

2023

Continuous Vascular Access Education for Health Care Staff

Denise R. Jones
Walden University

Follow this and additional works at: <https://scholarworks.waldenu.edu/dissertations>

This Dissertation is brought to you for free and open access by the Walden Dissertations and Doctoral Studies Collection at ScholarWorks. It has been accepted for inclusion in Walden Dissertations and Doctoral Studies by an authorized administrator of ScholarWorks. For more information, please contact ScholarWorks@waldenu.edu.

Walden University

College of Nursing

This is to certify that the doctoral study by

Denise Jones

has been found to be complete and satisfactory in all respects,
and that any and all revisions required by
the review committee have been made.

Review Committee

Dr. Joan Hahn, Committee Chairperson, Nursing Faculty
Dr. Patricia Dittman, Committee Member, Nursing Faculty
Dr. Corinne Wheeler, University Reviewer, Nursing Faculty

Chief Academic Officer and Provost
Sue Subocz, Ph.D.

Walden University
2022

Abstract

Continuous Vascular Access Education for Health Care Staff

by

Denise Renee Jones

MS, Walden University, 2016

BS, Eastern University, 1999

Project Submitted in Partial Fulfillment
of the Requirements for the Degree of
Doctor of Nursing Practice

Walden University

February 2023

Abstract

End-stage renal disease is a growing public health problem associated with high health care costs and high morbidity and mortality rates. Dialysis patients' vascular access is a critical component to their survival, and knowledge in managing patients' vascular access can reduce access complications and improve vascular access outcomes including community settings. This DNP project is an education program developed for health care staff who attend church services to provide ongoing vascular access education to address vascular access outcomes in dialysis patients. The education project was developed using the ADDIE model. The site of the project was a rural city in the Mid-Atlantic United States. The 6-item pre and posttest findings demonstrated an improvement in health care staff's knowledge in the technique of properly applying direct pressures to manage and to prevent a fatal hemorrhaging accident in the dialysis vascular access. The potential impact of this DNP vascular access project is to promote a positive social change in health care staff out in the community to prevent and reduce vascular access hemorrhaging fatalities in dialysis patients. Preventing and reducing fatal incidents due to dialysis vascular access hemorrhage is an uncommon catastrophic but potentially preventable event when health care staffs receive ongoing education. Educating health care staff is vital to preventing vascular access fatalities. This DNP project has the potential to promote a positive social change by improving the care of dialysis patients in their communities when fatal access hemorrhaging incidents are prevented and reduced.

Continuous Vascular Access Education for Health Care Staff

by

Denise Renee Jones

MS, Walden University, 2016

BS, Eastern University, 1999

Project Submitted in Partial Fulfillment
of the Requirements for the Degree of
Doctor of Nursing Practice

Walden University

February 2023

Dedication

To my late mother, Ethel T. Jackson. Thank you for telling me to keep God first in my life. It is only through the grace of God, which has made it possible for me to obtain a doctoral degree in nursing. Thank you, God.

Acknowledgments

To my husband, Theodore August Jones Jr., thank you for your loving support and words of encouragement. To my daughters, thank you for cheering me on when I started doubting myself. My prayer is that my accomplishment will inspire you both to never stop learning and to never stop believing in yourselves.

To my first chair Dr. Lynda Crawford. Thank you for your guidance and support during the process of developing my doctoral project. I deeply appreciate your efforts. To my second chair Dr. Joan Hahn. Thank you for having a compassionate heart to listen. Thank you for your endless support, which help me to achieve my goal of obtaining a doctoral degree in nursing. Thank you for believing in me.

Table of Contents

List of Tables	iii
Section 1: Nature of the Project	1
Introduction.....	1
Problem Statement.....	3
Purpose Statement.....	4
Practice-Focused Question.....	5
Nature of the Doctoral Project	5
Significance.....	7
Summary.....	8
Section 2: Background and Context	9
Introduction.....	9
Concepts, Model, and Theory.....	9
Model Concepts	10
Relevance to Nursing Practice	10
Local Background and Context	11
Definition of Concepts.....	13
Role of the DNP Student.....	14
Summary.....	15
Section 3: Collection and Analysis of Evidence.....	16
Introduction.....	16
Practice-Focused Question.....	16

Sources of Evidence.....	16
Participants.....	18
Procedures.....	18
Protections.....	18
Analysis and Synthesis	19
Summary.....	19
Section 4: Findings and Recommendations.....	21
Introduction.....	21
Findings and Implications.....	23
Demographic Findings.....	23
Pretest Posttest Questionnaire Findings.....	23
Recommendations.....	24
Contribution of the Doctoral Project Team	25
Strengths and Limitations of the Project.....	25
Section 5: Dissemination Plan	27
Analysis of Self.....	27
Summary.....	27
References.....	29

List of Tables

Table 1. Demographic Survey Responses (N = 13)..... 23

Table 2. Pre- and Posttest Questionnaire Finding..... 24

Section 1: Nature of the Project

Introduction

Chronic kidney disease (CKD) is on the rise and projected to increase as obesity rates increase in adults, which leads to diabetes and cardiovascular disease (Bergjan & Schaepe, 2016). CKD is ranked among the top 10 causes of death in the United States (Johns & Jaar, 2013). Managing individuals diagnosed with CKD contributes to higher health care costs (Bergjan & Schaepe, 2016). CKD occurs when the glomerular filtration rate drops below $60 \text{ ml/min}1.73\text{m}^2$. Normal kidney function declines with age, so the risk of developing CKD increases with age (Bergjan & Schaepe, 2016). In addition, end-stage renal disease is progressive and debilitating (Bergjan & Schaepe, 2016).

Dialysis is a lifesaving therapy used to treat individuals diagnosed with CKD. Dialysis therapy removes toxins and excess fluid from a patient's body using a vascular access directly entering the circulatory system (Bergjan & Schaepe, 2016). The dialysis vascular access is a patient's lifeline to receiving treatment and living with end-stage renal disease (Daugirdas et al., 2015). The dialysis fistula and the graft are the two most common types of dialysis vascular access used for maintenance hemodialysis (Daugirdas et al., 2015). The dialysis fistula access is created when a vascular surgeon connects an artery to a vein. Anastomosis is a surgical term describing how a vein and artery are connected to allow blood to directly flow from a patient's artery to vein (Daugirdas et al., 2015). After creating a fistula access, it takes 6 to 8 weeks to mature, allowing for wall thickening and dilation of the vein. The patient's maturing fistula requires continuous monitoring and assessment during the healing process before cannulation (Daugirdas et

al., 2015). Patients dialyzing with the fistula access have a lower risk for infection and a higher survival rate of living longer on dialysis than any other vascular access (Daugirdas et al., 2015). In 2003, the National Kidney Foundation developed the Fistula First Initiative to increase fistula use for dialysis patients. As a result, fistula use for new patients beginning dialysis has increased since 2003 (Brahmbhatt et al., 2019). However, in 2019 the United States Renal Data System reported that 80% of all new dialysis patients begin dialysis treatment with a central venous catheter (Brahmbhatt et al., 2019). Late patient referrals for dialysis care and vascular access placement are commonly associated with central venous catheter placement (Brahmbhatt et al., 2019).

Vascular surgeons and dialysis nurses influence the successful maturation of patients' vascular access (Lee, 2017). The dialysis patient's comorbid conditions and vascular anatomy determine whether fistula placement is appropriate (Lee, 2017). The surgeon's training and ability to identify a suitable vessel for access placement are essential when creating the fistula access (Lee, 2017). Likewise, the dialysis nurse's experience in assessing and monitoring a patient's developing fistula is vital for ensuring proper fistula maturity (Lee, 2017). But in the United States, it is estimated that 20% of hospitalizations among dialysis patients are due to adverse vascular access events (Schoch & Smith, 2012). Current literature estimated that 40% of permanent arteriovenous fistula (AVF) failures occur within the first year of creation (Thamer et al., 2018). The estimated mean cost of a vascular access for a patient in the first 2 years after creation is \$7,871 (Thamer et al., 2018). The estimated cost for maintaining the AVF within the first year of use is \$13,282 and the cost associated with AVF lost in 1 year is

\$17,808 (Thamer et al., 2018). The estimated cost associated from a AVF that fail to mature in the first year of creation is \$31,630 (Thamer et al., 2018).

Problem Statement

Nursing skills in the management of a maturing fistula is essential for increasing fistula use and providing quality dialysis care (Wright, 2017). The Kidney Disease Outcomes Quality Initiative (KDOQI) developed vascular access guidelines to support nurses' practice patterns in managing patients' vascular access to improve fistula use (Wright, 2017). Despite evidence-based clinical guidelines, some variations in patterns of vascular access monitoring practices among dialysis nurses still exist (Wright, 2017). Variation in practice happens when nurses do not receive ongoing training and knowledge in access care, which could negatively impact patient care (Wright, 2017). Current literature shows that vascular access education offered by companies is effective for improving the practice of dialysis nurses (Wright, 2017). Dialysis nurses' ongoing knowledge in vascular access is essential to improving the quality of care for dialysis patients (Lee, 2017).

During a quality meeting the clinical manager shared her frustrations on finding an experienced dialysis nurse after losing two experienced nurses within 6 months. She was surprised to receive several resumes from graduate nurses and from nurses with nursing experience but not in dialysis. Dialysis centers are having a tough time in finding nurses with dialysis experience, so new graduates and nurses without dialysis experience are being hired. Review of literature suggests that nephrology nurses are frustrated and feel uneasy with having insufficient staffing to provide care (Gaietto & Williams, 2020).

Hemodialysis facilities and state nurse practice regulations for many states do not mandate nurse/patient ratios or the overall staffing mix (Gaietto & Williams, 2020).

This DNP project was designed to address continuous vascular access education at two outpatient clinics located in the northeast region of the United States. The identified clinics have a high turnover of their experienced nursing staff, which creates a gap in knowledge. The nephrologist interventionist has identified concerns with how nurses are monitoring patients' vascular access. Advance practitioners rounding in the clinics have also observed deficiencies in how nurses are managing patients' vascular access. Nursing turnover has created a loss of experience nurses with five or more years of experience in vascular access care. Review of literature suggest that high turnover rates create a gap in knowledge (Sever et al., 2021). This project aimed to reduce nurses' knowledge gap and gaps in assessment skills by providing access a 2-day vascular access workshop to update staff knowledge and assessment skills when caring for a patient with a maturing fistula. Evidence-based practice suggests that educational intervention for nurses can improve patients access outcomes (Wright, 2017).

Purpose Statement

The purpose of this project was to provide educational activities that will provide nurses with knowledge and skills to better manage dialysis patients' vascular access. Continuous staff education can close the gap in staff knowledge in monitoring and managing patients' vascular access (Basha, 2017).

Practice-Focused Question

The project question was “Does continuous vascular education increase nurses’ knowledge in monitoring and managing patients with a vascular access?” It was anticipated that this project would increase nurses’ knowledge and assessment skills in caring for patients with a vascular access. Improving nurses’ access knowledge improves access survival for patients. (Wright, 2017). The project goal was to increase nurses’ knowledge and assessment skills. Current literature indicates that improving nurses’ knowledge and skills leads to better patient outcomes and consistency of care (Wright, 2017).

Nature of the Doctoral Project

This project followed the guidelines in the Walden University DNP Staff Education Manual. Planning involved scheduling a meeting at both clinics to discuss the staff education project with the clinical managers, medical directors, and the director of operation. The project team reviewed Medicare and Medicaid Fistula First guidelines, which are considered the gold standard of evidenced based care of patients with fistulas. The project team reviewed best practices identified from the literature review for assessing and monitoring the dialysis vascular access. The project team reviewed the appropriateness of the pretest and posttest questions to ensure questions are appropriate to assess a change in staff knowledge.

The intent was to design a 2-day lunch-time staff education to be provided at two outpatient dialysis facilities located in a metropolitan city in the northeast United States. The content would cover the process of basic access assessment of previous cannulation

sites and thorough assessment of the current vascular site, including demonstrations of determining patency of the vascular access.

Staff would be required to complete a pretest and posttest. The test questions would be derived from inspection, palpation, and auscultation components of assessing the vascular access. A pretest and posttest would include a total of six multiple-choice test questions with the same test content. Staff would have 10 minutes to complete both tests. The pretest and posttest would be given on the first day. The posttest would be given at the end of the first session and focus only on the content covered in the first training session. The pretest and posttest scores would be used to capture any difference in staff knowledge. The return demonstration would be part of the post test score but would not be part of the comparison data. Ratio data were used to compare the multiple-choice answers selected. Data collection for the return demonstration would assess participants ability to apply newly learned access assessment skills when assessing a patient vascular access. Participates would receive a “P” for “passing” and “N” for “not passing” on the return demonstration on the second training day.

For developing the content of the program, a literature review was conducted through Walden University’s online database. To capture the specific databases and to organize keywords and study finding an excel spreadsheet was used. The findings from the literature review were used to develop content for the staff pretest and posttest. This project reviewed some sentinel articles published before 2015. The review of literature using seminal articles captures foundational research evidence that contributes to the development and longevity of the dialysis vascular access.

Significance

This project emphasizes the importance of providing nurses with ongoing education to improve the care of dialysis patients. A nonfunctional dialysis vascular access contributes to high healthcare cost for dialysis patients and reduces their quality of life (Thamer et al., 2018). Review of literature suggests that high health care cost for patients with CKD is associated with managing and maintain the dialysis vascular access (Thamer et al., 2018). Patients are scheduled for additional vascular access surgeries or interventional procedures to restore the function of the vascular access (Lee, 2017). This project intends to increase dialysis staff knowledge and access assessment skills to better prepare them to improve patient care. Nurses will learn how to apply evidence-based practice to improve nursing practice. This project has potential to increase patients and family's awareness of the importance of caring for the dialysis access. Dialysis patients and family members interact with a dialysis nurse three times a week when receiving dialysis treatment. Knowledgeable nurses recognize that every encounter with a patient is an opportunity to educate patients and families on how to care for the dialysis vascular access. Current literature suggests that improving vascular access care for dialysis patients will improve their quality life when access complications are prevented, and surgical intervention procedures are reduced (Lee, 2017).

Nurses have an opportunity to explore the nursing profession and to change nursing practice when they engage in continuous education (Quan, 2017). Continuing education is also an effective strategy for nurses to disseminate practice changes to advance the profession of nursing (Quan, 2017). This project will be a model for other

sites on how to better prepare their staff in managing and maintain patients' vascular access. This project has potential to demonstrate to members within the dialysis community including dialysis companies, nephrologist, access surgeons, access interventionist, nurse practitioners, and access care coordinators of the importance of providing ongoing education to nursing staff to improve dialysis patients' care and outcomes.

Summary

Section 1 discussed the identification of a local problem and the development of a focus practice question. In Section 2, the review of literature and findings will be described.

Section 2: Background and Context

Introduction

It is estimated that 2 million individuals worldwide receive hemodialysis therapy. To provide successful hemodialysis therapy a patient must have a fully mature and functioning vascular access that can be used (Thamer et al., 2018). To ensure that a dialysis patient access is matured and working effectively, it must be monitored and managed by knowledgeable dialysis staff. The practiced focused question was “Does continuous education increase nurses’ knowledge in monitoring and managing patients with a vascular access?” Review of literature indicates that ongoing vascular access education of dialysis staff improves nursing care and the delivery of the best possible care to dialysis patients (Hemachandar,2015). The purpose of this project was to increase the knowledge and skills of the dialysis staff in two dialysis clinics.

Concepts, Model, and Theory

This project was grounded in the ADDIE Model, which is an instructional designed framework commonly used to transfer essential knowledge. This model can be used in any environment (Aldoobie, 2015). ADDIE is an acronym, which stands for Analysis, Design, Development, Implement, and Evaluation and each of these phases interacts with the others. The end of one phase is the starting point of the next phase (Aldoobie, 2015). This model was used for developing and for implementing this educational project.

Model Concepts

Analysis phase is the first phase of the model that is used to assess the learner's skills and need (Aldoobie, 2015). This phase ends with developing learning objectives on what new knowledge you want the learner to learn. *Design phase* is the second phase of the model that is used to create effective strategies to facilitate learning. This phase involves selecting a method and materials to help the learner understand what you want them to learn. *Developmental phase* is the third phase of the model and is dependent on the first and second phases of the model. This phase uses suggested feedback from stakeholders or project team to assess for weakness in the project content or project material. This phase involves doing a rehearsal to use all the material created for the project. *Implementation phase* is the fourth phase of the model involves organizing the learning environment by providing the learner with information about the project. This phase involves informing the learner about session start and ending times, when and where the training will take place and what the learner needs to bring to the training. *Evaluation phase* the final phase of the model and is used to evaluate if the needs of the learner were met. This phase is accomplished with having learners do a return demonstration.

Relevance to Nursing Practice

Nurses working in dialysis receive special training and knowledge to appropriately care for dialysis patients. Dialysis nurses play a major role in helping patients to manage their vascular access. Nurses are expected to deliver safe and quality care that is based on evidence and best practice. But gaps in nurses' knowledge causes

gaps in practice (Bindon, 2017). Continuous education is vital for providing nurses with the opportunity to reflect regularly on their knowledge and skills to identify gaps in practice and reduce work-related anxiety because of enhanced confidence in their ability to provide care (Mlambo et al., 2021). Review of literature indicates that continuous education improves interprofessional collaboration and prepares nurses for new or different roles which inevitably causes change in practice environment (Bindon, 2017). Continuous learning plays a vital role in advancing nursing practice by connecting nurses and providing them with new practices and ideas (Bindon, 2017; Norman et al., 2021).

The practice of nephrology nurses recommends that nurses should continuously reassess their competencies to identify their need for additional knowledge, skills, and integrative learning experiences (Gomez et al., 2017). Nurses are encouraged to be lifelong learners. It is anticipated that this education project will support the learning needs of nurses and improve nursing practice. Nurses can use this project as a guideline for developing annual competencies. The practice question for this project is “Does continuous vascular education increase nurses’ knowledge in monitoring and managing patients with a vascular access?”

Local Background and Context

The dialysis outpatient facilities are open 6 days a week to provide dialysis treatment for patients. The units are set up to treat 12 to 25 patients per shift. Patients are scheduled to dialyze either on a Monday, Wednesday, and Friday schedule or a Tuesday, Thursday, and Saturday schedule. Patients are assigned either to the first shift, second shift, or third shift. Starting time for the first shift is usually 5:30 a.m. or 6:00 a.m., the

second shift starts around 9:00 a.m. or 9:30 a.m., and the third shift usually starts around 2:00 p.m. or 2:30 p.m.

The layout of the unit is usually configured in a L or U shape to keep the treatment floor open to allow staff better visualization of patients and the dialysis machine during treatment. Patient seating is arranged in stations around the room and each station there is a leather recliner and a small TV mounted to back wall behind the dialysis machine. Depending on the dialysis unit size there are one or two nursing stations located at opposite ends of the unit.

For a patient to receive treatment there must be a treatment prescription and each prescription is prescribed specifically for each patient. The length of time a patient dialyzes on the dialysis machine is part of that treatment prescription. The vascular access type and needle size used to access the fistula is also part of the treatment prescription.

The clinical sites chosen for this project were located in a metropolitan city in the northeast United States. The patient census is 60 for Clinic A and the patient census is 80 for Clinic B, and the average number of employees at both clinic is 13.5. This number does not include other dialysis team members, such as the social work, renal dietician, and administrative assistant. In Clinic A there are 16 stations, and in Clinic B there are 24 stations.

In Clinic A there is no charge nurse but in Clinic B there is a charge nurse. The role of a charge nurse is important in the day-to-day operation of a dialysis unit. The charge nurse assigned staff according to patients' access needs. Typically, a more experienced technician or nurse with expert cannulation skills is assigned to patients with

a maturing access. The experience cannulator must also have good assessment skills when evaluating a patient's access if it is ready for cannulation to avoid injuring the access. Injuring maturing access with cannulation increases the risk for access clotting and CVC dependence (Lee, 2017).

Definition of Concepts

Angioplasty: A procedure performed by a radiologist or interventional nephrologist and involves inserting a catheter with a balloon tip is inserted into the vein or artery of the fistula.

Arteriovenous fistula (AVF): Created when a surgeon surgically connects a vein to an artery, which causes the vein to enlarge and the vein's wall to thicken. The increased flow of blood passing through the vein causes it to bigger and stronger to accommodate 17-, 16-, and 15-gauge needle placement. To dialyze a patient, there must be direct access to the circulatory system.

Arteriovenous graft: Created when a surgeon surgically inserts synthetic material or bovine under the skin and connects it to the end of a vein and artery. Patients who are not suitable for fistula placement because of small veins that are seen in diabetic patients.

Central venous catheter: When a nephrologist places a synthetic tube in a large vein in the neck, chest, or groin to create access into the bloodstream or circulatory system.

Chronic kidney disease (CKD): A disease in which kidney function is measured by an estimated glomerular filtration rate reduced when it is 50% or less.

End-stage renal disease: When kidney function severely declines, and the estimated glomerular filtration rate is 15% or lower.

Fistulogram: An x-ray that exams the blood vessels, artery, and vein used to create the fistula. A radiologist or interventional nephrologist performs the procedure.

Hemodialysis: To clean the blood of by-products of protein breakdown, chemicals, toxins, and excess water is removed from the body. The patients' blood is cleaned when it passes through an artificial kidney called the dialyzer. The artificial kidney is a pores membrane that permits fluid and toxins to pass through.

Urea: Waste broken down by the liver from ingested food.

Role of the DNP Student

To translate evidence-based practice into nursing practice, I developed an educational program. The idea to develop an educational project originated from a previous preceptor, who is a nephrologist and vascular access interventionist. The project planner and the presenter for all the educational sessions was me. In the first phase I planned to involve a project team. The team would consist of two nurses and two patient care technicians, who would be employees from both clinics selected by the clinical managers. There would be two 1-hour meetings to discuss and review project content. The project team would review pretest and posttest questions, the checklist for the return demonstration, and project objectives.

After the project content was finalized by the project team, in the second phase I planned to coordinate a 45-minute meeting with the clinical managers to review project content and to discuss the best time for the sessions and the locations for the education

sessions. If there were no additional revision needed with project content. I planned to move to the third phase, give the managers a flyer and sign-up sheet to post in the staff breakroom. The flyer would provide information about the sessions, which would include scheduled topic, session dates, time, and location with an invitation to pack a brown bag lunch for both days. In the final phase, it was planned that staff would participant in the education sessions to be presented by me, the educator. I planned to conduct a 2-day 45-minute educational session at both clinics with the last day planned for conducting a return demonstration of learned skills.

Employee centered educational programs that use peer learning and stimulation increase participants self-confidence and improves their learning (Farzi et al., 2018). The review of literature suggested that education methods that include simulation and peer learning create a positive learning environment, which motivate employees to learn (Farzi et al., 2018). Literature review findings also suggested that the educator skills and feedback play a vital role in making the education activity effective (Farzi et al., 2018).

Summary

Section 2 discussed the ADDIE Model and its application to this project. Current evidence on CKD, ESRD, and vascular access guidelines was presented. Providing ongoing vascular access education for dialysis staff can improve their ability to appropriately manage patients' vascular access and impact patient care. Section 3 discusses the educational program plan as well as participant selection, procedures, and protection of participants.

Section 3: Collection and Analysis of Evidence

Introduction

Hemodialysis is the primary treatment modality for over 2 million individuals' worldwide (Balaz et al., 2021). For patients to receive hemodialysis treatment, they need to have reliable vascular access to enter the circulatory system to remove build-up fluid and toxins from the body. The Centers for Medicare and Medicaid recommend the arteriovenous fistula (AVF) as the preferred hemodialysis vascular access (Wright, 2017). The literature suggests that access complications contribute to fistula loss and shorter overall AVF survival (Wright, 2017). Section 3 addresses the process used to collect, organize, analyze, and interpret data to determine if providing ongoing vascular access impact, the care of dialysis patients.

Practice-Focused Question

The project question was “Does continuous vascular education increase nurses’ knowledge in monitoring and managing patients with a vascular access?” The sites selected to implement this project were experiencing a high turnover among the nursing staff. Graduated nurses and nurses without experience in dialysis were being hired. The clinical managers at both facilities wanted to ensure that patients with maturing access were still being closely monitored to prevent access complications and access failure.

Sources of Evidence

The project followed the steps for developing a staff education project using the DNP Manual for Staff Education. Review of literature originated from a database search of scholarly articles utilizing the Walden University Library. Searches included

CINAHL, MEDLINE, Thoreau, and Google Scholar. Google searches were done to find up-to-date statistics relevant to the project which includes the website, United States Renal Data System, and the Center for Medicare and Medicaid Service. The review of literature to develop project content utilized the following key terms: *end-stage renal disease, nephrology, renal nursing, dialysis vascular access, KDOQI guidelines, evidence-based practice, nursing knowledge, dialysis standards of care, vascular access monitoring, hemodialysis quality improvement, arteriovenous fistula, arteriovenous graft, vascular access education, vascular access monitoring, access failure, continuous education, professional development, and continuing education*. Exclusion criteria included articles involving home hemodialysis. Most of the articles reviewed were published during 2015 through 2021. This project also used seminal peer-review articles published before 2015.

The source of evidence included a pretest and posttest and a return demonstration. Participants were asked to complete a 6-question pretest on the first day and the same questions were used for the posttest. The posttest was given to participants at the end of the first day. The test questions were used to measure if participants experienced an improvement in their vascular access knowledge from participating in the ongoing learning session. The return demonstration was used to measure if this activity reinforced participants' learning experience. The return demonstration was used to measure if participants could apply their newly acquired skills into practice. Participants would receive a satisfactory or unsatisfactory score for the returned demonstration. Data

collection for this project began once approval had been granted by the Walden University Institutional Review Board.

Participants

Attendance was by invitation. A flyer would be posted for staff to attend. This allowed for diversity in attendance and to make staff feel welcome to attend this education session.

Procedures

There were two tools used to collect and evaluate project outcomes: pretest and posttest and return demonstration. The pretest and posttest content used in this project was developed from the review of literature findings. Participants were given 10 minutes each to complete pretest and the posttest. Test questions evaluated participants' vascular access knowledge and the knowledge about the physical assessment skills for monitoring and managing patients' vascular access. The mean average test scores were compared using the paired dependent sample *t* test. Ordinal data (pass or not pass) scores were reviewed for the return demonstration.

Protections

Participants' test scores, if shared with the clinical manager, could be used as a competency skill tool which could negatively impact a nurses annual performance evaluation and annual raise. Test scores could also impact a nurse's opportunity for promotion within the organization. To prevent managers from using test score and return demonstration scores for purposes other than this project, several measures ensured the confidentiality of the scores. Hard copies of participants' tests and test scores were stored

off site in a locked file cabinet in my home. Test scores are also stored off site on a flash drive in my home. Excel spreadsheets were used to track pretest and posttest scores. Hard copies of both tests will be shredded and disposed offsite at my home at the end of the project, test scores will not be shared, and the flash drive used to store pretest and posttest scores will be wiped clean offsite at my home on the last day of the project.

Analysis and Synthesis

I used Microsoft Excel to enter and examine the data. Pretest and posttest scores were coded and entered, and descriptive statistics were used to compare differences in mean value of the pretest and posttest scores. Ordinal data were used to score the return demonstrations and reported as percent passing.

Summary

Section 3 discussed the impact of continuous learning has on dialysis staff knowledge and skills when managing and monitor patients' vascular access. The project aimed to explore how continuous vascular access learning for dialysis nurses and staff may impact their knowledge about patients' vascular access care. The section outlined how the review of literature was done to find best evidence base practices in vascular access to develop project content. I also discussed the steps taken to ensured ethical protection of participants as well as the tools used for data collection and analysis to ensure project integrity. In Section 4, I will discuss the analysis and synthesis findings from collected evidence and potential solutions to addressing gaps in nurses' knowledge in vascular access practice as well as recommendations and lessons learned. In Section 5

I will describe my role as a project manager, practitioner, and scholar while developing a scholarly project.

Section 4: Findings and Recommendations

Introduction

Vascular access bleeding occurs in up to 50% of patient receiving hemodialysis (Pavord & Myers, 2011). Dialysis patients are uremic and anemic, which increases patients' risk for bleeding (Pavord & Myers, 2011). Fatal vascular access hemorrhaging is rare, but when it occurs it is fatal. According to the literature vascular access hemorrhage contributes to 0.4 % of dialysis deaths in the United States in 2000 to 2007 (Jose et al., 2017). The U.S. Veterans Health reported 47 episodes of vascular access bleeding that resulted in fatalities between 2002 and 2007 (Jose et al., 2017). Vascular access fatalities are preventable; therefore, increasing nurses' knowledge and expertise on immediate first aid to handle the vascular access hemorrhage accident is vital.

This project was intended to be conducted at three outpatient dialysis facilities. However, due to reasons beyond my control the project site was switched to a community church located in a rural city in the Southwest United States. The education was designed to address a gap in knowledge among nurses, but was modified to be inclusive of other members of the congregation working in health care settings. The project shifted focus to assess health care staff's knowledge in managing the dialysis patient vascular access in emergent situations in the church setting. The project content was modified and shaped to assess the needs of health care staff in managing a bleeding accident of the dialysis patient vascular access in the community. The project question was modified as: "Does continuous vascular education increase health care staff's knowledge in monitoring and managing patients with a vascular access?"

The content expert review of a demographic survey and the pretest and posttest questions was provided by a dialysis nurse and dialysis nurse practitioner who attend the church. Their feedback was instrumental in modifying the demographic survey questions to assess who would be attending the training. The suggestion was to limit the number of questions to 5–6 to prevent participants from feeling overwhelmed. The other suggestion was to ask participants to share their years of experience with the class. This activity was the ice breaker to introduce the training and emphasized the importance of ongoing learning. The activity also provided me the opportunity to acknowledge participants attending the training.

The problem addressed in this doctoral project was whether continuous vascular access education increases' knowledge and skills when managing a dialysis patient's vascular access. The project site revealed that health care staff within the local church community were not knowledgeable on how to manage a bleeding vascular accident. This project addressed the identified gap in knowledge by developing an evidence-based training program that increased staff's knowledge in managing a bleeding dialysis vascular access. The project was designed to educate health care staff on how to manage a dialysis vascular access. Vascular access bleeding complications although rarely fatal can make the care of dialysis patients a major clinical challenge (Roetker et al., 2022). Providing health care staff with continuous vascular access education keeps them informed and improves their knowledge in vascular access care for dialysis patients. This section presents the findings, recommendations, and project strengths and limitations.

Findings and Implications

There were 13 participants including nursing assistants, a license practical nurse, a register nurse, a nurse practitioner, and other healthcare members. All participants completed the 5-question pretest and posttest, which contained the same questions. The project lasted 90 minutes and included the data collection and the teaching presentation.

Demographic Findings

All 13 participants completed the 6-question demographic survey at the beginning the training session. The Questions 1 through 2 of the demographic survey assessed participants experience in dialysis. The Questions 3 through 6 of the survey assessed participants level of education and years of experience in practice (see Table 1).

Table 1

Demographic Survey Responses (N = 13)

Item	Column A
Work in a dialysis unit	0
Experience in hemodialysis?	0
Nursing Role	
Licensed practice nurse	1
Registered nurse	1
Nursing assistant	7
Nurse practitioner	1
Other	3
How many years in practice	
0-5 years	6
6-10 years	1
11-15 years	1
>20 years	5

Pretest Posttest Questionnaire Findings

The participants' pretest and posttest scores were calculated and converted to percentages (see Table 2). The test questions on the pretest and posttest were numbered

in order of increased complexity with Questions 1 through 3 being simplest and Questions 4 through 6 being the hardest. The improvement in pre- and post-test scores suggests the need for continuous education to increase health care staff's knowledge in managing a bleeding dialysis vascular (see Table 2).

Table 2

Pre- and Posttest Questionnaire Finding

Question	Pretest <i>n</i> (%)	Posttest <i>n</i> (%)	Difference <i>n</i> (%)
1. What supplies are needed to control the bleeding of a dialysis vascular access?	13 (100%)	2 (15.38%)	-11 (84.62%)
2. What is the first thing you should do to control the bleeding of a dialysis vascular arm access?	11 (84.62%)	13 (100%)	2 (15.38%)
3. How should you attempt to control the bleeding of a dialysis vascular access?	9 (69.23%)	12 (92.30%)	3 (23.07%)
4. How long should you apply direct pressure to a dialysis vascular access?	2 (15.38%)	13 (100%)	11 (84.61%)
5. When should you call 911 when a dialysis patient vascular access is bleeding?	7 (53.84%)	11 (84.61%)	4 (30.76%)

Recommendations

The recommendations drawn from this project are supported by the project findings. Based on positive outcomes of this project, providing health care staff with continuous education on vascular access should be ongoing. Health care staff can be better prepared in managing a bleeding dialysis vascular access with ongoing vascular education, which can improve dialysis patients' care. The project encouraged the

community church to explore the opportunity of developing ongoing education for nurses and other health care staff within their community. The pastor and the nurses within the community are working on developing a yearly educational training program on topics relevant to their community.

Contribution of the Doctoral Project Team

The doctoral project team is a panel of experts selected to provide the student with input on the developing staff education project leading to completing project milestones. The project as modified did not utilize a formal project team. I did collaborate with a work colleague who worked in dialysis and with two DNP committee members to guide the modification of the project training material for the change audience at new practice site. I recognized Walden's doctoral project team as being an essential component for ensuring a student's success in completing the doctoral program. The project team was a vital resource to the project leader in completing the doctoral project.

Strengths and Limitations of the Project

The strengths of the project included me being a change agent and a leader for nephrology nurses. The outcome of the project was to improve health care staff's knowledge in managing dialysis patients' vascular access. The doctoral project emphasized the importance of health care staff and nurses being lifetime learners to improve their knowledge. The doctoral project provided me with the opportunity to demonstrate how ongoing learning for health care staff can impact vascular access care for dialysis patients. I demonstrated leadership qualities by developing a dialysis vascular access project for health care staff. The doctoral project also provided me with the

opportunity to encourage nursing peers to be leaders within their place of work to improve nursing practice. I demonstrated to other members in the community on how health care staff improve patient care.

A project limitation was not being able to implement the project at the initial partner site. The project sample size was another limitation. Having a larger sample size of participants would increase the potential generalizability of the findings of the project. Not having a post training survey summary evaluation was also a project limitation. The evaluation survey would provide additional feedback on what to change to improve future training sessions.

Section 5: Dissemination Plan

I will plan on disseminating project findings to the institution experiencing the problem. I also have plans to present project finding to the church community on a designed Sunday as well as sending a thank you note to the pastor and to the church community. In this way I will acknowledge the church community for the opportunity to implement and to present project findings. I plan to be available to assist the church in planning upcoming educational training.

Analysis of Self

Developing the doctoral project provided me with the opportunity to gain experience as a nurse leader. I became more aware of my own weaknesses in public speaking. I learned to welcome new experiences to grow professionally as well as feel more comfortable with speaking in front of nursing peers. The doctoral project built my confidence in my new role as a scholar. The doctoral project taught me how to develop effective communication skills and how to write scholarly. The doctoral project also taught me how to effectively collaborate with health care staff in the community and disseminate evidence-based project findings to health care staff in a local church community. The health care staff in the church community enjoyed the educational training and want to offer additional educational training in the future.

Summary

This doctoral project provided health care staff with ongoing learning to increase their knowledge. The project demonstrated the significance of providing health care staff with ongoing learning to improve their skills in managing dialysis patients' vascular

access. Though the project was initially designed to address vascular access learning needs of health care staff at three outpatient dialysis units, I ended up tailoring the project to address the learning needs of health care staff in the community. Nurses and other health care staff learned how to manage a dialysis vascular access bleeding accident, which improves the care of dialysis patients. The doctoral project demonstrates the significance of providing ongoing educational training to health care staff in improving health care staff knowledge and skills.

References

- Aldoobie, N. (2015). ADDIE model. *American International Journal of Contemporary Research*, 5(6). <https://www.aijcrnet.com>
- Balaz, P., Hanko, J., Magowan, H., Masengu, A., Lawrie, K., & O'Neill, S. (2021). The arteriovenous access stage (AVAS) classification. *Clinical Kidney Journal*, 14(7). <http://doi:10.1093/ckj/sfaa189>
- Basha, P., C. (2017). Role of education in social change. *International Journal of Advance Educational Research*, 2(5). 236-240. <https://www.educationjournal.org>
- Bergjain, M., & Schaepe, C. (2016). Educational strategies and challenges in peritoneal dialysis: A qualitative study of renal nurses' experiences. *Journal of Clinical Nursing*, 25(12–12), 1729–1739. <https://doi.org/10.1111/jocn.13191>
- Bindon, L. S. (2017). Professional development strategies to enhance nurses' knowledge and maintain safe practice. *AORN Journal*, 106(2). <https://dx.doi.org/10.1016/j.aorn.2017.06002>
- Brahmbhatt, Y., Burke, P., Shinn, B., Menachem, B., Abai, B., Salvatore, D., & Sorokin, R. (2018). A quality improvement intervention to improve the efficiency of arteriovenous access placement for pre-dialysis patients. *American Journal of Medical Quality*, 34(4), 376–380. <https://doi.org/10.1177/1062860618810847>.
- Daugirdas, J. T., Blake, P. G., & Ing, T., S. (2015). *Handbook of dialysis 5th edition*. Wolters Kluwer. <https://solution.lww.com/daugirdas>
- Farzi, S., Shahriari, M., & Farzi, S. (2018). Exploring the challenges of clinical education in nursing and strategies to improve it: a qualitative study. *Journal of Education*

and Health Promotion, 7. <https://doi10.4103/jehp.jehp>

- Gaietto, J. K., & Williams, E. M. (2020) Attention: Workforce shortage as a barrier to optimal dialysis. *Seminars in Dialysis*, 33, 505–512. <https://doi10.1111/sdi.12920>
- Gomez, J. N., Castner, D., & Hain, D. (2017). Nephrology nursing scope and standards of practice: Integration into clinical practice. *Nephrology Nursing Journal*, 44(1).
- Hemachandar, R. (2015). Analysis of vascular access in hemodialysis patients-Single center experience. *Journal of Clinical and Diagnostic Research*.
<https://doi.org/10.7860/JCDR/2015/13342.6611>
- Johns T., & Jaar, G. B. (2013). U.S. centers for disease control and prevention launches new chronic kidney disease surveillance system website. *BioMed Central Nephrology*, 14(196). <https://www.biomedcentral.com/147-2369/14/196>
- Jose, M. D., Marshall, M. R., Read, G., Lioufas, N., Ling, J., Snelling, P., & Polkinghorne, K. R. (2017). Fatal dialysis vascular access hemorrhage.
<http://dx.doi.org/10.1053/j.akd.2017.05.014>
- Lee, T. (2018). Fistula first initiative: Historical impact on vascular access practice patterns and influence on future vascular access care. *Cardiovascular Engineering and Technology*, 8(3). <https://doi.org/10.1007/s13239-017-0319-9>
- Mlambo, M., Silen, C., & McGrath, C. (2021). Lifelong learning and nurses ‘continuing professional development, a metasynthesis of the literature. *BMC Nursing*.
<https://doi.org/10.1186/s12912-021-00579-2>
- Norman, L., Wells, B., & Edwards, P.A., (2021). From policy to practice: A DNP student perspective. *Nurse Forum*. <https://doi.org/10.1111/nuf.12582>

Quan, K. (2017). The importance of nursing continuing education. *Nursing CE*, 10(6).

<https://www.nurse.org>

Schoch, M., & Smith, V. (2012). Advance vascular access workshop for dialysis nurses:

A three-year review. *Renal Society of Australasia Journal*, 8(2).

Sever, S. M., Ortiz, A., Maggiore, U., Bac-Garcia, E., & Vanholder, R. (2021). Mass disasters and burnout in nephrology personnel from earthquake and hurricanes to covid-19 pandemic. *American Society of Nephrology*.

<https://doi.org/10.2215/CJN.08400520>

Thamer, M., Lee, C. T., Wasse, H., Glickman, H. M., Qian, J., Gottlieb, D., Toner, S., & Pfloderer, A. T. (2018). Medicare costs associated with arteriovenous fistulas among US hemodialysis patients. *American Journal of Kidney*, 72(1).

<https://doi10.1053/j.ajkd.2018.01.034>

Wright, M. S. (2017). Using evidence-based practice and an educational intervention to improve vascular access management: A pilot project. *Nephrology Nursing Journal*, 44(5), 427–446.