al., 2020). According to Saran et al. (2017), more efforts need to be made since transplant accounts for only 30%, while HHD is at two percent and PD at about 10%. This national data aligns with the number of hemodialysis and home dialysis patients in the current workplace. Creating a treatment plan that is sustainable and with an excellent outcome is essential in managing the care of patients with kidney failure.

Reports have been that home dialysis education is suboptimal because of the bias towards or against a specific treatment modality for patients with kidney failure (Combes et al., 2017). Nurses' perceived views can be from their personal and work experience, perception, and knowledge of home dialysis. Assessment of the knowledge and proficiency of the nurses in the use of screening tools is an important aspect to the project. A screening

tool can provide an objective assessment of who can be on home dialysis regardless of the nurses' perceived views and has been described by Rioux et al. (2015) as an essential step toward building a successful home hemodialysis program. Implementing the use of screening tools for home dialysis can contribute to the sustainability of the health systems and increase the engagement of nurses with patients and other providers, placing the nurses in a more visible leadership role in patient care that is focused on evidence-based practice and a treatment plan that facilitates active participation choice by the patients.

Improving the patient selection for home dialysis has been chosen in this project as a strategy for improving home dialysis incidence. According to Rioux et al., 2015, patient selection is crucial to building a successful home hemodialysis program that enriches the process of patient selection, education, and training in complex medical procedures such as home dialysis. In assessing the patient, a screening tool can objectively guide the in-center hemodialysis nurses in selecting an appropriate candidate for home regardless of their limited exposure to home dialysis. This project will determine the clinical question of whether the use of screening tools such as MATCH-D could increase the referral of patients to home dialysis.

Definition of Terms

This section defines the terms and concepts used in this DNP project.

Chronic kidney disease (CKD): a GFR of less than 60% as per the Kidney Disease Improving Global Outcomes **(**KDIGO**)** guidelines (Levey et al., 2005).

End-stage kidney disease (ESRD): irreversible progression of CKD with a calculated GFR of less than 15% (Rodger, 2012).

Dialysis: a treatment to artificially replace the essential functions of kidneys to maintain life (Vadakedath & Kandi, 2017).

In-center hemodialysis: also known as intermittent hemodialysis, a type of dialysis performed in outpatient clinics. It requires accessing the patient's vascular system for toxin excretion, solute exchange, and removal of excess fluids (Gul et al., 2018).

Peritoneal dialysis (PD): a type of dialysis done at home. It requires having an abdominal catheter that delivers the desired sterile dialysis solution and excretion of the waste products and excess fluids collected in the abdominal cavity (Andreoli & Totoli, 2020).

Home hemodialysis (HHD): like in-center hemodialysis but done at home using a smaller, portable dialysis machine. This dialysis provides a gentler, more frequent than the in-center hemodialysis (Lockridge et al., 2020).

Attitude: nurses' cognition, affect, and conation toward home dialysis (Ajzen, 2005).

Subjective norm: the perception of the social expectations in the use of screening tool (Peters & Templin, 2010).

Perceived behavioral control: is the nurses' perception or belief in the use of screening tools in patient selection in improving home dialysis (Peters & Templin, 2010).

Nature, Scope, and Limitation of the Project

Tennankore et al. (2013) concluded that nurses have prevailing views on treatment selection determined by their area of experience and expertise. A nurse with expertise in in-center hemodialysis may favor patients going to the clinic rather than home. In-center hemodialysis nurses are involved in patient education; therefore, assessing their knowledge about screening tools and their application is important. Screening tools improve the population's health outcomes at a reasonable cost (Iragorri & Spackman, 2018).

The Medical Education Institute developed the MATCH-D for the Centers for Medicare and Medicaid Services Conditions for Coverage to assess whether a patient is clinically appropriate for home dialysis (Schatell, 2015). MATCH-D describes the suitability criteria for home dialysis through three categories: strongly encourage, encourage after assessing and eliminating barriers, and may not be able to do home dialysis. MATCH-D

predicts the likelihood of a successful home dialysis treatment or warns the providers of concerns that need to be addressed before transitioning the care to home dialysis.

- Scope – This project used the survey to collect data. The survey was chosen since it can collect meaningful data to guide decision-making and improve practice (Robb & Shellenbarger, 2020). The survey can create a process that can help better strategize how to address a problem, improve quality outcomes and help test the comprehension and engagement of the participants (Conrad et al., 2015). There were two surveys. First, the pre-survey (Appendix A) identified if nurses had any knowledge of screening tools and if any of their 15 patients were candidates for home dialysis. The post-survey (Appendix B) was administered after the class on MATCH-D. It identified if the same list of patients were candidates for home dialysis and the nurses' proficiency in applying MATCH-D through a grading system. This project identified that MATCH-D helped assess those patients who can be candidates for home dialysis regardless of the nurses prevailing views or bias towards or against particular dialysis. This tool also guided nurses in identifying patients at high risk for home dialysis.

The acronym "ESCORT" summarized the nursing workflow consisting of six steps. The nursing workflow was designed to give the nurse steps that are easier to remember and meaningful in the screening process. Each letter in the word "ESCORT" represents a step in the implementation phase activity:

E: Educating the nurses about the MATCH-D

S: Screening patient's eligibility for home dialysis

C: Communicating with patient's providers

O: Orienting the patient to home dialysis

R: Referral to a home dialysis clinic

T: Transitioning care to home dialysis.

Step One involved educating the nurses about MATCH-D. This involved a face-to-face educational class about the MATCH-D screening tool. An educational PowerPoint presentation was used to describe MATCH-D with a presentation of several examples, such as full-time employee patients, a history of uncomplicated abdominal hernia repair, and a patient in a nursing home or with limited home space, from the three selection criteria in MATCH-D. Step Two involved screening the patients for home dialysis. After the presentation, each nurse was asked to complete a post-survey by applying MATCH-D to the 15 patients they assessed before the class. The nurses' proficiency in MATCH-D was graded with a passing score of 80%. The passing score represented 12 correct applications of the screening tool. Each correct screening tool has the equivalent point of 6.7 percent (12 correct screening tools multiplied by 6.7% is 80.4%). The researcher calculated their scores, and the results were given to the nurses. However, the pass or fail score did not reflect the nurse's actual performance at work.

Step Three is communicating with the patient's providers who have been identified as potential candidates for home dialysis. Step Four is orienting the patient about home dialysis. The nurse or designated home dialysis educator discussed with the patient what home dialysis is, how it works, and its benefits and burden. Educational material from professional organizations such as the Home Dialysis Central (HDC), the American Association of Kidney Patients, and Consumer Value Stores (CVS) Kidney Care were given to the patients. Step Five is referring the patients to a Wellbound home dialysis clinic. Wellbound is a subsidiary of Satellite Healthcare, Inc., focusing exclusively on self-care dialysis therapy options for people with kidney failure. The home dialysis nurses can further assess suitable patients based on physical exam and their competency for self-care, assessment of patient's home support, training schedule, scheduling of home visits, and others. The patient's

decision for home dialysis will be reconfirmed, and a referral for appropriate dialysis access will be made. The last step, Step Six, is transitioning the patient from the hemodialysis clinic to home. Nurses in the hemodialysis clinic will provide a hand-off report to home dialysis nurses that will include the patient's dialysis access, latest laboratory studies, medications, and status of kidney transplant referral. The implementation process was for four weeks, with the first week for Steps One and Two, the second and third week for Steps Three to Five, and the fourth week for Step Six. The number of patients identified to be potential candidates for home dialysis and those referred to home dialysis has been reported in this project.

- Limitations – This DNP project has several limitations, such as having a small sample of five participants. Unlike some hemodialysis clinics with attached home dialysis clinics, the chosen site is a free-standing clinic which can make the nurses less familiar with the home dialysis setting. Using pre-and post-survey research design in studies is known to have inherent flaws (Stratton, 2019) and has the potential for a low-response burden which can yield an unreliable response. The choices in the pre and post-survey are different since the current practice in pre-survey is limited to yes or no in selecting patients for home dialysis. While in the post-survey, MATCH-D screening was used to identify patients based on the three patient criteria. Since the implementation is for four weeks, Step Six will not be reported, which involves transitioning the patients to home dialysis. The results of this study cannot be applied to the general target population since nursing staffing and workflows may differ.

- Delimitations – Since no other screening tools other than MATCH-D were used, this project will not attempt to compare the effectiveness of this screening tool with others. The pass/fail grading systems will not represent the nurse's performance at work.

- Assumptions: The assumption is that the in-center hemodialysis nurses who are not

experts in managing home dialysis can screen patients appropriately after educational training and that screening tools have value in selecting patients for home dialysis.

Conclusion

CKD is the gradual loss of kidney function over time. The continuous progression of loss of kidney function leads to ESRD. A dialysis is a treatment option for patients with ESRD; however, patients on dialysis have a poorer health-related quality of life and higher mortality rates than patients with other chronic conditions. The cost of dialysis affects national healthcare spending and causes severe financial strain on patients. Home dialysis can offset the health-related and financial burdens more prominent in patients dialyzing in clinics. This project aimed to help nurses select home dialysis patients by educating them about MATCH-D. The nurses at a hemodialysis clinic have completed pre and post-surveys. The pre-survey asked the nurses if patients were candidates for home dialysis. The post-class survey identified if the same list of patients is candidates for home dialysis using MATCH-D. A six-step nursing workflow was developed to guide the nurses through the screening process and transitioning patients dialyzing in clinics to home. This project assessed the nurses' proficiency using MATCH-D through a grading system.

Chapter 2: Literature Review

A comprehensive literature review of the related topic was performed. The databases such as Cochrane Library, CINAHL, PUBMED, and MEDLINE were searched using keywords such as dialysis, home dialysis, screening tools for home dialysis, and MATCH-D. The search was limited to English writing and publications from January 2015 to March 2022. Studies were selected based on their relevance to the topic.

Benefits of Home Dialysis

Bonenkamp et al. (2020) conducted a systematic review and meta-analysis of the health-related quality of life (HRQoL) as an essential outcome for dialysis patients. The study concluded a marginally better physical HRQoL for home dialysis patients but no difference in mental HRQoL compared to incenter hemodialysis. One limitation of this study was the high heterogeneity or excessive clinical diversity in the included studies.

Miller et al. (2018) reviewed 44 publications comparing in-center hemodialysis to HHD for cardiovascular outcomes, hospitalization, nutrition, quality of life, and survival.

Their findings showed that about 60% of publications reviewed demonstrated cardiovascular, nutrition, quality of life, and survival improvements; however, there is no difference in hospitalization between the two types of dialysis. The study concluded that home hemodialysis (HHD) is not for all patients, but incidence can be higher than the 1.8% of HHD patients in the US.

Rydell et al. (2019) analyzed the long-term effects of home hemodialysis. The study yielded 152 patients initially in home hemodialysis, considering their age and comorbidities and matching them to in-center hemodialysis and PD. They concluded that HHD, when used as an initial treatment option showed improved long-term patient survival compared with the other two types of dialysis and that the survival advantage persisted after matching and a higher transplantation rate.

Krahn et al. (2019) conducted a population-based study on patients 18 years and older between 2006 to 2014 in Ontario, Canada, to identify the economic and health consequences of choosing home dialysis. Their study showed that the mean 30-day cost of dialysis in PD was 50% less and 64% less on HHD than on in-center hemodialysis. The nine-year cohort study concluded that home dialysis is more cost-effective than incenter hemodialysis.

Shared Decisions and Nurses Role in Optimizing Home Dialysis

Truglio-Londrigan and Slyer (2018) conducted a systematic literature review on shared decision-making between patients and nurses. Shared decision-making was defined as a partnership between the nurses, providers, and patients, encouraging a collaborative mutual exchange of information and discussion. The study aimed to do an integrative review to understand the comprehensive process of shared decision-making from the patient's perspective and healthcare provider in all healthcare settings, which leads to creating a common language and appreciation that could be used in nursing practice. The quantitative, qualitative, and theoretical studies were reviewed, totaling fifty-two articles published between 1997 and 2016. The study provided a comprehensive understanding of shared

decision-making between the nurse and the patient. It described that shared decision-making is a comprehensive process during each ongoing encounter. The study highlighted the importance of nurses paying attention to what patients consider the context: the patient's family, caregiver, home, community support, time, and access to resources.

Molina-Mula and Gallo-Estrada (2020) conducted a phenomenological qualitative study to analyze the nurse-patient relationship and explore its implications for clinical practice and impact on quality of care and patient decision-making capacity. The study involved thirteen in-depth interviews with nurses and 61,484 nursing records from internal medicine and specialties departments in a general hospital from 2015–to 2016. The study concluded that an equal distribution of power allowed patients to acquire decisions on health and disease processes with the advice of professionals.

Hirpa et al. (2020) conducted a study to evaluate patients' priorities in ambulatory care consultations based on five key health service delivery domains: patient-physician relationship, personal responsibilities, tests and procedures, medications, and healthcare cost. Using the survey, "What Matters to You," the study aimed to determine if there were associations between patient priorities and if Patients' demographics could be used as potential predictors to identify patients' priorities and choices. The study identified that the patients ranked healthy lifestyles, shared decisions for medications, tests, procedures, humanistic qualities of physicians, and knowledge about insurance coverage as their priorities. Patients who were more educated and those with private insurance did not rank the physician's humanistic qualities high, but they, along with younger participants, ranked a healthy lifestyle as a top choice. Shared-decision making was ranked as necessary by those with more education. The study concluded that the things that matter most to patients help create a patient-centered matter based on value-care models. The patient demographics can predict their priorities and the qualities they value.

Jayanti et al. (2017) surveyed the staff response in five study centers in the United Kingdom regarding their beliefs and practices toward home dialysis and the barriers affecting its implementation. The study was also a part of the Barriers to Successful Implementation of Care in Home Hemodialysis (BASIC-HHD), an observational study of patient and organizational factors affecting home HD uptake. 104 staff were approached to complete the online survey between May and July 2013. Twenty questions were included in the survey using the five-point Likert scale. Their study had a 46% response rate, mainly among experienced hemodialysis practitioners. The study's findings were that most believed in the benefits of home HD therapy, the staff knowledge and bias influenced the offer of home HD therapy, dialysis education lacked clarity and uniformity, and there was a need for better home training set-up to do self-care hemodialysis. They concluded there were differences in the attitudes and practices between low and high prevalence centers but addressing the staff concerns can address the challenges in growing the home dialysis program.

Shamblen et al. (2018) surveyed the application of TPB in 288 health care professionals exposed to the Veterans Health Administration program. In their study, a survey questionnaire was done prior to and immediately after the program and three months later to identify the factors with the strongest predictors of intentions that could be used in clinical practice. Their findings suggested that the TPB provided a reasonable integration of integrated medical approaches into clinical practices, with self-efficacy and perceived preparedness as the strongest predictors of intentions.

Strategies for Improving Home Dialysis

El Shamy et al. (2021) retrospectively studied patients referred for CKD education in a single dialysis center between January 1, 2019, and March 31, 2020. One hundred sixty-seven patients were enrolled in their study with mean age of 60 years, predominantly male and African American. Their study showed that 74% who attended CKD education chose home dialysis. They concluded that three barriers limit patients from choosing not to be on

home dialysis: lack of space for dialysis supplies, lack of caregivers, and poor surgical candidacy for home dialysis.

Horntvedt et al. (2018) conducted a deductive and thematically analysis of six qualitative and one mixed-method study on how well nurses are prepared to apply evidence-based practice (EBP) to ensure patient safety and identify teaching strategies for EBP knowledge and skills. EBP has been defined as structured queries that are trustworthy and have been critically appraised in the research for their reliability, validity, and applicability to a clinical context. The strategies identified were interactive teaching strategy, interactive and clinical integrated teaching strategies, learning outcomes from using EBP, barriers such as challenging collaborations, limited awareness of EBP principles, and poor information literacy skills. The study further concluded the need for more qualitative research on interactive and clinically integrated teaching strategies to enhance EBP in nursing education.

Paterson et al. (2021) conducted a retrospective cohort study of adults on HHD between January 2013 to June 2020 to identify the reasons for HHD training failure, withdrawal, and timing. One hundred sixty-seven patients were enrolled in the study. The researchers concluded that the median time for technique failure was 17 months, while withdrawal was 23 months. The reasons for withdrawal after the training were transplantation, death, and technique failure. Technique failure was because of medical, psychological, and safety reasons.

Jacquet and Trinh (2019) examined the associated burden reported by patients and caregivers doing home dialysis. A critical appraisal tool was used to identify related literature and recurring issues. Their findings were that home dialysis has been associated with burdens like burnout and psychological stress in specific populations, but some strategies can alleviate the burden, particularly when identified early. They recommended improving patients' priorities and strategies that improve their quality of life.

Oliver and Quinn (2015) explained that older individuals are less likely to have the opportunity to complete an assessment because of their unstable medical conditions, consideration for palliative care, or reluctance to change once on in-center hemodialysis. Early assessment of their condition and regular sit-down rounds with an interdisciplinary team could help minimize missed opportunities. Assessment should not be limited to reviewing their medical conditions but should include physical, cognitive, and social factors that may represent barriers to self-care dialysis. Other tools Method to Assess Treatment Choices for Home Dialysis (MATCH-D) to assess patients' eligibility for home dialysis are formal geriatric assessments during PD training to identify unrecognized barriers and the need for assisted PD. Assessing older patients' eligibility, identifying barriers to PD, and having adequate support are essential components in creating, maximizing, and effectively using PD.

Conceptual Framework

Change is needed to improve the number of patients choosing to be on home dialysis, and nurses have a vital role in ensuring effective change and sustaining the needed change. Using evidence-based practices such as the Theory of Planned Behavior as the theoretical framework and MATCH-D as the screening tool can help improve patients' health-related quality of life on dialysis. In shared decisions like home dialysis, understanding the nurses' knowledge is essential for collaborative efforts with optimal outcomes. Current practices do not involve screening tools to assess patients' candidacy for home dialysis. This project aimed to survey hemodialysis nurses working in outpatient hemodialysis on their knowledge and proficiency in the application of screening tools and assess the candidacy of patients dialyzing in outpatient clinics to home. The complexity of healthcare calls for interprofessional collaboration to improve and sustain the best outcomes for safe and high-quality patient care. Lewin's Theory of Planned Change has been chosen as the conceptual framework of this DNP project.

Lewin's theory proposes that the individual's actions are influenced by restraining forces or obstacles that counteract the driving forces for change which leads to keeping the practice a status quo, making the tension between the driving and restraining maintain equilibrium (Wojciechowski, 2016). Lewin's Theory of Planned Change includes a three-step process for successful change: (a) unfreezing, (b) moving, and (c) refreezing (Shirey, 2013). Wojciechowski (2016) described the three-step process: unfreezing or creating problem awareness allows people to let go of old ways that challenge the status quo. Moving or changing means looking for alternatives that demonstrate the benefits of change. Refreezing is incorporating the new practice and change so it can become a habit and resists further change. Applying Lewin's Theory of Planned as the conceptual framework of this DNP project meant that unfreezing is educating the nurses about MATCH-D in screening patients for home dialysis. Moving is screening and assessing appropriate candidates for home dialysis. Refreezing is integrating the use of screening tool during the 30 and 90 days and annual assessments of patients.

Methodological Framework

The methodological frameworks are essential in a research project since they enhance the quality of research, improve the robustness and trustworthiness of reporting, and maintain consistency in the approaches used in the research (McMeekin et al., 2020). The methodological framework to be used in completing this DNP project has been divided into five stages: (a) identifying the research question; (b) identifying relevant studies in the last seven years; (c) creating the appropriate methodology; (d) collecting the data, summarizing, and reporting the data; and (e) data management.

The first stage identifies the primary research question, identifying if a patient's candidacy for home dialysis can be determined using the MATCH-D screening tool and allowing the patients to explore if home dialysis can be an option. The second stage is the literature search, conducted in December 2021 using Medical Subject Headings (MeSH)

terms such as dialysis, home dialysis, screening tools for home dialysis, and MATCH-D.

Preferred Reporting Items for Systematic Reviews and Meta (PRISMA) (Appendix C) were

chosen in systematic reviews of past literature reviews and related studies to improve the

standardization of systematic reviews, analysis, and data collection reporting (Ahn and Kang,

2018). The PRISMA 2020 checklist has seven sections and 27 items to help plan and conduct

systematic reviews to capture information accurately (Page et al., 2021). Fourteen studies

were included because of their results, similarity in the theoretical and methodological

framework, publication year, and because it is written in English. The third stage is creating

the appropriate methodology for this project, identifying sample participants, and defining the

inclusion and exclusion criteria. The fourth stage involves data collection, data analysis, and

reporting findings and conclusions. The fifth or last stage is data management.

Conclusion

Four studies summarized the benefits of doing home dialysis in providing a higher

physical health-related quality of life (HRQoL) than in-center hemodialysis (Bonenkamp et

al., 2020) and the benefits from cardiovascular, nutrition, quality of life, and survival (Miller

et al., 2018). Home dialysis is also more cost-effective than in-center hemodialysis, showing

that the mean 30-day cost of dialysis in PD was 50% less and 64% less on HHD than on in-

center hemodialysis (Krahn et al., 2019). Additionally, when home dialysis was used as an

initial treatment option showed improved long-term patient survival (Rydell et al., 2019).

Five studies described the shared decision between patients and healthcare providers

and the role of nurses in optimizing home dialysis. Shared decision-making is the partnership

between the nurses, providers, and patients to create a collaborative mutual exchange of

information that could be used in nursing practice (Truglio-Londrigan & Slyer, 2018). The

study of Truglio-Londrigan and Slyer (2018) highlights the importance of nurses paying

attention to what patients consider the context: the patient's family, caregiver, home,

community support, time, and access to resources. Identifying the things that matter most to

patients helps create a patient-centered matter based on value-care models (Hirpa et al., 2020). The Theory of Planned Behavior (TPB) can provide the framework for integrating integrated medical approaches into clinical practices, with self-efficacy and perceived preparedness as the strongest predictors of intentions (Shamblen et al., 2018). Additionally, the equal distribution of power between healthcare providers and patient allows patients to acquire decisions on their health and disease processes with the advice of professionals (Molina-Mula & Gallo-Estrada, 2020) while addressing the staff concerns can help address the challenges in growing the home dialysis program (Jayanti et al., 2017).

Five other studies described strategies for improving home dialysis. Chronic kidney disease (CKD) education contributes to a higher incidence of home dialysis (El Shamy et al., 2021). Identifying the barriers in teaching strategies, such as challenging collaborations, limited awareness of evidence-based principles, poor information literacy skills (Horntvedt et al., 2018), and the barriers to home dialysis, such as the patient's lack of space for dialysis supplies, lack of caregivers, and poor surgical candidacy for home dialysis (El Shamy et al., 2021) or the reasons from withdrawal from HHD training (Paterson et al., 2021) are an important aspect of findings ways to increase home dialysis. The screening tool, such as Method to Assess Treatment Choices for Home Dialysis (MATCH-D), is a means to assess patients' home dialysis eligibility and identify unknown home modality risks (Oliver & Quinn, 2015). Alleviating the burden, particularly when identified early, can improve patients' priorities and strategies that improve their quality of life (Jacquet & Trinh, 2019).

Chapter 3: Methodology

This project aimed to identify if the knowledge about screening tool such as MATCH-D can improve the proficiency of hemodialysis nurses in patient selection for home dialysis. This DNP project included creating a comprehensive educational class about the screening tool to aid in patient selection for home. A nursing workflow was created to facilitate the screening process for home dialysis and transition candidate patients to a home dialysis setting.

Project Design

The project design for this DNP project is a survey. Surveys are designed to collect meaningful data to guide decision-making and improve practice (Robb & Shellenbarger, 2020). Surveys involve creating a process that can elicit maximum insights from the topic of interest to strategize better how to address a problem or improve quality outcomes. Surveys are helpful in testing comprehension and engagement (Conrad et al., 2015).

This project involved asking the nurses to complete a survey before and after the class. The pre-class survey was to identify whether the nurses knew about screening tools and if 15 patients were candidates for home dialysis. After the class, the post-survey using MATCH-D to 15 patients previously screened was administered. The nurse's proficiency in using MATCH-D was assessed using a grading system.

Sample and Setting

The sample size of this project was small. Six registered nurses working at the approved site were invited to the educational class; however, only five nurses could participate in the class and survey. There was no specific demographic information required to attend. Non-nursing staff was excluded from this project.

Once approval from the institutional review board (IRB) was obtained, a copy of the approval letter was provided to the Satellite Healthcare Research Team and Chief Medical Officer. A request was made to meet the clinic manager of the approved site, Satellite Menlo Park. This site is a free-standing hemodialysis clinic with the capacity to dialyze 50 to 60 patients per day. Each nurse was assigned to about 10 to 20 patients per day. The clinic operates for 12 to 14 hours daily, Monday to Saturday. The schedule was divided into three shifts; each shift could run patients for three to four hours. The clinic has 24 dialysis stations, including a designated area for positive hepatitis B virus patients. Each station has a hemodialysis machine and recliner chair. A patient care technician is assigned to three to four patients per shift, with primary responsibilities of cannulating, connecting, disconnecting the patients to the machine, and monitoring. This clinic requires two nurses daily since each nurse is assigned to ten to twelve patients per shift. Nurses oversee the activities in the treatment area and the dialysis of each patient. Other activities include putting on and taking off patients with catheters, medication administration, and reconciliation, reviewing and monitoring patient's laboratory studies, surveillance of patient's arteriovenous fistula and grafts, communicating problems with patient's healthcare providers, participating in quality improvement meetings, educating the patients, and others.

Instrumentation

MEI was created to help people with chronic diseases and help empower them by developing evidence-based patient and professional educational materials for The Centers for Medicare and Medicaid Services (CMS) Conditions for Coverage (Schatell, 2015). The MATCH-D was then developed by a multidisciplinary, international group of home dialysis experts to help providers and patients assess eligibility for home dialysis (Schatell, 2015). It was designed to assess whether a patient is clinically appropriate for home dialysis. MATCH-D describes the suitability criteria for home dialysis through three categories: "Strongly," "Encourage after assessing and eliminating barriers," and "May not be able to do." Using the

MATCH-D tool potentially predicts the likelihood of home dialysis success or warns the providers of concerns that need to be addressed before starting home dialysis. The screening tool can be used without prior permission from the developers.

A survey using MATCH-D was the instrument of this project. It was chosen since it can collect meaningful data to guide decision-making and improve practice in selecting patients for home dialysis. A pre and post-survey was administered to identify their familiarity with any screening tools and assess their proficiency in applying them. The pre-survey was administered to identify if nurses knew any screening tools, and a checklist of 15 patients was assigned to them on the day of the class, asking them to answer if these patients were candidates for home dialysis. After the class, each nurse was asked to do the post-survey, which is the application of MATCH-D on the 15 patients they assessed before the class.

Data Collection

The data collection tool was a survey. The survey was chosen to create a process that can help better strategize how to engage the nurses in the educational class, address the low incidence of home dialysis, and identify if MATCH-D can increase referral to home dialysis. The implementation included a pre-and post-survey. The pre-survey asked for the nurses' demographic information, if they are aware of any screening tool in patient selection, and identified if any of their assigned 15 patients are candidates for home dialysis using a "Yes" or "No" answer.

The post-survey is embedded in Step Two of the implementation phase. Step Two involved screening the patients for home dialysis using MATCH-D. After the PowerPoint presentation on MATCH-D and how it can be applied, each nurse was asked to complete the post-survey, which involved reassessing the 15 patients they had previously assessed using MATCH-D. The number of patients discussed with providers and referred to home dialysis clinics and the nurse's proficiency in the use of the screening tool were collected.

Data Analysis and Management

Microsoft Excel (MS Excel) was the tool for data analysis. MS Excel was chosen since it is a common data collection and statistical analysis program in biomedical research (Tanavalee et al., 2016). MS Excel's built-in pivot table for equations calculation was easy to use and visually understandable. Since the participants of this project were not expected to exceed six, the limitation in the analysis functions of MS Excel did not hinder data analysis as long as each cell was filled up or cells were selected manually for analysis. MS Excel aimed to answer the research question, "Will screening tools, such as MATCH-D, increase home dialysis referrals?"

Data management included handling and storing data correctly. The strategies for creating good data management started with understanding the data lifecycle. Data lifecycle included (a) creating or collecting data, (b) processing data from its rawest form to another form for analysis, (c) analyzing the data so that the results can be reproduced and published, and (d) preserving the data, and (e) giving access to data (Surkis & Read, 2015). Data management helped with the research's validity and reliability, improved the analysis's quality, prevented errors, and saved time. The implementation phase observed continuous monitoring and flexibility in scheduling the classes. The data was securely stored with encryption and password-protected but will be destroyed after three years.

Ethical Consideration

The ethical principles of the Aspen University IRB committee were followed in implementing this DNP project. Ethical principles include protecting the participants' life, health, dignity, integrity, confidentiality and privacy, and right to self-determination (Barrow et al., 2021). In promoting compliance, integrity, and ethical conduct, the three legal and ethical principles of beneficence, justice, and respect for a person's life (Yip et al., 2016), were adopted.

The participants were asked for the least amount of personal information to maintain confidentiality and privacy. Participation was voluntary, and no cash or incentives were provided. No funding from any public, commercial, or not-for-profit agencies was received. IRB denial included research misconduct, such as failure to acquire IRB approval before project implementation, neglecting to follow the ethical principles in research, and providing informed consent to participants. Publication of this project in a nephrology journal will be pursued without any participants' identifiers.

Internal and External Validity

Home dialysis improves patients' quality of life and survivability while providing more cost-effective treatment. Nurses have an essential role in selecting patients with the potential to do home dialysis; therefore, their knowledge about screening tools is an essential factor if the goal is to improve the incidence of home dialysis in the dialysis community and nationally. There were several internal and external issues in this project.

Internal validity describes the truth in the study and is shown in the sample participants, the approved site, and the instrumentations of this project. In the sample of participants, nurses are from hemodialysis clinics and not from other fields. The approved immersion site is also a clinic providing dialysis and medical practitioners with expertise in home dialysis developing MATCH-D (Schatell, 2015).

External validity refers to the adaptability of the result of this study to other populations. The sample of participants was small and limited to a single dialysis clinic. However, the results of this project can be helpful to other nurses who may not be familiar with the screening process and to those dialysis clinics that do not use any screening tools or have the process of transitioning patients from clinics to home. The use of MATCH-D allows for assessing potential patient candidates for home dialysis after barriers have been identified.

Conclusion

The project design and instrument used for this DNP project is a survey. The survey was chosen to create a process that can elicit insights to strategize a workflow that can improve quality outcomes. The survey also tested nurses' comprehension and engagement in screening patients for home dialysis. Five nurses participate in the class and survey. The nurses were asked to complete a survey before and after the class. The pre-class survey was to identify whether the nurses knew about screening tools and if any of their 15 patients were candidates for home dialysis. After the class presentation, each nurse was asked to assess their previously 15 patients using the MATCH-D. MATCH-D describes the suitability criteria for home dialysis through three categories. The nurse's proficiency in using MATCH-D was assessed using a grading system. MS Excel was the tool for data analysis that aimed to answer the research question, "Will screening tools, such as MATCH-D, increase home dialysis referrals?" Throughout the project's implementation, the Aspen University IRB committee's ethical principles were followed, including protecting the participants' life, health, dignity, integrity, confidentiality, and privacy, and right to self-determination.

Chapter Four: Results and Discussion of Findings

Patients on dialysis have a higher mortality rate (Murdeshwar & Anjum, 2021) and poorer health-related quality of life than those with diabetes and hypertension (Chen et al., 2016). Additionally, the healthcare-related expenses in maintaining patients on dialysis are high, adding to the healthcare system's financial burden (Wang et al., 2016). There are several initiatives passed in the United States (US) to address the quality outcomes and high costs of dialysis-related expenses. One initiative is the Advancing American Kidney Health initiative (AAKHI). AAKHI established a goal that 80% of patients with kidney failure will be treated with either home dialysis or a kidney transplant by 2025 (Knight, 2020). Therefore, creating a treatment plan to meet this demand will be crucial. Home dialysis can reduce the mortality rates of patients on dialysis and improve the quality of their lives while being more economical; however, in the US, most patients go to dialysis clinics and not home (Robinson et al., 2016). According to Jacquet and Trinh (2019), patient selection is one strategy in building a successful home hemodialysis program.

This project involves teaching the nurses the use of MATCH-D and how the screening tool can be used to evaluate the patients receiving hemodialysis if they are potential candidates for home dialysis. The nurses were asked to complete a survey before and after the class. The pre-class survey identifies whether the nurses know of any screening tools and evaluates the 15 of their patients if they are candidates for home dialysis. The post-survey consists of assessing the same list of patients using MATCH-D to identify their candidacy for home dialysis using the three criteria and assessing the nurse's proficiency in using MATCH-D. The educational class was repeated three times to accommodate the nurse's schedule. The purpose of this section is to present the collected data, interpret the results, relate the findings to the project's purpose, and describe how this project met the objectives.

Summary of Methods and Procedures

In completing this DNP project, five stages were followed: (a) identifying the research question; (b) identifying relevant studies in the last seven years; (c) creating the appropriate methodology; (d) collecting the data, summarizing, and reporting the data; and (e) data management. The first stage identified the primary research question, if the patient's candidacy for home dialysis can be determined using the MATCH-D screening tool and if this can increase the home dialysis incidence. The second stage is the literature search, conducted in December 2021 using Medical Subject Headings (MeSH) terms such as dialysis, home dialysis, screening tools for home dialysis, and MATCH-D. Preferred Reporting Items for Systematic Reviews and Meta (PRISMA) was used to improve the standardization of systematic reviews, analysis, and data collection reporting (Ahn & Kang, 2018). Fourteen studies were included because of their results, similarity in the theoretical and methodological framework, publication year, and because they were written in English. The third stage is creating the appropriate methodology for this project, identifying sample participants, and defining the inclusion and exclusion criteria. The fourth stage involves data collection using a pre-and post-survey, analysis, and the findings and conclusion reporting. The fifth or last stage is data management.

The implementation process was for four weeks. The acronym "ESCORT" represents the six steps of a nursing workflow used in the implementation process. Each letter in "ESCORT" represents the following steps:

Step One: E: Educating the nurses about the MATCH-D

Step Two: S: Screening patient's eligibility for home dialysis

Step Three: C: Communicating with patient's providers

Step Four: O: Orienting the patient to home dialysis

Step Five: R: Referral to a home dialysis clinic

Step Six: T: Transitioning care to home dialysis.

The first week was focused on Step One and Two. Step One involved educating the nurses and screening the patients. Three classes were provided to the staff. In each class, pre-and post-surveys were administered. The pre-survey was administered to identify the participant's demographic information, if nurses know any screening tools for patient selection for home modality, and if any of their 15 patients were potential candidates for home dialysis. The post-survey was administered to assess the proficiency of nurses in the application of MATCH-D and identify who among their list of 15 patients were potential patients for home dialysis with the MATCH-D screening tool.

The second and third weeks were allotted to implement Step Three, Four, and Five of the nursing workflows. Step Three involved communicating with the patient's healthcare provider about the 43 patients identified as potential home candidates. Out of these patients, 12 were selected by the patient's nephrologists and advance practice provider as more appropriate patients for the home program based on the patient's medical history, adherence to dialysis, medications, and social support. Step Four involved orienting the 12 patients about home dialysis. Step Five involved referring seven patients who agreed to proceed to Wellbound home clinics for further discussion about home dialysis and evaluation. The fourth or last week was intended to transition patients to home dialysis. This included having a warm hand-off report of the patient from the clinic dialysis team to the home team; however, for various reasons, such as a patient request for a later appointment in Wellbound and limited available slots for new referrals in Wellbound and vascular clinics, no patient is expected to transition to home dialysis within the timeframe of this project.

In implementing these six steps, the ethical principles were followed. Ethical principles included the responsibility to protect the participants' life, health, dignity, integrity, confidentiality, and privacy, and the right to self-determination. The data was securely stored with encryption and password-protected, then will be destroyed after three years. The

participants' information was kept confidential, and the publication of this project in a scholarly journal will be pursued without any participants' identifiers.

Summary of the Sample and Setting Characteristics

The sample size of this project was small as there were only six nurses in this dialysis facility. Five nurses attended the educational class. The demographic data describes the nurse's age, gender, ethnicity, the highest degree of completed schooling, workplace setting, and if they are aware of any screening tools in patient selection for home dialysis.

Table 1

Demographic characteristics of participants (nurses in hemodialysis clinic)

Demographics	Responses	Number (Percentage)	Average
Age	49 to 71		59 (median)
Gender	Female	3 nurses (60%)	
	Male	2 nurses (40%)	
Ethnicity	Asian	5 nurses (100%)	
Highest education	Bachelor's degree	4 nurses (80%)	
	Master's degree	1 nurse (20%)	
Current workplace	hemodialysis clinic	3 nurses (60%)	
	Both inpatient and hemodialysis clinic	2 nurses (40%)	
Aware of screening tools in patient selection for home	None	5 nurses (100%)	

Note. This table describes the demographics of the nurses who participated.

The demographic information showed that the median age is 59 years old, mixed male and female, and of Asian ethnicity. Four have bachelor's degrees, and one with a master's in science in nursing. Two nurses work in the hospital and clinic, while the rest are in the hemodialysis clinic. None of the nurses knew any screening tool in patient selection for home dialysis.

Results

A total of 59 patients were evaluated for their candidacy for home dialysis. In the pre-survey question, "Are any of these patients' potential candidates for home dialysis?" participants answered "Yes" on 11 patients (19%). In comparison, participants answered that 48 patients (81%) were "No" or not a candidate for home dialysis. In the post-survey, the same 59 patients in the pre-survey were assessed using the MATCH-D. Participants were asked to evaluate patients based on the three suitability criteria for home: "Strongly Encouraged," "Encouraged after Assessing and Eliminating Barriers," and "May Not Be Able to Do." The participants answered that 14 patients (24%) would be "Strongly Encouraged," 32 patients (54%) would be "Encouraged after Assessing and Eliminating Barriers," and 13 patients (22%) "May Not Be Able to Do" home dialysis.

Table 2

Result of the pre-and post-survey

Pre-survey Candidate for home dialysis n=59 patients		Post-survey Using MATCH-D n=59 patients		
Yes	No	Strongly Encouraged	After Assessing and Eliminating Barriers	May Not Be Able to Do
11	48	14	32	13

Note. This table represents the result of the pre-and post-survey.

The project had a good response from the staff. Nine staff attended the class, but four were excluded based on the inclusive criteria, and their responses were not calculated in the survey. Five nurses participated in the class and completed the surveys. Each nurse was asked to assess 15 patients twice, the first before the class and the second time using MATCH-D. Sixteen patients appeared twice on the nurse's list because of their shared roles in patient care. In assessing the nurse's proficiency in using MATCH-D, all nurses scored at least 80%, concluding that they are proficient in using the screening tool.

Figure 1

Implementation process and the results of the pre and post surveys
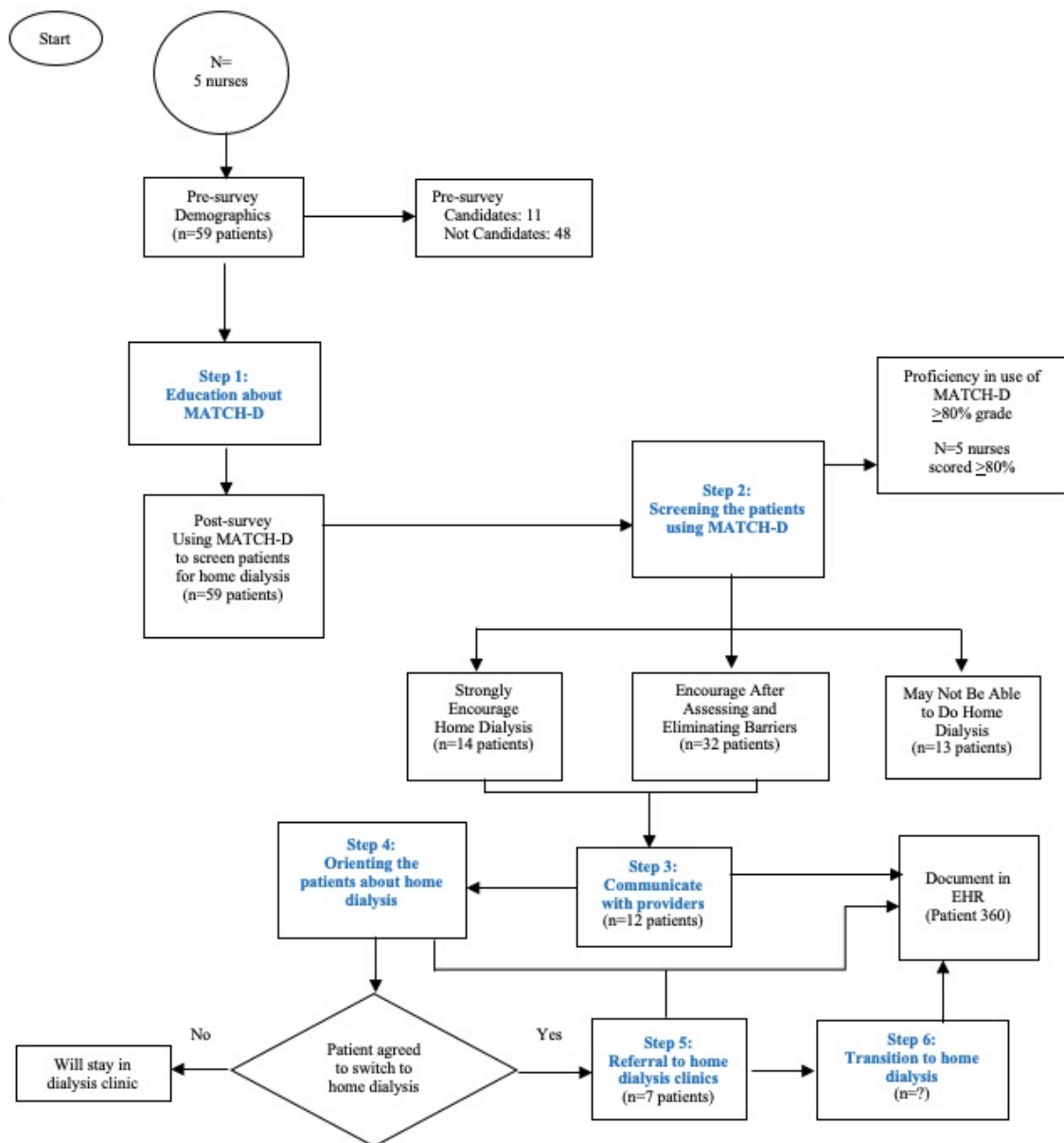
Note. This flowchart represents the workflow in the implementation process and the findings.

The 46 patients that the nurses assessed as potential candidates under the "Strongly Encouraged" and "Encouraged after Assessing and Eliminating Barriers" criteria for home dialysis were discussed with the patient's nephrologist in the second week of the implementation. Twelve patients were identified as more appropriate candidates by the patient's healthcare providers. Seven patients were referred to a home dialysis educator. The home dialysis team will further evaluate the patient for their physical assessment, competency for self-care, establishing social support, and scheduling a home visit.

The findings in this project met the objectives within the selected time. This DNP project increased the referral of patients to home dialysis using the MATCH-D. In addition, the nurses' proficiency in using MATCH-D was assessed.

Implications for Nursing Practice

Conventional hemodialysis has been associated with a higher risk for cardiovascular problems and mortality caused by intradialytic hypotension from intravascular fluid depletion, rapid fluid ultrafiltration, and an interdialytic period of no dialysis. Home dialysis can create a better health-related quality of life that is more cost-efficient. The nurses' knowledge about home dialysis can have a considerable role in promoting this type of dialysis therapy. Their individual decision to promote home dialysis can be predicted by their intention to engage in that behavior, reflected in the TPB, which proposes that the intentions presented by perceived behavior could lead to goal-specific actions such as improving the incidence of home dialysis in the dialysis community and nationally.

The involvement of nurses in initiatives that have better outcomes creates an environment aligned with the Advancing American Kidney Health Initiative (AAKHI) goal of increasing home dialysis growth in the United States (US). Nursing practices where they can potentially increase the incidence and prevalence of homes can create leadership roles that promote quality improvement measures and clinical practice guidelines that are evidence-based and measurable. Nurses will then be in a position to educate the public about home dialysis. Home dialysis can empower the patient for self-dialysis, lessening the nursing shortage demand. Increasing home dialysis can create more job opportunities for new graduate nurses or those considering switching to nephrology.

Conclusion

This DNP project provided an educational class about MATCH-D and how it can be used in selecting patients for home dialysis. The survey was the instrument for patient selection and assessing the nurse's proficiency in MATCH-D. The utilization of the tool

supported nurses applying it to determine patients that could be candidates for home dialysis instead of hemodialysis in clinics, thereby providing patients with an additional outcome option for their ESRD. The project showed that using MATCH-D increased the number of potential candidates for home dialysis.

Chapter Five: Discussions and Conclusion

Patients with kidney failure have a poorer health-related quality of life than those with other chronic conditions such as diabetes and hypertension (Chen et al., 2016). Patients on dialysis have a higher mortality rate from the build-up of toxins, fluids, and blood infections from dialysis catheters (Murdeshwar & Anjum, 2021). The cost of services related to kidney failure and maintenance dialysis has been an upward trend adding to the healthcare system's financial burden (Wang et al., 2016). One goal to address this problem is the creation of the Advancing American Kidney Health Initiative (AAKHI), which established

that 80% of ESRD patients will be treated with either home dialysis or a kidney transplant by 2025 (Ahmad et al., 2020). Creating a treatment plan that is sustainable and with an excellent outcome is essential in managing the care of patients with kidney failure.

Home dialysis has many benefits, such as improving the health-related quality of life and survival advantages. One strategy for increasing home dialysis referrals is patient selection. This project involved teaching the nurses in a freestanding clinic about a screening tool for home dialysis called Method to Assess Treatment Choices for Home Dialysis (MATCH-D). The focus was to teach nurses how MATCH-D could be used in identifying who are the potential candidates for home dialysis. Fifty-nine patients were evaluated using the standard pre-survey assessment and MATCH-D as a post-survey screening tool. At the end of the implementation of the developed nursing workflow, seven patients were referred for home dialysis.

Improving the patient selection for home dialysis has been chosen in this project as a strategy for improving home dialysis incidence. According to Rioux et al., 2015, patient selection is crucial to building a successful home hemodialysis program that enriches the process of patient selection, education, and training in complex medical procedures such as home dialysis. In assessing the patient, a screening tool can objectively guide the in-center hemodialysis nurses in selecting an appropriate candidate for home regardless of their limited exposure to home dialysis. This project will determine the clinical question of whether the use of screening tools such as MATCH-D could increase the referral of patients to home dialysis.

Discussion of Findings and Best Practices

The staggering spending on healthcare in the United States (US) creates an opportunity to find a model of care that is more cost-effective, provides better quality of life, and contributes to people living longer. The Advancing American Kidney Health Initiative (AAKHI) was created with the primary objectives of increasing home dialysis utilization and

sustaining it, and analyzing areas of strengths and weaknesses of home dialysis programs (Ahmad et al., 2020). One strategy is to improve nurse engagement.

Nurses have an essential role in patients' decisions about their health. A critical objective in nursing practice is to increase the patient's health and well-being, prevent death, and obtain the best possible physical and social rehabilitation for patients (Castro et al., 2002), which has been more evident since the inception of the end-stage renal program (ESRD) program. Nurses' roles have evolved to being educators, facilitators, and advocates for patients and their caregivers. However, these roles require new or enhanced knowledge, skills, and attitudes as the cost of managing patients on dialysis and the population with kidney failure increases. Screening tools can be a resource to identify appropriate patients and those at high risk for complications. MATCH-D was the screening tool used in the project. Current practice on patient selection for home dialysis is based on referrals from nephrologists or during care conferences. These limited encounters may not be enough if there is considerable interest in promoting home dialysis. Nurses then can fill the gap by ensuring patients are appropriately assessed for home dialysis and referral made at a reasonable time. Screening tools like MATCH-D helped the nurses assess the patients objectively for home modality regardless of their preconceived idea of home dialysis (Phillips et al., 2015; Tennankore et al., 2013). The nurses' actions to participate in the project supported the principles of the behavioral theory of planned behavior (TPB). The TPB reflected that the chosen perceived behavioral control, a screening tool, could guide the nurses in patient selection for home dialysis.

The project design and instrument in this project is a survey. The survey was chosen because of its capability to collect meaningful data that can guide decision-making and improve practice (Robb & Shellenbarger, 2020) which was observed in the implementation of the project. The survey helped test the comprehension and engagement of the nurses in assessing appropriate candidates for home dialysis. The survey provided the data on the

number of patients identified and who the patients are for home dialysis so it can be communicated to the healthcare providers. The survey measured the nurses' proficiency in MATCH-D using a grading system. Microsoft Excel (MS Excel) was the tool for data analysis since it is a typical statistical analysis program in biomedical research (Tanavalee et al., 2016). The sample size of this project was small. The demographic information showed that the median age is 59 years old, mixed male and female, and of Asian ethnicity. Four have bachelor's degrees, and one with a master's in science in nursing. Two nurses work in the hospital and clinic, while the rest are in the hemodialysis clinic. None of the nurses knew any screening tool in patient selection for home dialysis.

A total of 59 patients were evaluated for their candidacy for home dialysis. In the pre-survey question, 11 patients were potential home dialysis candidates but were not interested in switching to home dialysis. In the post-survey, 14 patients were selected for "Strongly Encouraged," 32 patients who would be "Encouraged after Assessing and Eliminating Barriers," and 13 patients for "May Not Be Able to Do" at home dialysis. The project findings showed a higher referral rate of patients for home dialysis compared with the standard assessment of identifying patients by merely a "Yes" or "No." A total of 46 patients were identified by the nurses as potential candidates under the "Strongly Encouraged" and "Encouraged after Assessing and Eliminating Barriers" categories in MATCH-D. Twelve patients were identified as more appropriate candidates after the secondary assessment, and after discussion of home dialysis with patients, seven of the twelve patients agreed to proceed with referral to a home dialysis educator. The findings in this project answered the clinical questions that using MATCH-D can increase the referral to home dialysis. Additionally, all nurses were proficient in MATCH-D using the grading system.

Implication for Practice and Future Projects

Future projects would mean improving how patients are assessed for home dialysis. The by-referral from the nephrologists will not be sufficient in meeting the AAKHI goal.

Home dialysis has many clinical outcomes, and the cost of care is lower than in-center dialysis. Nurses who spend the most time with the patient will have to take a more active role in patient selection and education on home dialysis. Incorporating the screening tool in the nurses continuing education can provide additional information about home dialysis, thus increasing their confidence in promoting it.

Home dialysis could be a part of home health service, similar to assisted programs in Canada. In 2017, peritoneal dialysis (PD) in Canada was up to 27% in patients 65 and older, compared to seven percent in the US (Oliver & Salenger, 2020). The temporary assistance from the home health team can make a difference in keeping a patient at home rather than switching them immediately to outpatient hemodialysis clinics. Home health nurses could be educated and trained about home dialysis to supplement and provide the assistance needed until the patient is back doing self-dialysis. The nurses' knowledge about home dialysis can have a considerable role in promoting this type of dialysis therapy. Their individual decision to promote home dialysis can be predicted by their intention to engage in that behavior, reflected in the TPB, which proposes that the intentions presented by perceived behavior could lead to goal-specific actions such as improving the incidence of home dialysis in the dialysis community and nationally.

The involvement of nurses in initiatives that have better outcomes creates an environment aligned with the Advancing American Kidney Health Initiative (AAKHI) goal of increasing home dialysis growth in the United States (US). Nursing practices can potentially increase the incidence and prevalence of homes and create leadership roles that promote quality improvement measures and clinical practice guidelines that are evidence-based and measurable. Nurses will then be in a position to educate the public about home dialysis. Home dialysis can empower the patient for self-dialysis, lessening the nursing shortage demand. Increasing home dialysis can create more job opportunities for new graduate nurses or those considering switching to nephrology

Plan for Dissemination

Dissemination of the research findings is an integral part of any research project. Disseminating and communicating what was known in the project helps enhance the visibility of the outcome of the research, create public engagement, improve the confidence of the audience in the research, and ensure that the conducted project has an impact socially, politically, and economically (Marín-González et al., 2017). Depending on the timing, plans to disseminate the project will be through online publication or face-to-face poster presentation. Online publications will be in the DNP repository and professional organizations like the National Kidney Institute (NKI), Home Dialysis Central (HDC), or the International Journal of Nursing and Health Care Research.

Sustaining Change

Two initiatives have been proposed and incorporated into the current practice to sustain the change from this project. The first is in the staff orientation of new nurses. The screening tool on patient selection for home dialysis has been added to the orientation checklist for the new employee. The second change model is on the patient assessment. Medicare's Final Rule of the Conditions for Coverage requires that the initial comprehensive assessment of new patients is completed within 30 calendar days or after 13 outpatient hemodialysis sessions and at least annually for stable patients ("Medicare and Medicaid programs; conditions for coverage for end-stage renal disease facilities. Final rule," 2008). The screening tools will be used to assess patient candidacy for home modalities on these scheduled comprehensive assessments, which can help the nurse objectively evaluate patients if they are appropriate for the home. The diagram below represents the sustainability plan.

Figure 2

Sustaining the changes
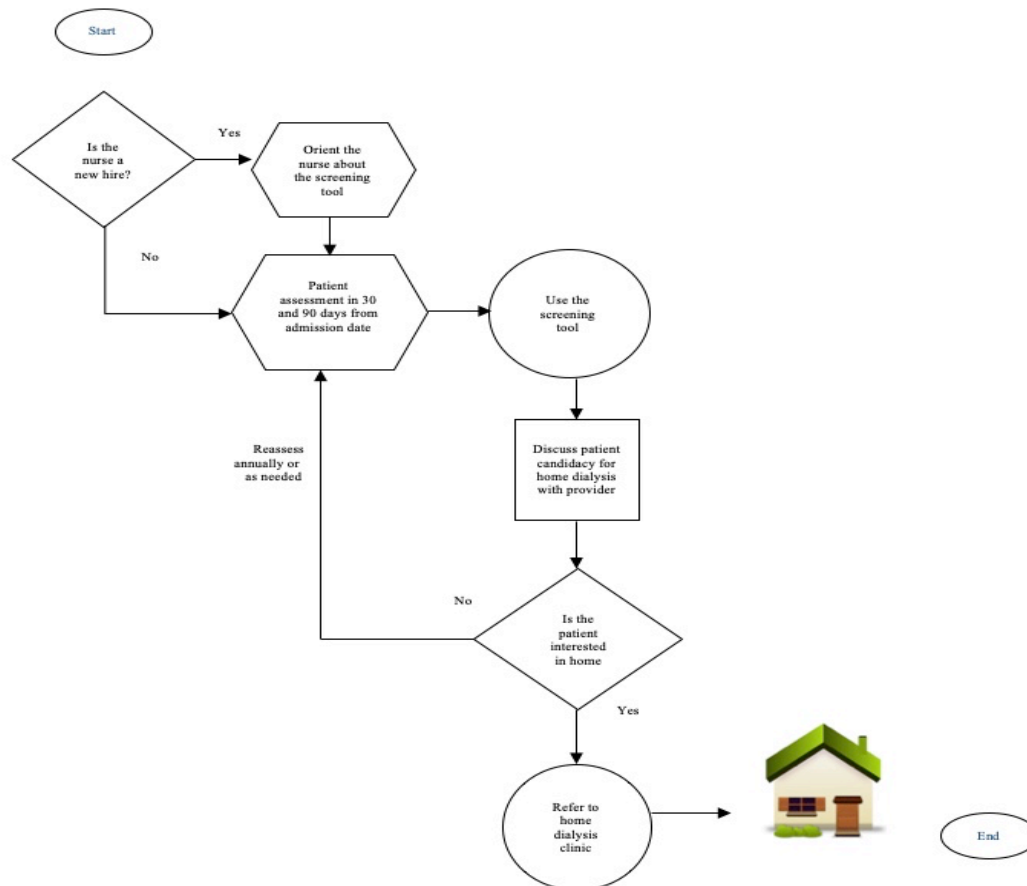
Note. This diagram describes the initiatives proposed to sustain the change after implementation.

Recommendations for Future Projects and Practice

The recommended future projects and practices are focused on improving patients' lives with kidney failure and living longer while being cost-effective in managing the health-related care in dialysis. The two recommendations for increasing the incidence of home dialysis are identifying the roles of the multidisciplinary team (MDT) and the impact of lower socioeconomic status on the patient's choice of whether to dialyze at home or clinic. The primary goal of a multidisciplinary team (MDT) is to bring together a group of healthcare professionals from different fields in order to identify the best treatment plan for the patient (Taberna et al., 2020). In nephrology, the MDT consists of the nephrologist, nurses, patient care technicians (PCTs), social workers, and dietitians. The PCT, for instance, can help

decrease some load on the nurses, allowing them to devote more of their time to other higher functioning roles (Bennett & Dewald, 2017). Therefore, it is also essential to identify the PCT's attitudes and perceptions about the screening tools for patient selection toward home dialysis, which could not be explored in the project based on the inclusive criteria. Recommendations, therefore, for future research are to include other non-nursing MDT members.

Another area that needs further discussion is identifying if the lower socioeconomic status contributes to not choosing home dialysis. Uninsured patients with end-stage renal disease can receive retroactive Medicare coverage for any essential services associated with home dialysis (Lin et al., 2020). The condition of coverage of the Centers for Medicare and Medicaid Services (CMS) of waiting until the first day of the fourth calendar month of dialysis was changed, delaying optimal ESRD care (Lin et., 2018) had been changed to incentivize early home dialysis use by extending coverage to the first day of dialysis for patients using home dialysis (Lin et al., 2020). The recent change in coverage applies to pre-dialysis services such as peritoneal catheter placements in the calendar month of dialysis (Centers for Medicare & Medicaid Services, 2017). However, home dialysis incidents remain low despite retroactive coverage in dialysis and related services. The study done by Shen et al. (2020) explores the association between socioeconomic status and peritoneal dialysis initiation. The study concluded that African American and Hispanic patients are leaning more towards hemodialysis in clinics. The various reasons include late referral to a nephrologist, lack of medical coverage at dialysis initiation, low incidence of high school graduates, and residence in a poorer community. Exploring these challenges can help create strategies focused on these reasons, which later could improve home dialysis incidence.

Actual DNP Essentials Met

Three DNP Essentials were met in the implementation of the project and are as follows:

Essential II: Organization and Systems Leadership for Quality Improvement and Systems Thinking

Choosing the optimal treatment option is a complex, shared decision between the patient and the healthcare providers. The use of screening tool increased the referral for home dialysis. Adopting systems thinking helped understand the current work process and design a nursing workflow that improves the screening process for patient selection. This project provided the platform to discuss who can be the appropriate patient for home dialysis. It also improved the interconnection with other multidisciplinary team members and helped address the complex decision of choosing the appropriate dialysis modality.

Essential VI: Interprofessional Collaboration for Improving Patient and Population Health Outcomes

Interprofessional collaboration means working with other disciplines to achieve a common goal. The increased incidence of home dialysis required collaboration between the nephrologist, nurses, patient care technicians, social workers, and patients. This collaboration was evident in the nursing workflow that was implemented. Collaborations with the nephrologists identified 12 patients suitable for home dialysis, where seven were referred to a home dialysis clinic. Therefore, the nurses' participation in this project improved patient and population health outcomes by educating patients about home dialysis, allowing them to identify if it is a better option.

Essential VIII: Advancing Nursing Practice

Improving patients' quality of life with kidney failure requires advanced nursing practice. Advancing the nursing practice was shown in incorporating the knowledge of a screening tool in the orientation of new hire nurses and assessment of patients, allowing patients to determine if home dialysis is a better option for them. Nurses have developed new roles and assumed greater responsibilities as educators, facilitators, and advocates for patients and their caregivers.

Conclusion

Dialysis has helped maintain life in those patients with kidney failure. In the last few decades, the number of patients on dialysis has increased, creating a significant burden in their lives and the healthcare system. Home dialysis has been shown to improve the quality of life and survivability that is cost-effective. One strategy for increasing home dialysis is patient selection.

The project involved teaching the nurses in a freestanding clinic about a screening tool for home dialysis called MATCH-D. The survey was used for data collection. The sample size of this project was small, with five nursing staff meeting the inclusion criteria. The nurses confirmed proficiency in the use of MATCH-D. Fifty-nine patients were initially evaluated for their candidacy for home dialysis using the standard assessment and MATCH-D. Twelve patients were selected after the secondary assessment with the healthcare providers, and seven patients agreed to proceed to be referred to a home dialysis clinic for further education and assessment. The study concluded that using MATCH-D increased home dialysis referral, which met the project's objectives.

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Weber, G. J., Pushpakumar, S., Tyagi, S. C., & Sen, U. (2016, November). Homocysteine and hydrogen sulfide in epigenetic, metabolic and microbiota related renovascular hypertension. *Pharmacological Research, 113*(Pt A), 300-312. https://doi.org/10.1016/j.phrs.2016.09.002

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Yip, C., Han, N., & Sng, B. L. (2016). Legal and ethical issues in research. *Indian Journal of Anaesthesia, 60*(9), 684-688. https://doi.org/10.4103/0019-5049.190627

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Appendices

Appendix A

Pre-survey Questionnaire

The pre-survey asked for the nurses' demographic information, if they are aware of any screening tool in patient selection, and identified if any of their assigned 15 patients are candidates for home dialysis using a "Yes" or "No" answer.

Pre-Survey   1

DNP Project:

The Use of Screening Tool in Patient Selection for Home Dialysis

By Golda Nohay

Demographics:

What is your age? _____

To which gender do you most identify?
- o   Male
- o   Female
- o   Prefer not to answer

How would you best describe yourself?
- o   American Indian or Alaska Native
- o   Black or African American
- o   Hispanic, Latino, or of Spanish origin
- o   Asian or Asian American
- o   Caucasian
- o   Native Hawaiian or other Pacific Islander

What is the highest degree or level of school you have completed?
- o   Associate Degree
- o   Bachelor's degree
- o   Master's degree
- o   Doctoral degree

Are you currently working in? (check all that applies)
- o   In-center hemodialysis clinic only
- o   Working also in home dialysis
- o   Working as well in inpatient dialysis

Are you using any screening tools in patient selection for home dialysis?
- o   Yes
- o   No

Pre-Survey   2

Does any of these patients potential candidates for home dialysis?

Patient Name	Yes	No
1)		
2)		
3)		
4)		
5)		
6)		
7)		
8)		
9)		
10)		
11)		
12)		
13)		
14)		
15)		

Thank you for participating in this survey.

Appendix B

Post-survey Questionnaire

The post-survey was administered to assess the proficiency of nurses in the application of MATCH-D and identify who among their list of 15 patients were potential patients for home dialysis with the MATCH-D screening tool.

Appendix C

PRISMA 2020 Checklist

PRISMA was chosen in systematic reviews of past literature reviews and related studies to improve the standardization of systematic reviews, analysis, and data collection reporting. The PRISMA 2020 checklist has seven sections and 27 items to help plan and conduct systematic reviews to capture information accurately.

PRISMA 2020 Checklist

Section and Topic	Item #	Checklist item	Location where item is reported
TITLE			
Title	1	Identify the report as a systematic review.	
ABSTRACT			
Abstract	2	See the PRISMA 2020 for Abstracts checklist.	
INTRODUCTION			
Rationale	3	Describe the rationale for the review in the context of existing knowledge.	
Objectives	4	Provide an explicit statement of the objective(s) or question(s) the review addresses.	
METHODS			
Eligibility criteria	5	Specify the inclusion and exclusion criteria for the review and how studies were grouped for the syntheses.	
Information sources	6	Specify all databases, registers, websites, organisations, reference lists and other sources searched or consulted to identify studies. Specify the date when each source was last searched or consulted.	
Search strategy	7	Present the full search strategies for all databases, registers and websites, including any filters and limits used.	
Selection process	8	Specify the methods used to decide whether a study met the inclusion criteria of the review, including how many reviewers screened each record and each report retrieved, whether they worked independently, and if applicable, details of automation tools used in the process.	
Data collection process	9	Specify the methods used to collect data from reports, including how many reviewers collected data from each report, whether they worked independently, any processes for obtaining or confirming data from study investigators, and if applicable, details of automation tools used in the process.	
Data items	10a	List and define all outcomes for which data were sought. Specify whether all results that were compatible with each outcome domain in each study were sought (e.g. for all measures, time points, analyses), and if not, the methods used to decide which results to collect.	
	10b	List and define all other variables for which data were sought (e.g. participant and intervention characteristics, funding sources). Describe any assumptions made about any missing or unclear information.	
Study risk of bias assessment	11	Specify the methods used to assess risk of bias in the included studies, including details of the tool(s) used, how many reviewers assessed each study and whether they worked independently, and if applicable, details of automation tools used in the process.	
Effect measures	12	Specify for each outcome the effect measure(s) (e.g. risk ratio, mean difference) used in the synthesis or presentation of results.	
Synthesis methods	13a	Describe the processes used to decide which studies were eligible for each synthesis (e.g. tabulating the study intervention characteristics and comparing against the planned groups for each synthesis (item #5)).	
	13b	Describe any methods required to prepare the data for presentation or synthesis, such as handling of missing summary statistics, or data conversions.	
	13c	Describe any methods used to tabulate or visually display results of individual studies and syntheses.	
	13d	Describe any methods used to synthesize results and provide a rationale for the choice(s). If meta-analysis was performed, describe the model(s), method(s) to identify the presence and extent of statistical heterogeneity, and software package(s) used.	
	13e	Describe any methods used to explore possible causes of heterogeneity among study results (e.g. subgroup analysis, meta-regression).	
	13f	Describe any sensitivity analyses conducted to assess robustness of the synthesized results.	
Reporting bias assessment	14	Describe any methods used to assess risk of bias due to missing results in a synthesis (arising from reporting biases).	
Certainty assessment	15	Describe any methods used to assess certainty (or confidence) in the body of evidence for an outcome.	

PRISMA 2020 Checklist

Section and Topic	Item #	Checklist item	Location where item is reported
RESULTS			
Study selection	16a	Describe the results of the search and selection process, from the number of records identified in the search to the number of studies included in the review, ideally using a flow diagram.	
	16b	Cite studies that might appear to meet the inclusion criteria, but which were excluded, and explain why they were excluded.	
Study characteristics	17	Cite each included study and present its characteristics.	
Risk of bias in studies	18	Present assessments of risk of bias for each included study.	
Results of individual studies	19	For all outcomes, present, for each study: (a) summary statistics for each group (where appropriate) and (b) an effect estimate and its precision (e.g. confidence/credible interval), ideally using structured tables or plots.	
Results of syntheses	20a	For each synthesis, briefly summarise the characteristics and risk of bias among contributing studies.	
	20b	Present results of all statistical syntheses conducted. If meta-analysis was done, present for each the summary estimate and its precision (e.g. confidence/credible interval) and measures of statistical heterogeneity. If comparing groups, describe the direction of the effect.	
	20c	Present results of all investigations of possible causes of heterogeneity among study results.	
	20d	Present results of all sensitivity analyses conducted to assess the robustness of the synthesized results.	
Reporting biases	21	Present assessments of risk of bias due to missing results (arising from reporting biases) for each synthesis assessed.	
Certainty of evidence	22	Present assessments of certainty (or confidence) in the body of evidence for each outcome assessed.	
DISCUSSION			
Discussion	23a	Provide a general interpretation of the results in the context of other evidence.	
	23b	Discuss any limitations of the evidence included in the review.	
	23c	Discuss any limitations of the review processes used.	
	23d	Discuss implications of the results for practice, policy, and future research.	
OTHER INFORMATION			
Registration and protocol	24a	Provide registration information for the review, including register name and registration number, or state that the review was not registered.	
	24b	Indicate where the review protocol can be accessed, or state that a protocol was not prepared.	
	24c	Describe and explain any amendments to information provided at registration or in the protocol.	
Support	25	Describe sources of financial or non-financial support for the review, and the role of the funders or sponsors in the review.	
Competing interests	26	Declare any competing interests of review authors.	
Availability of data, code and other materials	27	Report which of the following are publicly available and where they can be found: template data collection forms; data extracted from included studies; data used for all analyses; analytic code; any other materials used in the review.	

Appendix D

Approval of the DNP Proposal

In-center hemodialysis nurses are involved in patient education. Assessing the attitudes of the nephrology nurses towards home dialysis was the proposed topic for the DNP project. The proposal was approved in January 2022 by the project team.

Appendix E

Approval of the Final Project

Assessment of the knowledge and proficiency of the nurses in the use of screening tools is an essential aspect of the project. This project aimed to help nurses select home dialysis patients using MATCH-D. A six-step nursing workflow was developed to guide the nurses through the screening process and transitioning patients dialyzing in clinics to home. The project team approved the final project on August 20, 2022.

Appendix B: Approval of the Final Project

Doctoral Student: ___Golda Nohay_____

The Advisory DNP Project Team of the above-named Doctoral Student has met and reviewed the DNP entitled:

THE USE OF SCREENING TOOL IN PATIENT SELECTION FOR HOME DIALYSIS

The DNP Project Team has determined that the Project:

    1. Makes a significant contribution to the field of knowledge;
    2. Demonstrates the Student's ability to perform independent research related to the DNP Project;
    3. Contains material worthy of publication in a form appropriate to the discipline.

We recommend acceptance of this Final Project. It contains all appropriate content.

Signature of the DNP Project Team Members

Faculty Chair name: Dr. Robin Kirschner_____ Dr. Robin Kirsch 8/19/2022

                                                (Print, Sign, and Date)

Faculty Reviewer name: Dr. Nina Beaman_____ Dr. Nina Beaman 8/19/2022

                                                (Print, Sign, and Date)

Independent Reviewer name: Dr. Deborah Schiavone_____ Dr. Deborah Schiavone 8/20/2022

                                                (Print, Sign, and Date)

Program Director Approval Signature: Dr. Tracy Lookingbill   8/19/2022

Dr. Tracy Lookingbill   Date
Program Director

Completed form should be submitted to ProjectConcert after all signatures* are attained. Directions can be found in the DNP Handbook under "Instructions Uploading Documents to ProjectConcert."

*The Program Representative will be the Assistant Dean or Dean in the case that the Program Director is serving on the DNP Project Team.

Appendix F

Permission Letter

The permission letter granted the student investigator to conduct the project to determine the patient's candidacy for home dialysis using the MATCH-D screening tool and allow the patients to explore if home dialysis can be an option.

SATELLITE HEALTHCARE

Applied Pragmatic Clinical **RESEARCH**

May 16, 2022

Dear IRB Administrator,

I have granted Golda Nohay to conduct the project, "The Use of Screening Tool in Patient Selection for Home Dialysis," in our Satellite Healthcare Menlo Park at 1040 Hamilton Ct, Menlo Park, CA 94025. I attest that I have the authority to grant such permission. I understand the purpose of the project is to determine the patient's candidacy for home dialysis using the MATCH-D screening tool, allowing the patients to explore if home dialysis can be an option.

Satellite Healthcare will allow the following throughout the project:

A pre-survey will ask the nurses to identify if the selected 15 patients in their assigned patient list is a potential candidate for home dialysis. An education course will follow this about the screening tool for home dialysis, such as Method to Assess Treatment Choices for Home Dialysis (MATCH-D). After the discussion, the nurses will be asked to apply MATCH-D in screening the patients they evaluated prior to the class if they are potential candidates for home modalities. This will serve as the post-survey and measurement of their proficiency in MATCH-D. A passing score of 80%, representing 12 correct screening tools, will be required to meet the passing score for proficiency. Patients who are potential candidates for home dialysis will be communicated to the patient's nephrologist. Suppose the nephrologist agrees with the nurse's assessment, reading materials will be provided to the patient, and a referral to WellBound nurses will be made to further assess the patient for their suitability for home dialysis.

The DNP student will be required to follow all HIPPA and Personal Health Information (PHI) policies and procedures related to obtaining, storing, and destroying HIPPA and PHI-protected data related to this project.

If the IRB has any concerns about the permission being granted by this letter, please contact me by phone/email:

Nora.a@satellitehealth.com

Sincerely,

Authorizing Name: _Graham Abra, MD_

Signature: _____

Title: _Chief Medical Officer, Home Therapies_

Phone No.: _(650) 266-6341_

Date Signed: _05/16/2022_

Satellite Healthcare
Applied Pragmatic Clinical Research (APCR)
300 Santana Row, Suite 300, San Jose, CA 95128
P: 650.404.3600   F: 650.404.3601
www.satellitehealth.com/research

Appendix G

Participation Letter

The participation letter agreement provided the written invitation to actively seek out, find and recruit participants for the project. The participation letter provides the written agreement between the student investigator and the nurses in Satellite Healthcare, Menlo Park.

Participation Invitation Letter   1

Participation Invitation Letter

Date:

Dear Dialysis Nurse,

I am enrolled in Aspen University's Doctor in Nursing Practice (DNP) program. I kindly request your participation in my research study titled: The Use of Screening Tool in Patient Selection for Home Dialysis. This research project aims to identify if the knowledge and application of screening tools for patient selection for home modality, such as Method to Assess Treatment Choices for Home Dialysis (MATCH-D), can determine patient's eligibility for home treatment therapies. The study involves completing a pre-survey, educational class, and post-survey using the screening tool.

Participation is entirely voluntary, and one could withdraw anytime from the study. All information obtained in this study is strictly confidential unless the law requires disclosure. The results of this research project may be used in reports, presentations, and publications; however, any identifying information about the participants will be kept anonymous, and the data will be kept secure by password protection and encryption. Your participation will be meaningful in completing this research.

Thank you.

Sincerely,

Golda Nohay
Project Researcher
Aspen University
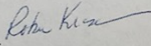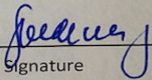1660 S. Albion St. Suite 225 Denver, CO 80222
Toll Free: 1-800-373-7814

Appendix H

Faculty Advisor Assurance

The faculty assurance is the written agreement that the faculty advisor supervised the student's conduct during the project's implementation to adequately safeguard the rights and welfare of the participants in compliance with federal regulations and institutional policies for the protection of human subjects.

ASPEN
UNIVERSITY

Faculty Advisor Assurance
For Human Subject Research

1. Protocol	
Title: **Could the Knowledge of Screening Tools Influence the Attitude of Nurses Towards Home Dialysis?**	
Previous IRB Number, if known: N/A	

2. Principal Investigator (Student)	
Name: Golda Nohay	Department:

3. Faculty Advisor	
Name: Dr. Robin Kirschner	Department:
Phone: (602)403-2936	email: robin.kirschner@aspen.edu

Faculty Advisor's Assurance Statement

I am the faculty advisor for the student (Principal Investigator) submitting this protocol. By my signature, I certify that I have reviewed the protocol and believe that it is scientifically sound. Furthermore, I believe that the student has the necessary training, experience, and knowledge to conduct the DNP Project in a manner consistent with the regulations governing human subject research and sound research principles. I agree to:

- Oversee and monitor the conduct of this DNP Project by communicating regularly with the PI;
- Assist with the resolution of any problems or concerns encountered during the DNP Project;
- Assure that the Aspen IRB is notified at irb@aspen.edu in the event of an adverse event or protocol deviation.

I understand that as the faculty advisor I am responsible for the conduct of this DNP Project.

_____   4.4.2022
Faculty Advisor Name and Signature   Date

  Golda Nohay   4/3/22
Principal **Investigator** Name and Signature   Date

NOTE: If this application is sent from the PI's Aspen University email account, a hand-written signature is not required. Please type in the name and date above.

Please upload form in Project Concert once completed

IRB Faculty Advisor Assurance Form   January, 2015 Version 0.0(a)

Appendix I

Immersion Site Agreement

The Immersion Site agreement is an established contract between Aspen University and Satellite Healthcare, Incorporation. The agreement lays out specific requirements expected from both organizations during the DNP project's implementation phase.

Appendix I: Immersion Site Agreement

This IMMERSION AGREEMENT is entered into between the ASPEN UNIVERSITY INC. with its principal place of business located at 1660 S. Albion St. Suite #525 Denver, CO 80222 (hereinafter referred to as "SCHOOL") and **SATELLITE HEALTHCARE, INC. / WELLBOUND** (hereinafter referred to as "AGENCY"). This agreement shall replace or supersede all other agreements between the parties.

WHEREAS, the mission of the Aspen University School of Nursing and Health Sciences is to enhance the health and quality of life for individuals, families, and communities at local, state, and national levels through excellence in teaching, scholarship and practice.

WHEREAS, the Doctor of Nursing Practice (DNP) program prepares nurses to assume leadership roles in management, education, and practice within a diverse society and across a spectrum of healthcare settings.

WHEREAS, the AGENCY is willing to share its facilities with the SCHOOL by making its resources available for the instruction of students.

NOW, THEREFORE, for and in consideration of the foregoing objectives and in further consideration of the covenants and promises hereinafter set forth, the parties hereto mutually agree as follows:

1. Upon inception, the doctoral student shall execute a form acknowledging all applicable policies required by SCHOOL and AGENCY.
2. The doctoral student participating in the immersion experience at the AGENCY will be enrolled in the doctoral nursing program and currently enrolled in a doctoral nursing course with an appropriately credentialed faculty member.
3. The doctoral student will hold a current, unencumbered nursing license. This license is on file with the SCHOOL and available upon request to the AGENCY.
4. A general orientation to the AGENCY will be provided by the Preceptor or AGENCY designee and must be attended by the doctoral student prior to beginning the immersion experience.
5. When on AGENCY premises, the doctoral student will be under the direct supervision of a specified Preceptor agreed upon by the SCHOOL and AGENCY.
6. The doctoral student and Preceptor will negotiate the specific areas of the immersion experience in alignment with the requirements of the doctoral course in which the student is enrolled.
7. The SCHOOL shall instruct the doctoral student that he/she shall follow all administrative policies, standards and practices of AGENCY while participating in the immersion experience to the extent that AGENCY's rules and regulations do not contradict the SCHOOL'S rules and regulations.
8. The SCHOOL and the doctoral student shall comply with the AGENCY'S applicable policy regarding the Health Insurance Portability and Accountability Act (HIPAA) and shall not disclose any records concerning a patient or participant to any third party without the prior written consent of the AGENCY.

9. Upon mutual agreement, the AGENCY reserves the right, upon consultation with the SCHOOL, to require the dismissal or removal from the AGENCY any doctoral student (i) whose personal characteristics prevent desirable relationships with AGENCY, (ii) whose health status is a detriment to the doctoral student's successful completion of the immersion experience or to the welfare of patient or participants or (iii) whose performance, after appropriate instruction and counseling, continues to fall below the level required to maintain practice standards.

10. The SCHOOL agrees that the faculty member may serve as consultant and on committees of the AGENCY when requested by the AGENCY.

11. There will be no exchange of monies between the AGENCY, the SCHOOL, the Preceptor, or the doctoral student.

12. The doctoral student will be responsible for personal transportation, meals, laundry and health care needs in the performance of this agreement.

13. To the extent permitted by applicable law, each party does hereby covenant and agree to indemnify and hold harmless the other party, its appointed boards and commissions, officials, officers, employees, students, and subagents, individually and collectively, from all fines, claims, demands, suits or actions of any kind and nature by reason of its acts or omissions occurring in the performance of this Agreement. Nothing in this Agreement or in its performance shall be construed to result in any person being the officer, agent, employee or servant of either party when such person, absent of this Agreement and the performance thereof, would not in law have had such status. Nothing in the execution of this Agreement or in its performance shall be construed to establish a joint venture by the parties hereto.

14. In addition to those laws specifically mentioned in this Agreement, AGENCY shall comply with all applicable policies of SCHOOL applicable to it and comply with all applicable laws and rules.

15. Both parties, in connection with any service or other activity under this Agreement, agree not to unlawfully discriminate against any person on the grounds of race, color, religion, sex, sexual orientation, gender identity, national origin, ethnicity, age, disability, political affiliations or belief. The SCHOOL and the AGENCY will comply with Title VII of the Civil Rights Act of 1964, Americans with Disabilities Act (ADA) of 1991, Title IX of the Education Amendments Act of 1972 and Section 504 of the Rehabilitation Act of 1973.

16. The SCHOOL and AGENCY will maintain in effect during the entire term of this Agreement, at their sole respective cost and expense, at least $1,000,000 of commercial general liability insurance on a standard comprehensive occurrence form. The SCHOOL and AGENCY will make certificates of insurance available to each other upon request. The SCHOOL and AGENCY will maintain in effect during the entire term of this Agreement, at their sole respective cost and expense, Medical Errors & Omission coverage.

17. This agreement is for a period of **2 YEARS** unless terminated by either party upon giving 30 days advance written notice to the other party.

Aspen University Inc.

Dr. Sherry Raber, DNP, WMHC, MSN, RN
By: _____

Print Name: Dr. Sherry Raber, DNP, MWHC, MSN, RN

Title: DNP Program Coordinator

Date: 2.11.2022

Nohay (Student), Immersion Site Agreement   3

Agency: SATELITE HEALTHCARE INC., / WELLBOUND

By: _____, MD

Print Name: _Graham Abra, MD_

Title: _Chief Medical Officer, Home Therapies_

Date: _2/7/2022_

(Student: Submit this completed form directly to ProjectConcert. Directions can be found in DNP Handbook under "Instructions Uploading Documents to ProjectConcert." If your site has its own site agreement, secure a copy and submit to the Coordinator for review.)
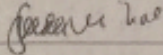
Appendix J

Preceptor Agreement

The preceptor agreement is negotiated arrangements between the student and preceptor, who will provide the student instructions to meet the course objectives. The chosen preceptor for this DNP project has expertise in the subject matter, has an affiliation with the immersion site, and whose role is consistent with the graduate program learning outcomes.

Appendix J: Preceptor Agreement

Aspen University - Preceptor Agreement – DNP Immersion
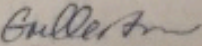**Student: Submit this completed form to Project Concert**

I, __GOLDA NOHAY__, have identified the following preceptor and he/she agrees to serve as my site preceptor for this/these course(s) DNP 851B, 852A, & 852B. I verify that I have provided this preceptor with a copy of the Aspen University DNP Handbook on 02/02/2022 (today's date).

Student's Full Name: GOLDA NOHAY   Student's Signature: _____

Preceptor's Information:

Preceptor's Full Name: __GLENN CHERTOW, M.D.__

Agency Affiliation: __SATELLITE HEALTCARE INC.__

Agency Address: 300 Santana Row, #300, San Jose, CA 95128

Position Title: Professor of Medicine (Nephrology), Stanford University

Work Telephone Number: (415) 596-3035   E-mail Address: gchertow@stanford.edu

Preceptor's Education: Degree (Highest Level Attained):

____ DNP ____ Ph.D. ____ Ed.D. __X__ MD

____ Other Doctoral Degree Specialization _____

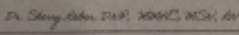RN License # (if applicable) _____ State _____ Expiration Date _____

Preceptor's Acknowledgement and Acceptance:

I agree to function as the immersion site preceptor. I have reviewed the DNP Handbook and accept the role and function as a preceptor. The information provided herein is true to the best of my knowledge.

Chllerton   __GLENN M. CHERTOW, M.D.__   2/2/2022

Signature (No Typed Signatures)   Printed Name

Date

Preceptor's Experience (Please attach and submit a 5-year resume or CV)

Immersion Site Information (Should be the Same as the Immersion Site Agreement):

Name of Sites:
1) Satellite Healthcare Menlo Park
Address: 1040 Hamilton Ct, Menlo Park, CA 94025   Telephone No.: (650)384-4800

~~2) Wallbound~~
~~Address: 525 Meridian Ave STE 101, San Jose, CA 95126   Telephone No.: (408)269-3668~~

ASPEN UNIVERSITY APPROVAL:

Signature: _____   Print Name: Dr. Sherry Raber, DNP, MHHC, MSN, RN

Date: _____   Title: DNP Program Coordinator

Appendix K

CITI Completed Programs

The Collaborative Institutional Training Initiative (CITI Program) is a web-based program designed to provide training in human subject research. The IRB required the student investigator to complete CITI human subjects research and administrative data management courses such as Responsible Conduct Research, Social Behavioral Educational Researchers, and Biomedical Data Researchers.

Certificate 1

CITI PROGRAM

Completion Date 27-Jan-2021
Expiration Date 27-Jan-2024
Record ID 40614382

This is to certify that:

Golda Nohay

Has completed the following CITI Program course:

Not valid for renewal of certification through CME.

Social Behavioral Educational Researchers
(Curriculum Group)
Social Behavioral Educational Researchers
(Course Learner Group)
1 - Basic Course
(Stage)

Under requirements set by:

Aspen University

CITI
Collaborative Institutional Training Initiative

Verify at www.citiprogram.org/verify/?wcefe874a-d3ed-41e2-8eaf-0a9dc972cc51-40614382

Certificate 2

CITI PROGRAM

Completion Date 01-May-2022
Expiration Date 30-Apr-2025
Record ID 48639349

This is to certify that:

Golda Nohay

Has completed the following CITI Program course:

Not valid for renewal of certification through CME.

Biomedical Data Researchers
(Curriculum Group)
Biomedical Data Researchers
(Course Learner Group)
1 - Basic Course
(Stage)

Under requirements set by:

Aspen University

CITI
Collaborative Institutional Training Initiative

Verify at www.citiprogram.org/verify/?w530a7a69-aa67-499f-8e6f-cab1d44f920f-48639349

Appendix L

IRB Approval Letter

The IRB's primary purpose is to protect human subjects' rights and welfare. The IRB approval letter is a written document that the application to implement the project has been approved under the Exempt Review. The IRB approval described that the student investigator agreed to maintain confidentiality and safeguard the rights of anyone who participated in the project.

IRB Review Form: DNP

IRB Case Number: 5GN5-23F2

Name of Candidate: Nohay, Golda

Title: The Use of Screening Tool in Patient Selection for Home Dialysis

Approval Expires on: 5/23/2023

Application Type:
    _X_ Exempt Review
    __ Expedited Review
    __ Full Review

Application Status:
    _X_ Approved
    ___ Not Approved
    ___ Approved with Amendment

The student/researcher understands and agrees to maintain the confidentiality of any entity agreeing to assist with providing data; to obtain informed consent from any human participants in the study; and to retain and safeguard written consents and the data for a period of five years from all entities, presenting copies to Aspen University, to the participants, and to authoritative bodies when appropriate.

DATE 5/23/2022

Heather Frederick, IRB Chair

All questions or concerns should be directed to IRB@aspen.edu. This includes immediately reporting any unexpected adverse events or alterations in risk levels for participants within 48 hours of occurrence of such events.

Aspen University
4615 E Elwood Street - suite 100
Phoenix AZ 85040

Appendix M

IRB Closeout

The Closeout report updates the IRB that the study has been completed and how the data will be managed.

Aspen University
4615 E. Elwood street, Suite 100
Phoenix, AZ 85040
IRB@Aspen.edu

IRB Close Out Letter

IRB Case Number: 5GN5-23F2   Date Today: 9/11/22

Name of Principal Investigator: Golda Nohay
Project Title: The Use of Screening Tool in Patient Selection for Home Dialysis

Date: 9/10/22

Storage of data
You must keep records for the longest applicable period:

- Federal regulations require three years after completion of the study/project.
- HIPAA regulations require six years after a participant has signed an authorization.
- Research sponsors or collaborating organizations may require longer times.

Destruction of data
When research records are destroyed, you must protect your participants' confidentiality throughout the process. Paper records should be shredded. Records stored on a computer hard drive should then be erased using commercial software applications designed to remove all data from the storage device. If you can guarantee that your research records are secure, you may keep them indefinitely.

By submitting this form: I am informing the IRB of the completion of the study/project listed above and that no further data will be collected.

☒ I agree to keep my records secure for a minimum of 3 years and possibly longer, depending on the longest applicable standard.
After the required storage time, I will continue to keep my research records secure or appropriate destroy the data.

PI Signature   *Golda Nohay*   9/11/2022
DocuSigned by:
43DC2D6BD09C4B0...

If you are a doctoral candidate, this form must include your chair' s signature
I attest that this candidate's final manuscript has been approved by the Dean or Dean 's designee:

DocuSign Envelope ID: D59B7FB9-AD37-43E3-AFA2-57A50320EEC2

Chair Signature: *Robin Kiss*