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Prevention of Infection During Hemodialysis Treatment Initiation

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by

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Abstract

Infection in the dialysis access of a patient can be detrimental to the health of a dialysis patient. For this reason, infection control is extremely important in the outpatient hemodialysis setting. The goal of this project is to prevent infection during dialysis treatment initiation. This goal will be achieved during a 5-week project in which staff of an outpatient hemodialysis unit will be directly observed and then educated on the importance of infection control during treatment initiation. Staff will be given education on areas that need improvement regarding infection control during treatment initiation. The staff will be able to use this information to educate future staff members, as well as patients. The staff will be observed before and after the continuing education is presented. This project will provide better patient outcomes for the dialysis clinic because staff will be more competent regarding infection control measures and practices.

Keywords: dialysis treatment initiation, infection control, arteriovenous access

Acknowledgments

Thank you to my husband for putting up with me while working, being pregnant, and finishing my degree at the same time. I know you have put up with a lot.

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CHAPTER I

Introduction

Dialysis is a life-saving treatment for end-stage renal disease. Patients who reach this stage in renal disease require dialysis, or a kidney transplant, to continue to live (Jha et al., 2017). Once a patient is on dialysis, this treatment is usually life-long. A patient usually receives dialysis treatment through cannulation of an arteriovenous (AV) fistula or graft. Infection control in the initiation of hemodialysis treatments using AV fistulas and grafts is extremely important. Infection control can be neglected and overlooked by staff for a variety of reasons; inadequate staffing, rushing, lack of attention, and failure to understand principles of infection control. Not cleaning hands appropriately prior to initiation and failing to properly disinfect the access site can lead to infection (Gork et al., 2019).

Significance

Infections are one of the main causes of death and hospitalizations among chronic dialysis patients in the United States (Lindberg et al., 2019). Patients who are receiving dialysis treatment are also more prone to infection due to being immunocompromised as well as consistent needle cannulation (Kear & Ulrich, 2015). Exposure to infection is also possible through passing of organisms from a person's hands or from touching contaminated equipment.

Infection is the second leading cause of death in dialysis patients, the patients are put at this increased risk due to repeated needle cannulation and treatment initiation (Gork et al., 2019). Hemodialysis patients are more than two times as likely to die from infection than patients with other co-morbid conditions (Fram et al., 2015).

Purpose

The purpose of this project was to educate nursing staff on the high acuity and risk for infection in the hemodialysis patient. Education will include the significance of infection control during treatment initiation and will remind nurses to take the proper steps to protect patients and themselves. Nursing staff will also be educated on best practices for significance and principles of infection control. Improving infection control will prevent infection and death, leading to better patient outcomes.

Theoretical or Conceptual Framework

The theoretical framework for this project is based on Anne Boykin's Theory of Nursing as Caring. This theory directly relates to the education aspect of staff needing to understand how to care for AV grafts and fistulas by getting to the core of why nursing staff should properly care for them. This theory covers caring, the focus and intention of nursing, nursing situation, personhood, direct invitation call for nursing, nursing response, and "the caring between" (Boykin & Schoenhofer, 2020, pp. 335-337).

From the viewpoint of the Theory of Nursing as Caring, the focus and intention of nursing are a "person living caring and growing in caring" (Boykin & Schoenhofer, 2020, p. 335). Providing nurses with factual evidence for improving their practice will assist in applying knowledge and better caring for the patient. Following best practices and ensuring the safety of the patient is caring. "The practice of nursing, and this the practical knowledge of nursing, lives in the context of person-with-person caring" (Boykin & Schoenhofer, 2020, p. 336). If a nurse understands the consequences of actions when properly caring for the patient during access disinfection, nurses will be motivated to improve practice and make the best decisions for the patient's health and well-being.

Nurses care for the patient, so they strive to prevent infection and hospitalization. The Nursing as Caring Theory assumes all persons are caring, and we need to view others as caring people, "and to nurture that person in situation-specific, creative ways" (Boykin & Schoenhofer, 2020, p. 338).

Application of the Nursing as Caring Theory

Figure 1

Application of the Nursing as Caring Theory

Definition of Terms

- Antiseptic: preventing infection by inhibiting the growth of bacteria (The National Kidney Foundation, 2020).
- Arteriovenous fistula: the surgical connection of an artery and vein (The National Kidney Foundation, 2020).
- Arteriovenous graft: “A conduit of synthetic or biological material connecting an artery to vein” (The National Kidney Foundation, 2020, p. s12). The most common grafts are either synthetic or biological. Synthetic is made of synthetic materials, but biological is made of biological materials, one example being a bovine artery (The National Kidney Foundation, 2020)
- Catheter: A medical device placed in the patient that gives access to the right atrium, which allows for the high blood flow that is required for hemodialysis (The National Kidney Foundation, 2020).
- Hand Hygiene: “Hand hygiene applies to hand washing with soap and water, or the use of waterless alcohol-based products or surgical antiseptic solutions” (Kear & Ulrich, 2015, p.439).
- Hemodialysis: Dialysis is a life-saving treatment for end-stage renal disease. The patient’s blood is removed, ran through a filter, and returned to the patient.
- Insertion/exit site: the location on the patient where the dialysis needle inserts into the body or exits the body (The National Kidney Foundation, 2020).
- KDOQI: The Kidney Disease Outcomes Quality Initiative of the National Kidney Foundation Kt/V: The urea clearance index., a lab value that represents the adequacy of dialysis (Wu et al., 2021).

- Needle cannulation: The insertion of a needle with a lumen into a vascular vessel, in this case, the AV graft or fistula (The National Kidney Foundation, 2020).

CHAPTER II

Literature Review

Long-term dialysis was not a reality until the 1960s and since then doctors and nurses have been working to improve dialysis for the patient by providing better outcomes. Better outcomes start with infection control. Prevention of infection can increase the life of the dialysis access, and in turn, the patient. Improvement in infection control and overall dialysis outcomes comes with knowledge and education. The patients and the staff need knowledge and understanding of the dialysis process and the importance of infection prevention for the patient to have the best outcomes. Prevention is best, but if prevention cannot be achieved then early detection of infection is necessary (Biela, 2015). However, prevention is the goal.

Access-Related Infections in Two Haemodialysis Units: Results of a 9-Year Intervention and Surveillance Program

Hemodialysis access-related infections can be serious and can cause access-related bacteremia. The question addressed by the study was if the rate of infections could decrease by using an "intervention and surveillance program" (Gork et al., 2019). The intervention program included nine intervention steps from the CDC, and the results over the first 9 years of the program are used in the study. These steps were implemented to decrease the rate of access-related infections in hemodialysis patients.

The study was performed in two different dialysis units, and data was collected from each infection that was access-related in the units. The nurses would chart the information about the infection type and the location of the infection. Each month, the information was reviewed, and the program's infectious disease specialist and infection

control nurse would record and review the data that was direct to access-related infections. The program staff would also review compliance with the vascular access, and standard precautions, and helped create problem-solving steps to improve the infection prevention of the staff of the dialysis unit (Gork et al., 2019).

For the analysis of the study, it was examined to see if there had been any trends over the years. This was done using the linear regression model and WINPEPI computer programming. For the results of the study, dialysis unit A treated 4,471 patients over the time period, and they had 938 reported infections. Unit B treated 7,547 patients and had 1,061 infections. An interesting find, which seems to be universal, is that the catheter infection rate was higher than the AV fistula or the AV graft. The rates of infection decreased over the 9-year period of program implementation. The authors believe this to be related to the evaluation of the methods and evaluation of the workspace. Staff members of the units were also involved in the study, which helped educate them and make them more aware of infection prevention (Gork et al., 2019).

This study has several strengths and weaknesses. One of the strengths is the length of time that the study was conducted over. Another strength is the amount of surveillance done in relation to the study. Some limitations include that the nursing staff of the units was collecting data and that there was no more in-depth information about the patient's health information. Overall, this study is very strong and shows strong evidence that supports the hypothesis.

Anaerobic Infections of Autogenous Arteriovenous Fistulae

Infections of the AVF can cause aneurysms, bloodstream infections, among other problems. This study reviews two cases of patients that had infections from anaerobic

organisms. Both patient treatment and outcomes are reviewed so that the information can be used for future studies and treatments. The cases were reviewed by the Department of General Surgery at Rush University in Chicago, Illinois, as well as the Department of Vascular Surgery, John H. Stroger Hospital of Cook County Chicago, Illinois (Coughlin et al., 2017).

The first patient was a 95-year-old woman with ESRD on hemodialysis using an AVF. The patient's primary symptom was bleeding from her AVF. Bleeding from the AVF can be extremely dangerous because if the fistula ruptures, the patient can lose a large amount of blood, or can expire from blood loss. The patient was found to have an infection from the Klebsiella oxytoca bacteria. She was initially treated with levothyroxine for 1 month. Later, it was found that she also had Clostridium perfringens and Peptostreptococcus species. Hemodialysis patients generally are immunocompromised, the infection led to delayed wound healing and surgical debridement (Coughlin et al., 2017).

The second patient was a 48-year-old man with ESRD on Hemodialysis with an AVF. He initially presented with an aneurysm on his AVF that was bleeding and was shown to have an infection with the bacteria Enterococcus faecalis and was treated with vancomycin. Almost 2 years later, the patient presented with another infection of the same access that required a 6-week treatment of vancomycin. Ultimately, the fistula incision re-opened and required surgical intervention. The patient became septic and ultimately, had to have a central venous catheter (CVC) placed for hemodialysis therapy. Prior infections and surgeries can make patients more susceptible to access infection (Coughlin et al., 2017, p.E410). According to the author "Aggressive surgical

management of recalcitrant infections can lead to preservation of native hemodialysis access without the need for placement of prosthetic material or catheter insertion" (Coughlin et al., 2017, p.E410). This article could have been a lot stronger if more patients were reviewed, but the information provided is very informative about the treatment of dialysis access infections.

Analysis of Different Vascular Accesses on Dialysis Quality and Infection Risk Factors of Hemodialysis Patients

This study analyzes several types of vascular access and reviews their quality and their relation to infections in patients on chronic hemodialysis. This study covers 162 patients in the hospital setting who are on chronic dialysis. There were inclusion and exclusion criteria, and the patients all signed informed consent. Patients were in two groups, patients with a permanent AVF or patients with a dialysis catheter. Patients were all on the same dialysate bath, had the same size dialyzer, and ran the same amount of time. Labs were drawn periodically to look for dialysis adequacy, creatinine clearance, and other vital labs. Any blood samples that were drawn from the patients that had suspected infection were sent for blood cultures (Wu et al., 2021).

In relation to one another, there was no major difference between the group of subjects. Many factors were compared, such as gender, lab value results, and age. One difference was patients with AVFs, have better Kt/V than patients with a catheter. This is one reason doctors strongly suggest patients with chronic kidney disease get permanent access before they need dialysis. Overall, 31 patients had vascular access-related infections in this study. The results also show patients in the catheter group had a higher incidence of infection than the AVF group. The infection and mortality rates are higher

for patients using dialysis catheters versus fistulas. This is one reason why infection control during the initiation of treatment is so vital (Wu et al., 2021).

This study was very thorough in analyzing the AVF versus catheters in infection rates. Lab values and other dialysis factors were monitored and compared to ensure there were no positive trends that would affect the results of infection rates between the two groups, this was a strength of the study. One weakness is that only 162 patients were monitored, the study was done from February 2018-July 2020. The study was done over an appropriate amount of time. It could have been stronger if the results compared hospitals or facilities.

What Keeps Nurses in Nursing?

Hemodialysis requires nurses to help initiate treatment and monitor patient treatment while on hemodialysis. Nurses also provide infection control education and are able to educate and empower patients, as well as non-licensed personnel, to do the best for the patient in regard to their treatments. Nurses have a direct impact on the patient's daily care. This study uses Heideggerian hermeneutic interpretive phenomenology to examine the nurses' situations and to show what keeps nurses in the healthcare field. The purpose of this study was to "describe and understand" what keeps nurses in nursing (Dunn, 2012, p. 35).

Boykin and Schoenhofer's nursing as caring theory is used for this study. The theory essentially states that nurses stay in nursing because they care and want to continue to care for people. This study surveyed eight participants, who are RNs (registered nurses). These participants volunteered to be a part of the study. Each person had a 1-hour face-to-face interview with the researcher. The results supported that

nursing is caring, and each person had things to offer, and experiences to share, based on caring. “Doing the right thing is intentional ethical caring and keeps the nurse in nursing by intentionally doing something of value, to give back, and validates who the nurse is” (Dunn, 2012, p. 37).

This study had strengths and weaknesses. One weakness was the study did not have a large or very diverse group of participants. Also, all participants were female. Another demographic factor is all participants are in school to some degree. A strength was that the interview was an hour-long. Lots of data were collected regarding each individual person. The study gave room for deeper understanding and deeper evaluation than simply data collection regarding things such as satisfaction and retention rates. Nurses who are caring and want the best care for their patients will try to make good, strong decisions for the best outcomes for their patients. This is related to hemodialysis because when the nurse cares for the patient, they will help ensure that the patient is cared for properly.

Nurses' Practices toward Applying Infection Control Measures Using Notice Checklists at Dialysis Unit

Dialysis patients are at an increased risk for healthcare-acquired infection due to repeat cannulation of their dialysis access. Nursing compliance and adherence to infection control measures can prevent infection and save the patient’s access, and life. The purpose of this study is to monitor nursing care related to dialysis care (Bayoumi et al., 2019). A problem that is addressed is that there needs to be standard care and guidelines regarding infection control. This would help nurses know what guidelines to follow and would help educate them regarding the importance of infection control.

A cross-sectional study was conducted to monitor the nurses' use of infection control practices. The study took place in a Hemodialysis unit at central Ehnasa' government hospital, Beni-Suef City in Egypt between November 2016 and January 2017. The researchers used a tool called the “National opportunity to improve infection control in ESRD National Opportunity to improve infection control in end-stage renal disease (NOTICE)” (Bayoumi et al., 2019, p. 2).

The study results showed there was a need for improvement in infection control, as some of the standards were not being met. This could partially be due to limitations in the study (Bayoumi et al., 2019). Only 17 nurses were observed, and the article mentions a staff shortage and patient overcrowding, nurses may feel rushed in these types of situations. One strength of this study, is a longer-term evaluation, as the same nurses were observed over several months. Nursing shortage is another reason for the increased need for education and retraining, nurses need to be supported and know the best practices. The researchers recommended a training program to help these nurses have a higher standard of patient care, and included posters with tips to help the nurses keep best-practice in mind (Bayoumi et al., 2019).

Using Evidence-Based Practice and an Educational Intervention to Improve Vascular Access Management: A Pilot Project

Nursing staff attending to hemodialysis patients are responsible for administering proper care. One of the goals of this project was to monitor and evaluate the staff’s knowledge and adherence to clinical guidelines. The staff was monitored before and after an educational intervention (Wright, 2017). This project had a pre and post-questionnaire that was focused on “educational intervention” for the staff (Wright, 2017, p. 429).

The criteria and education were based on KDOQI guidelines. The study was conducted at an outpatient chronic hemodialysis unit. The staff at the unit were the ones being observed and studied. This included RNs, licensed practical nurses (LPN), and patient care technicians (PCT) (Wright, 2017). According to Wright (2017), "findings suggest that a vascular access QI [quality improvement] educational program can be effective in improving nursing knowledge and behavioral patterns in managing the vascular access according to clinical guidelines" (p.434).

The results of the study showed staff required continued education to improve their skills regarding access management (Wright, 2017). Staff showed improvement post-education. The studied facility did not have an educator (Wright, 2017). The presence of an educator to help inform and guide staff could lead to much better patient outcomes by improving the staff's practice and keeping the staff educated on best practices. A study strength was generalizability, as the study was conducted in a typical outpatient dialysis unit. A limitation is it only covered one clinic, with one set of staff members (Wright, 2017).

CHAPTER III

Needs Assessment

Infection control in the initiation of hemodialysis treatments using AV fistulas and grafts is extremely important. Introducing infection to the patient's bloodstream can cause infection, loss of dialysis access, or death. Nurses need to be educated, and able to educate others regarding the importance of infection control and the importance of preventing infection during dialysis treatment initiation. Education is power, and nurses can use this power to prevent infection, empower staff and patients, and have better patient outcomes. Educating staff through continued education is one way to improve infection control practices. Helping staff understand the importance and severity of their actions could literally be lifesaving to a patient.

Target Population

The target population affected by poor infection control during dialysis initiation is the patient. The patient is the one receiving the needle sticks. Usually, the patient has an arterial and venous needle and receives this treatment three times a week, which adds up to six needle sticks into their dialysis access every week. These are six direct chances to push bacteria or infection into their bloodstream. ESRD patients have a higher mortality rate due to infections than other patients, approximately 20% of deaths in ESRD patients are due to infection (Abbasi, 2020). These patients are also immunocompromised, leading to greater infection risk (Kear & Ulrich, 2015).

The target population most able to correct the problem are nurses working in outpatient dialysis units. These nurses should be educated on proper infection control techniques and guidelines so that they can lead the other staff in the units and educate the

patients. Nurses need continuing education and training to ensure infection control is adequate in their workplace, and patients receive the best possible outcomes. Nurses have an impact on the patient's access, in the care they give and the education that they give the patient (Ulrich, 2017).

Setting

The setting for this project was an outpatient dialysis unit. These units are found all over the country, and all over the world. These clinics serve chronic hemodialysis patients and are staffed by RNs, LPNs, and PCTs. The project could also be applied to hospital inpatient dialysis units to educate dialysis nurses in the hospital acute dialysis environment as well. A typical outpatient dialysis unit will have approximately 15-30 chairs and machines, all in one large open area, or it can be divided into rooms. In the middle of the room is a counter with computers, otherwise known as the nurse's station. This is where nurses chart and gather supplies. There are other modalities, such as home hemodialysis programs that also have increased infection risk, but the focus of this project will be in-center hemodialysis (Carver, 2018).

Sponsors and Stakeholders

The Project Partner is a nurse educator, RN, for an outpatient hemodialysis unit. The partner is invested and interested in the project to see how infection control can be improved in the outpatient setting. Educators should seek ways in which to improve patient outcomes and find best practices, which is why the partner is invested. Another stakeholder would be the administrator or nurse manager of the unit. The leadership of the unit is invested to see the outcomes and improvements in infection control in dialysis initiation, and in best practices among the staff.

Desired Outcomes

Desired outcomes for the project included several items.

- The main desired outcome is for staff to be informed and educated regarding infection control, and given the tools and knowledge needed to prevent infection within the 5-week project.
- Another desired outcome is the patients will receive better care and stronger education from the staff regarding their care. This outcome will be visible after the implementation of the 5-week project. The nurse managers of the clinic should also see growth moving forward. For the hemodialysis patient, their access is their "lifeline" (Bueno & Latham, 2017, p.328).

The patients and staff need to understand the importance of infection control and be able to apply proper infection prevention techniques to preserve their access. Infection breaches can be very expensive for a clinic (Shankar et al., 2018) These outcomes will be achieved through analysis of staff actions and education that can be applied to practice.

SWOT Analysis

Table 1

SWOT Analysis

SWOT Analysis	
Strengths • Observation and participation in an outpatient dialysis clinic. • The ability to monitor staff and progress over time.	Weaknesses • The inability to monitor more than one-two dialysis clinics. • The number of staff that can be reached.

SWOT Analysis

Opportunities	Threats
• To improve staff's knowledge, skills, and patient care. • To have a lasting impact on the staff's practice. • To prevent infection during dialysis initiation.	• Clinics are short-staffed. • Clinic staff is overworked. • Limited time for education. • Staff burnout.

The strengths of this project include being able to directly observe staff and patients in an outpatient dialysis clinic. This gives the project leader the ability to observe infection control practices directly. Another strength is being able to observe the clinic over time, to see the initial care as well as care provided after educational redirection. A major weakness of this project is the ability to only observe one to two dialysis clinics. Observing more clinics would give the project leader more information and would allow the project leader to reach more staff with the education that could benefit their clinic. But given the amount of time, and the availability of approximately one project leader, this is a limitation.

There are several beneficial opportunities that arise from the implementation of this project. The first opportunity is to improve the knowledge, skills, and patient care of the staff members. This education could then be passed on to future staff members, or the results could be shared with other clinics. The second opportunity is the lasting impact the project will have on the staff's practice. Hopefully, staff will apply their knowledge and use this opportunity for positive change to drive their practice in the direction of increased infection control and prevention. The main opportunity and goal are to prevent infection during the dialysis initiation process.

Threats are also prevalent in the project. Many clinics are facing staff shortages. A shortage of staff puts a burden on the staff that is present (Foster, 2021). Staff shortages can lead to remaining staff being overworked or working more than 40 hours a week. This can also contribute to less time being available for continued education, or the lack of staff to present continued education. Another threat to the project is staff burnout. If a staff member feels burned out, then the staff member may not be open to change or improvements in practice and may not feel the motivation to make improvements in care (Foster, 2021).

Resources

The main resource for the project is an observation tool. This tool will help the project leader see what areas the staff are satisfactory in, and what areas need improvement. This will help the researcher give appropriate education to the staff members following the observation. The researcher will also use the clinic's policies and procedures regarding infection control and infection prevention. The unit-specific policies and procedures will be compared with the KDOQI guidelines. This will be used to create another resource, which would be the educational posters used to help remind staff of proper infection control techniques. These will remain in place after the project for continued staff education.

Team Members

The project team will consist of multiple members. The Team Leader will oversee and guide the project. The Facility Nurse Researcher, which would be a dialysis RN, would gather observations and data from the staff in the dialysis clinics. The Team Leader will assist the Facility Nurse Researcher as needed, or act as a second researcher

if the need arose. The third member would be the project partner, who is a nurse educator, and RN, for an outpatient hemodialysis unit. The next team member would be the administrator or nurse manager of the dialysis clinics that are being observed. This team member would be mainly interested in the results. The administrator would also need to be aware of the research and activities being conducted since the research would be taking place in the dialysis clinics that they oversee. The final team member would be the support nurse, which is, another dialysis nurse that could help guide, give feedback, or conduct research.

Cost-Benefit Analysis

The cost of this project would mainly include the pay for the researcher and team leader. The other team members would have these tasks added to a list of regular duties. The team leader and researcher will be spending a considerable number of hours in the dialysis clinics observing and educating. The stakeholders and sponsors would help cover the cost of this time. If the project was conducted over 4 weeks, with both members working 40 hours a week, the total hours worked would be 320 hours. The team would be using the clinic's lights, heating, and internet access. The number of hours would be multiplied by the hourly wage of the researcher and project leader. Since the two paid team members will be working directly with the staff, they will be able to produce the educational materials using the information they gather with no additional cost, except the direct cost of the poster itself, and other handouts as needed. The posters will be able to be printed at the clinics, and the cost of the printing provided by the stakeholders. According to "Amazon" pricing, posterboard would be $11.64 for 8 sheets, a pack of

white printer paper would be $10.38, and a cartridge of ink would be approximately $30.00 (Amazon, 2022).

Summary

The project was conducted in an outpatient dialysis unit. The project team will consist of multiple RNs and a unit manager/administrator. The team will work over 4 weeks to observe the staff's current infection control measures and develop evidence-based educational tools to be presented to the staff at the clinic. The infection prevention educational tools will then be shared with other clinics or groups as needed. The tools and the education provided will help staff prevent infections in dialysis treatment initiation.

CHAPTER IV

Project Design

This project is a 5-week project with the intention of preventing infection during dialysis initiation. The ideology for the project is based on Anne Boykin's Theory of Nursing as Caring. The project will begin with the observation of staff and then move into education and implementation of infection control practices.

Goals and Objectives

The goal of this project is to prevent infection during the initiation of hemodialysis treatment when using a graft of the fistula. This goal is accompanied by objectives to ensure the goal is met. The following objectives pertain to the goal:

- 2 weeks of direct observation of staff to observe current infection control practices.
- 2 weeks of reviewing staff practice and creating and implementing new educational tools. The tools will be used to educate staff and equip staff to educate future staff, as well as patients. The staff will be educated during the last 2 days of week 4.
- 1 week of project review and presentation, this time will be spent evaluating staff post-education for improvement.

Plan and Material Development

Week 1, Day 1

For the project, the entire team will meet at the dialysis clinic. The team leader, Facility Nurse Researcher, the project partner, and the clinic nurse educator will be present at the meeting. Each team member will be introduced at the beginning of the

meeting, and roles discussed. The team leader will be the head and guidance of the project. The Facility Nurse Researcher will be collecting data and observations, alongside the team leader. The project partner will review materials and help create educational tools. The clinic's educator will be available for questions and will show the team the clinic-specific policies and procedures. Also in this meeting, the data collection tools will be presented. The team leader will then present the "notes" (Appendix A) pages for observation notes to be recorded. The data collection tools include a "daily observation tool" (Appendix B) and a "unit information questionnaire" (Appendix C).

Following the morning meeting, the team will go on a tour of the unit that would be led by the nurse educator. The team will be introduced to the staff and patients. The team will then take the evening to review the current guidelines and unit-specific policies and procedures related to hemodialysis initiation, infection control, and staff delegation.

Week 1, Days 2-5

In days 2-5, the team will be gathering data and observing staff. The team leader and Facility Nurse Researcher will watch each staff member perform at least 10 treatment initiations. Notes will be taken on each staff member. The staff members' names will not be used; however, they will be assigned numbers: ex. staff 1 RN, staff 2 PCT, etc. The team will be using the "notes" document and the "daily observation tool" to gather the data.

Week 2, Days 1-4

This week, the team will continue observation of staff using the provided tools. The team will also work on answering the "clinic information questionnaire" sheet and finding background and pertinent information regarding the training and awareness of the

staff. This tool includes questions about the clinic's last infection control audits, the staff's amount of education regarding infection control and treatment initiation, as well as questions to be asked to each staff member directly regarding their understanding of infection control.

Week 2, Day 5

On week 2, day 5 the team will meet and review the collected data. All the data will be read and reviewed. The team will make comments and notes and discuss the findings as a group. The data will also be organized, and a chart will be developed that shows the breaches of infection control and when they occurred in the treatment initiation process, and if the breach was from an RN or a PCT.

Week 3

During week 3 the team leader, Facility Nurse Researcher, and the project partner will work on creating educational tools based on the findings from the previous 2 weeks. The education that they develop will be specific to the needs of the clinic. The education developed will focus on the prevention of infection with specific steps. One of the educational tools will be information regarding the consequences of poor infection control. This specific tool will be beneficial for staff and will also be beneficial for staff to educate patients regarding infection control and the importance of the following policy.

Week 4, Days 1-3

During week 4, days 1-3, the Team Leader, Facility Nurse Researcher, and Project Partner will finalize educational tools and ensure that they align with the clinic's policies and procedures as well as best practices. The tools need to be presented to the

nurse manager and educator of the clinic to ensure that they are appropriate for the clinic, and to have approval from the manager and educator before they are presented to the staff.

Week 4, Days 4-5

During days 4-5 of week 4, the tools will be presented during an end-of-day staff meeting, and staff will be able to ask any questions. This learning material needs to be presented on both days so that the maximum number of staff can benefit and have the opportunity to attend the education. The staff members will have a chance to ask questions and provide input. This will be beneficial for the staff individually, and as a team. Learning together will help them be able to hold each other accountable to higher standards of practice and patient care.

Week 5, Days 1-3

Week 5 will begin with more observation of staff. The staff has been given the education, and this will be the time to observe to see if any changes were made in their daily practice. The educational tools will be posted around the clinic as a reminder to the staff. The Team Leader and Facility Nurse Researcher will observe staff and make notes of any infection control issues during treatment initiation. They will also be observing for improvement in infection control practice and listening to see if any staff educates patients regarding infection control. The staff will also be asked follow-up questions to see how well the staff remember the information that was presented to them the week before.

Week 5, Day 4

On week 4, day 4, the team leader, researcher, and project partner will meet to review the new information found in observation post-education. The team will look for trends and see if there was any improvement from the previous observations and now. They will also note if any patients were educated or if any patients were given any information on infection control by the staff members. The team will also evaluate if the improvements were from RNs, PCTs, both, or neither. Staff members will also be asked questions regarding infection control practices at random to see if the questions are able to be answered correctly.

Week 5, Day 5

On week 5, day 5 the whole team will present the overall findings to the stakeholders. The team will report the original findings, the educational components, and the follow-up findings regarding improvement. The team leader will record any feedback from the stakeholders. The team leader will make all the data collection tools, and educational resources available to the clinic for use. The clinic will be given permission to share the tools and resources with other clinics or providers.

Timeline

- Week 1:
  - Day 1: Introduction meeting, unit tour, and review of policy and procedures
  - Days 2-5: Data collection
- Week 2:
  - Days 1-4: Data collection
  - Day 5: Review of data collection

- Week 3: Creation of educational tools
- Week 4:
  - Days 1-3: Finalization of educational tools, presentation of tools to clinic manager and educator
  - Days 4-5: Presentation of tools to staff
- Week 5:
  - Days 1-3: Observation of staff practice
  - Day 4: A review of observations and analysis of improvement
  - Day 5: Presentation of overall findings

Budget

Table 2

Budget

Name of Cost	Costs	Total Cost
Salary of team leader	$32/Hr x 40 hours x 5 weeks	$6,400
Salary of Facility Nurse Educator	$32/Hr x 40 hours x 5 weeks	$6,400
Salary of project partner	$32/Hr x 20 hours x 5 weeks	$3,200
Office Supplies	Posterboard: $11.64 Printer Paper: $10.38 Ink: $30.00	$52.02
Power and facilities	Heat/power/water: facilities for the project staff over 5 weeks	$150.00
Total Cost:		$16,202.02

A portion of the budget for this project consists of salaries for the team leader, researcher, and project partner. The budget also includes office supplies and facility use costs of the clinic. The costs for the project would come either from the stakeholders or from a grant, that would be granted to the stakeholders for the administration of the project. The salary of the team members is based on a general nurse's salary. The office supplies would come from Amazon. Power and facility use would be supplied by the dialysis clinic, so the project cost would supply $150 back to the clinic for use of facilities. The other team members, as well as the unit staff, would not receive any funds, because their contribution to the project would be considered daily duties/tasks.

Evaluation Plan

The evaluation plan is implemented in week 5 of the project. The goal of the evaluation plan is to see if there was any positive change in the infection control practice of the staff during hemodialysis treatment initiation. During week 5 of the project, the Team Leader and Facility Nurse Researcher will re-evaluate the direct practice of the clinic staff. The team leader, researcher, and project partner will then review the findings and compare them to the findings that were observed before the education was implemented on day 4 The team will compare the number of breaches in infection control before education compared to after education. The team will also look for instances of staff giving education to patients. If the number of breaches in infection control decreases, and there are staff that educates patients, then the project is successful. If there is no change in practice, and no patients are given education, then the project would need to be revisited or edited in some way to improve outcomes. The staff will also be asked

some questions at random regarding the education from the previous week to see if they are able to answer correctly.

Summary

If successful, this 5-week project will give staff a stronger understanding of infection control and improve their practices regarding hemodialysis treatment initiation. The project will decrease the risk of infection and give staff and patients a better understanding of the importance of proper technique. The team has items to complete each day and must stay on task to complete the project in the allotted 5-week time span. The team members must also work together and collect data, observe staff, and analyze results with a non-biased and open mind.

CHAPTER V

Dissemination

The purpose of this project was to educate nursing staff on the high acuity and risk for infection in the initiation of treatment of the hemodialysis patient. Patients who use a graft or fistula for their treatment access must have two needles placed into the access each treatment. This creates a high risk of introduction to infection. Due to this high risk, healthcare workers who take care of these patients need to be aware of the severity of their actions. Using improper infection control techniques can cost a patient their access, or their life (Indian Journal of Nephrology, 2020). This project is designed to help staff members identify areas in need of improvement, and strengthen their care in weak areas.

Dissemination Activity

The project was presented to a stakeholder on June 28, 2022, for review. The project was presented in PowerPoint form (Appendix D). The project was presented and allowed for stakeholder feedback and comments. The stakeholder is a nurse manager of a local outpatient dialysis unit. The stakeholder showed interest in the project and gave a few suggestions. The stakeholder suggested that the infection rates in the clinic should be observed before the project and after the project to see if there was any change, with the goal of zero access infections. The stakeholder also suggested a team-building exercise to be implemented and for all staff to be aware and on board with any change in policy so that change will be a team effort. This project will also be presented via poster at the Gardner-Webb University Hunt School of Nursing Scholar's Day.

Limitations

This project has several limitations. The most prominent limitation is only reviewing one dialysis clinic. It would be beneficial to see the results of the study across multiple clinics to see if the results were the same at each clinic, or if there were any major differences. Another limitation is time, being able to observe staff several months later to see if there were any changes would also be beneficial but would increase the cost. The Team Leader would also have to take more time off work if the Team Leader had a job outside of the project and would be compensated through the stakeholders, which would also increase the cost for the stakeholders.

Due to time restraint, the educator and nurse manager will be given a "follow-up survey" (Appendix E) that can be used to observe growth for future use if the manager and educator choose to do so. This can be beneficial to the clinic to ensure that the staff implements the correct infection control practices in the future.

Implications for Nursing

The project is very relevant to current nursing practice. Infection control is an ongoing issue throughout nursing and needs to be continually addressed (Indian Journal of Nephrology, 2020). The policy regarding infection control in nursing is continually changing (Fortnum & Bradshaw, 2019). Infection control is a continual issue in every area of nursing, and it is important to equip staff on how to prevent infection for the benefit of their patients. Strengthening the current staff at the dialysis clinic will affect the future staff. The current staff will likely train new staff and pass their practices on to newcomers. Continuing education regarding infection control allows the staff to become

strong, remain strong, and prepare others for preventing infection during treatment initiation.

Recommendations

The project could be strengthened by examining more than one dialysis clinic. This would allow the project leader and stakeholders to see if there were any differences from one clinic to another. Revisiting the project quarterly would also be beneficial because it would help staff be reminded of best practices and would prepare staff for audits. Also observing staff more often would help instill the importance of infection control and help make practices more concrete and habitual. Another recommendation would be to not let the staff know when the audit/observation would happen. The staff would be aware that someone is coming soon for observation but would not know the date. This would possibly help prevent staff from changing practices or not practicing as normally when no one is watching. The staff needs to perform the same whether someone is observing them or not.

Conclusion

This 5-week project will evaluate and strengthen infection control practices during dialysis treatment initiation using AVGs and AVFs. The project team will educate staff in areas of non-compliance and inadequate infection control. The staff will then be able to educate patients and future staff regarding best practices and infection prevention. Nurse managers and other project teams will be able to implement this project, or a similar project in other outpatient dialysis clinics using the information and tools provided. If successful, staff awareness of infection prevention, patient awareness of infection prevention, and patient outcomes will improve.

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Appendix A

Project Notes and Observation Tool

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Appendix B

Daily Observation Tool for Individual Staff

Date:

Is the clinic short staffed today or adequately staffed?

Staff member number being observed:

How many RNs are on the unit today?

How many PCTs are on the unit today?

Did staff member follow policy when initiating treatment?

Did staff member breach infection control practice during initiation? If so, list how.

Appendix C

Unit Information Questionnaire

1. When were the policy and procedures last updated?

2. When was the clinic's last infection control audit?

3. What were the results of the clinic's last infection control audit?

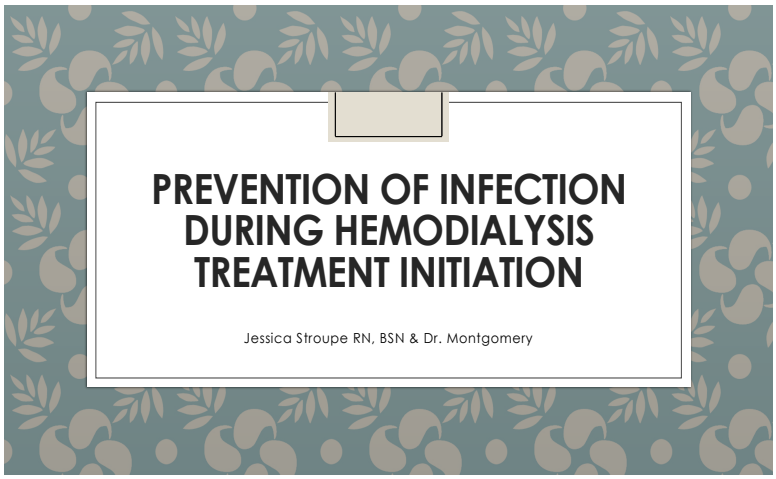
4. When was the clinic's last infection control related education?

5. Do the policy and procedure guidelines match KDOQI/CDC guidelines?

6. Do the Charge nurses/nurse manager/nurse educator address or follow up on any infection control concerns? If so, is this documented/followed or recorded in the clinic?

Appendix D

PowerPoint Presentation for Stakeholders



Introduction

- Dialysis is the life-saving treatment for end stage renal disease.
- Patients who reach this stage in renal disease require dialysis, or a kidney transplant, to continue to live (Jha, 2017).
- A patient usually receives dialysis treatment through cannulation of an arteriovenous (AV) fistula (AVF) or graft (AVG).
- Infection control in initiation of hemodialysis treatments using AV fistulas and grafts is extremely important

Significance

- Infections are one of the main causes of death and hospitalizations among chronic dialysis patients in the United States (Lindberg et al., 2019).
- Patients who are receiving dialysis treatment are also more prone to infection due to being immunocompromised as well as consistent needle cannulation (Kear & Ulrich, 2015).
- Exposure to infection is also possible through passing of organisms from a person's hands or from touching contaminated equipment.

Purpose

- The purpose of this project is to educate nursing staff on the high acuity and risk for infection in the hemodialysis patient
- Education will include the significance of infection control during treatment initiation and will remind nurses to take the proper steps to protect patients and themselves.
- Improving infection control will prevent infection and death, leading to better patient outcomes.

Theoretical or Conceptual Framework

- The theoretical framework for this project is based on Anne Boykin's Theory of Nursing as Caring. This theory directly relates to the education aspect of staff needing to understand how to care for AV grafts and fistulas by getting to the core of why nursing staff should properly care for them.
- Providing nurses with factual evidence for improving their practice will assist in applying knowledge and better caring for the patient. Following best practice and ensuring the safety of the patient is caring
- If a nurse understands the consequences of their actions when they do not properly care for the patient in access disinfection, then hopefully they will be motivated to better their practice and make the best decisions for the patient's health and well-being.

Chapter II – Literature review

- A copy of the literature review is provided for you to review and analyze. The literature backs the importance of infection control and staff education regarding infection prevention.

Chapter III: Needs Assessment

- Nurses need to be educated, and able to educate others regarding the importance of infection control and the importance of preventing infection during dialysis treatment initiation. Education is power, and nurses can use this power to prevent infection, empower staff and patients, and have better patient outcomes

Target Population

- The target population most able to correct the problem are nurses working in outpatient dialysis units.

Setting

- The setting for this project will be an outpatient dialysis unit.
- The project could also be applied to hospital inpatient dialysis units to educate dialysis nurses in the hospital acute dialysis environment as well.

Sponsors and Stakeholders

- The main sponsor or stakeholder of the project is the administrator or nurse manager of the unit.
- The leadership of the unit is invested to see the outcomes and improvements in infection control in dialysis initiation, and in best practice among the staff.
- The nurse manager would be interested due to possible increased performance from staff as well as better patient outcomes.

Desired Outcomes

- The main desired outcome is for staff to be informed and educated regarding infection control, and given the tools and knowledge needed to prevent infection.
- Another desired outcome is the patients will receive better care and stronger education from the staff regarding their care. For the hemodialysis patient, their access is their "lifeline" (Bueno & Latham, 2017, p.328)

SWOT ANALYSIS

Strengths

- Observation and participation of an outpatient dialysis clinic.
- The ability to monitor staff and progress over time.

Weaknesses

- The inability to monitor more than one-two dialysis clinics.
- The number of staff that can be reached.

Opportunities

- To improve staff's knowledge, skills, and patient care.
- To have a lasting impact on the staff's practice.
- To prevent infection during dialysis initiation.

Threats

- Clinics being short-staffed.
- Clinic staff being overworked.
- Limited time for education.
- Staff burnout.

Resources

- The main resource for the project is an observation tool. This tool will help the project leader see what areas the staff are satisfactory in, and what areas need improvement.
- The unit specific policies and procedures will be compared with the KDOQI guidelines

Team Members

- The team leader will oversee and guide the project.
- The researcher, which would be a dialysis RN, would gather observations and data from the staff in the dialysis clinics
- The third member would be the project partner, who is a nurse educator, RN, for an outpatient hemodialysis unit
- The next team member would be the administrator or nurse manager of the dialysis clinics that are being observed. This team member would be mainly interested in the results

Chapter IV: Project Design

- This project is a five-week project with the intention of preventing infection during dialysis initiation. The ideology for the project is based on Anne Boykin's Theory of Nursing as Caring. The project will begin with observation of staff, and then move into education and implementation of infection control practices.

Goals and Objectives

- The goal of this project is to prevent infection during the initiation of hemodialysis treatment when using a graft of fistula
- Two weeks of direct observation of staff to observe current infection control practices.
- Two weeks of reviewing staff practice and creating and implementing new educational tools. The tools will be used to educate staff and equip staff to educate future staff, as well as patients.
- One week of project review and presentation

Timeline

- Week One:
  - Day one: Introduction meeting, unit tour, and review of policy and procedures
  - Day two through five: Data collection
- Week Two:
  - Day one through four: Data collection
  - Day five: Review of Data Collection
- Week Three: Creation of educational tools

Timeline

- Week Four:
  - Day one through three: Finalization of educational tools, presentation of tools to clinic manager and educator
  - Day four and five: Presentation of tools to staff
- Week Five:
  - Day one through three: Observation of staff practice
  - Day four: review of observations and analysis of improvement
  - Day five: Presentation of overall findings

Budget

Name of Cost	Costs	Total Cost
Salary of team leader	$32/Hr x 40 hours x 5 weeks	$6,400
Salary of researcher	$32/Hr x 40 hours x 5 weeks	$6,400
Salary of project partner	$32/Hr x 20 hours x 5 weeks	$3,200
Office Supplies	Posterboard: $11.64 Printer Paper: $10.38 Ink: $30.00	$52.02
Power and facilities	Heat/power/water: facilities for the project staff over 5 weeks	$150.00
		Total Cost: $16,202.02

Evaluation Plan

- The evaluation plan is implemented in week five of the project.
- The goal of the evaluation plan is to see if there was any positive change in the infection control practice of the staff during hemodialysis treatment initiation
- During week five of the project, the team leader and researcher re-evaluate the direct practice of the clinic staff. The team leader, researcher, and project partner will then review findings and compare them to the findings that were observed before the education was implemented on day four. The team will compare the number of breaches in infection control before education compared to after education.

Evaluation Plan

- The team will also look for instances of staff giving education to patients. If the number of breaches in infection control decreases, and there are staff that educate patients, then the project is successful. If there is no change in practice, and no patients are given education, then the project would need to be revisited or edited in some way to improve outcomes. The staff will also be asked some questions at random regarding the education from the previous week to see if they are able to answer correctly.

Chapter V: Dissemination

- The purpose of this project is to educate nursing staff on the high acuity and risk for infection in the initiation of treatment of the hemodialysis patient.
- This project is designed to help staff members identify areas in need of improvement, and to strengthen their care in weak areas.

Limitations

- The most prominent limitation is only reviewing one dialysis clinic. It would be beneficial to see the results of the study across multiple clinics to see if results were the same at each clinic, or if there were any major differences
- Another limitation is time, being able to observe staff several months later to see if there were any changes would also be beneficial but would increase cost. The team leader would also have to take more time off work if they had a job outside of the project and would be compensated through the stakeholders, which would also increase cost for the stakeholders.

Implications for Nursing

- The project is very relevant to current nursing practice. Infection control is an ongoing issue throughout nursing and needs to be continually addressed (Prevention of Infection, 2020).
- Strengthening the current staff at the dialysis clinic, will affect the future staff. The current staff probably will be training new staff and passing their practices on to the next set of staff.
- Continuing education regarding infection control helps the staff become strong, remain strong, and prepare others for preventing infection during treatment initiation.

Recommendations

- The project could be strengthened by examining more than one dialysis clinic. This would allow the project leader and stakeholders to see if there were any differences from one clinic to another.
- Revisiting the project quarterly would also be beneficial because it would help staff be reminded of best practice and would prepare staff for audits.
- Also observing staff more often would help instill the importance of infection control and help make their practices more concrete and habitual.
- Another recommendation would be to not let the staff know when the audit/observation would happen. The staff would be aware that someone is coming soon for observation but would not know the date. This would possibly help prevent staff from changing practices or not practicing as normally when no one is watching. The staff need to perform the same whether someone is observing them or not.

Conclusion

- If successful, this five-week project will give staff a stronger understanding of infection control and improve their practices regarding hemodialysis treatment initiation.
- The project will decrease the risk of infection control and give staff and patients a better understanding of the importance of proper technique.
- The team has tasks to complete each day and must stay on task to complete the project in the five-week timespan that is allotted.
- The team members must also work together and collect data, observe staff, and analyze results with a non-biased and open mind.

Appendix E

Follow-Up Survey

Are staff still following policy regarding infection control during treatment initiation?

- Are staff cleaning the access site per clinic policy?

- Are staff using aseptic technique when cannulating the patient's access?

Observe each staff member at least once.

How many staff members breached infection control?

Is this number better than previously?

When asked questions regarding the importance of infection control can staff answer correctly?