



Walden University
ScholarWorks

Walden Dissertations and Doctoral Studies

Walden Dissertations and Doctoral Studies
Collection

2020

Educational Program for Decreasing Catheter-Associated Urinary Tract Infections

Josephine Crentsil
Walden University

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



Part of the [Nursing Commons](#)

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 Health Sciences

This is to certify that the doctoral study by

Josephine Crentsil

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. Barbara Gross, Committee Chairperson, Nursing Faculty
Dr. Courtney Nyange, Committee Member, Nursing Faculty
Dr. Cheryl McGinnis, University Reviewer, Nursing Faculty

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

Walden University
2020

Abstract

Educational Program for Decreasing Catheter-Associated Urinary Tract Infections

by

Josephine Crentsil

MS, Excelsior College, 2015

ASN Excelsior College, 2009

Project Submitted in Partial Fulfillment

of the Requirements for the Degree of

Doctor of Nursing Practice

Walden University

May 2020

Abstract

Catheter-associated urinary tract infection (CAUTI) is the most common hospital-acquired illness. Insertion and maintenance of urinary catheters are critical factors that predispose patients to CAUTI. Studies have shown that many nurses have a knowledge deficit regarding evidence-based practices in the insertion and management of urinary catheters, which can help prevent CAUTI. This is a concern because nurses are typically the first point of contact with patients and are responsible for the promotion of evidence-based practice and preventative measures. Therefore, this project aimed to develop an educational intervention for nurses with a focus on proper insertion and maintenance of indwelling urinary catheters. Lewin's theory of planned change was used to provide the theoretical framework. The education program was developed based on recommended practices for CAUTI prevention and management. A paired *t*-test was used to analyze the differences in the knowledge scores of the nurses before and after the intervention (n=62). The average knowledge score of the participants improved significantly following the provision of the intervention by 11.4% (95% CI: 9.7, 13.0; $p < 0.001$) while CAUTI rates decreased by 55%. The findings show that educating nurses on evidence-based practices on catheter insertion, maintenance, and timely removal is an effective approach to decreasing CAUTI rates. The reduction in CAUTI rates can promote social change by decreasing healthcare costs and length of hospital stay.

Educational Program for Decreasing Catheter-Associated Urinary Tract Infections

by

Josephine Crentsil

MS, Excelsior College, 2015

ASN Excelsior College, 2009

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

Walden University

May 2020

Dedication

I would like to dedicate this project to my husband, Victor, and my three children - Victor, Eliana and Jasson - for all their love and support. To my parents for their encouragement.

Acknowledgments

I would like to express my sincere thank you to Dr. Barbara Gross, my project mentor, for always being available to answer my questions and to direct me and to Dr. Courtney Nyange and Dr. Cheryl McGinnis for their guidance through this project.

Table of Contents

List of Tables	iv
List of Figures	v
Section 1: Nature of the Project	1
Introduction.....	1
Problem Statement.....	1
Nature of the Doctoral Project	4
Significance.....	5
Social Change	7
Summary.....	7
Section 2: Background and Context	8
Introduction.....	8
Concepts, Models, and Theories.....	8
Definition of Terms.....	10
Relevance to Nursing Practice	10
Local Background and Context	13
Role of the DNP Student.....	14
Role of the Project Team	15
Summary.....	16
Section 3: Collection and Analysis of Evidence.....	17
Introduction.....	17
Practice-Focused Question.....	17

Sources of Evidence.....	17
Data Collection	19
Participants.....	19
Data Collection Procedures.....	20
Instruments.....	21
Protection of Human Subjects	22
Analysis and Synthesis	22
Summary	23
Section 4: Findings and Recommendations	24
Introduction.....	24
Findings and Implications.....	24
Characteristics of the Participants.....	25
Reductions in CAUTI Rates	26
Improvements in Knowledge.....	27
Implications of the Findings	29
Implications for Practice	29
Implications for Policy.....	30
Implications for Research	31
Implications for Social Change.....	31
Recommendations.....	32
Contribution of the Doctoral Project Team	33
Strengths and Limitations of the Project.....	33

Summary	35
Section 5: Dissemination Plan	36
As a Nurse Practitioner	37
As a Scholar	38
Project Manager	39
Summary	39
References.....	41

List of Tables

Table 1. Participants Demographic Characteristics ($N = 62$)26

List of Figures

Figure 1. CAUTI rates before and after implementation.....27

Figure 2. Knowledge of test scores for participating nurses.....28

Section 1: Nature of the Project

Introduction

Urinary tract infection (UTI) is one of the most commonly reported healthcare-associated infections in nursing homes, often resulting in blood stream infections and hospital readmissions (Meddings et al., 2017). Unsuitable usage of antibiotics to treat asymptomatic bacteriuria is a common but a dangerous practice for nursing home residents. This is because treatment of asymptomatic bacteriuria in adults is unlikely to confer clinical benefits and may instead promote the emergence of antimicrobial-resistant flora (Trautner et al., 2009). About 5 to 22% of nursing home residents will have an indwelling urinary catheter at some point during care (Mody et al., 2015). Nursing home residents with indwelling catheters have a higher risk of developing catheter-associated urinary tract infection (CAUTI), with over 50% exhibiting some symptoms of CAUTI (Meddings et al., 2017; Mody et al., 2015).

A commonly cited reason for such a high CAUTI prevalence is lack of knowledge and nonadherence to evidence-based practices for the prevention and management of CAUTIs (Jain, Dogra, Mishra, Thakur, & Loomba, 2015). The practicum site is a nursing home where CAUTI rates are above the national average. The problem addressed was the knowledge deficit of nurses on the proper catheter insertion and maintenance practices. The project leader sought to develop a staff education program on the management of indwelling catheters with the goal of improving knowledge on the insertion and care of indwelling urinary catheters.

Problem Statement

The practice problem at the nursing home is that nurses have inadequate knowledge and skills for the proper insertion and management of indwelling catheters. As a result, there has

been an increase in CAUTI rates at the facility, with a prevalence rate surpassing the national average. Mody et al. (2015) asserted that the risk of developing CAUTI increases with extended usage, incorrect insertion, and maintenance of indwelling catheters. The inadequate knowledge with regards to the insertion and improper management of indwelling catheters has led to a gap in the provision of quality care. The nurses are unable to provide care based on the best available evidence for the insertion and maintenance of indwelling catheters. In most cases, the catheters are not inserted correctly and are left to stay for a longer duration than needed, leading to increased prevalence of CAUTIs.

The practice problem at the nursing home was attributed to a lack of educational interventions targeting improvements in nursing practice. Nursing staff at the facility were not mandated to participate in regular training on CAUTI prevention and management and thus are not kept abreast of the changes taking place in the field. More than 80% of the project site's nurses fail to assess inserted urinary catheters and tend to leave them in the patient for longer than needed. If the issues of knowledge and skills deficits are not addressed, CAUTI rates may continue to increase, and the healthcare facility could experience higher rates of morbidity and readmission. The facility's CAUTI rate is 3.4%, which is almost twice as high as the national average of 1.8%. The facility's high CAUTI rate highlighted the need to train nurses on the proper insertion and monitoring of catheters.

The issue of knowledge and skill deficit for CAUTI prevention has been confirmed in the existing literature about factors associated with and the prevention of CAUTI. Jain et al. (2015) found that most of the nurses were unfamiliar with the indication of catheterization. For instance, less than a third of the nurses supported urine output monitoring or obtaining a sample for culture

and sensitivity as an indication for catheterization. Most of the nurses were unfamiliar with one or more indications of catheterization, and the healthcare facilities lacked a defined management plan to prevent unnecessary catheterization. The lack of awareness about various indications points to why there is an increase CAUTIs and the inappropriate usage of catheters. The findings from the survey demonstrated the need for the training of healthcare providers and making CAUTI prevention a priority in the provision of care to catheterized patients.

This doctoral project is of significance to the nursing facility as well as nursing profession. CAUTI is the most common hospital-acquired infection, accounting for approximately 40% of all nosocomial infections (Mori, 2014). The prevalence of CAUTI makes it one of the facility's biggest threats of harm to their residents. CAUTIs result in substantial morbidity in patients, including fever, discomfort, malaise, and excessive use of antibiotics, resulting in antibiotic resistance (Jain et al., 2015). Researchers have revealed that CAUTI is the leading cause of other infections within healthcare settings, including septic arthritis, urethral injury, endocarditis, hematuria, and prostatitis (Centers for Disease Control and Prevention [CDC], 2017; Nicolle, 2014). It is also a major cause of death, particularly for patients with a secondary bloodstream infection (Mitchell et al., 2017). The CAUTI mortality rate has been estimated to be around 10% (Fekete, 2016). CAUTI has also been associated with increased readmission and hospital stays, and this is critical for healthcare facility to monitor, considering that the Center for Medicare and Medicaid Service is no longer reimbursing facilities with high rates of length of stay and readmission (Nicolle, 2014; Saint et al., 2016).

Healthcare facilities have been forced to address the issue of nosocomial infections using evidence-based strategies with the nursing staff. Several studies reported the development and

implementation of educational interventions targeting nurses as an evidence-based strategy in reducing CAUTI rates (Adams, Bucior, Day, & Rimmer, 2014; Mori, 2014; Saint et al., 2016; Wenger, 2010). Nurses play a critical role in the insertion and maintenance of indwelling catheters, hence the need to keep them updated on evidence-based practice. The nursing education intervention focused on evidence-based practice guidelines to empower nurses to learn appropriate catheter insertion and maintenance.

Purpose Statement

The gap in practice was that nurses were not providing care based on the best available evidence, typically due to inadequate knowledge. In most cases, the indwelling catheters were not inserted properly and were left to stay for a longer duration than required, leading to increased CAUTI rates. The guiding practice-focused question was as follows: Will the implementation of an evidence-based educational program among nurses about CAUTI prevention in a nursing home improve their knowledge on the insertion and care of indwelling urinary catheters within 2 months? Nurses should have the knowledge and competence to provide safe, evidence-based care to catheterized patients. The application of best practices has the potential to reduce the prevalence of CAUTI and readmissions to the hospital due to nosocomial infections.

Nature of the Doctoral Project

Two main sources of evidence were used in this project. The first source of evidence was a literature review of evidence-based practices in reducing the incidence of CAUTI. The need for this project has been substantiated by empirical studies at the national level that have validated the practice problem at the nursing home. The program focused on best practices for CAUTI

prevention and management, including minimizing the use of urinary catheters, removing them immediately when not needed, and developing a catheter insertion policy to include all proper steps for the nursing staff providing care to catheterized patients (CDC, 2015; Meddings et al., 2017). The next source of evidence was a health needs assessment and review by local nursing experts for hospital acquired infections.

The educational program was designed in a multimodal format to address the different aspects of learning. It was delivered in a self-paced didactic educational approach focusing on the concepts of catheter insertion and maintenance. The didactic approach involved the use of PowerPoint slides highlighting the best practices for catheter insertion and maintenance. Addressing the practice gap led to improved quality and safety of care provided to catheterized patients alongside decreased CAUTI and readmission rates.

Significance

Stakeholders are individuals or groups that may be affected by outcomes of a project (Zaccagnini & White, 2015). In this project, stakeholders were individuals or groups with a connection to the facility that have an interest in reducing CAUTI rates and may be affected in one way or another by the educational program. Direct stakeholders included the nursing staff, facility administrators, project champions, patients, and the project leader. Ancillary stakeholders included family and community members, regulatory agencies, and insurance companies or the payer source of the patient. The nursing staff benefited through improvements in knowledge and competence for insertion and maintenance of urinary catheters. The facility administrators benefited through reductions in CAUTI rates, thus saving money by avoiding financial penalties associated with a high prevalence of CAUTI.

The project champions are the nurses who promoted the adoption of best practices and benefited from improved knowledge and quality of care provided to catheterized patients. As the project leader, I had an opportunity to practice leadership skills when developing and implementing nursing projects aimed to promote evidence-based practice (EBP) at the bedside. Patients were the main beneficiaries because CAUTI incidences declined, leading to a reduction in readmission rates and length of stay. Ancillary stakeholders, such as family members and the community in general, benefited through reductions in morbidity and mortality rates, leading to improved social and economic productivity.

This project contributes to nursing practice. The Institute of Medicine (2011) asserted that nurses should have the ability to fully practice nursing to the extent of their education and training. In addition, the DNP Essential VI requires nurses to have the ability to work alongside other healthcare providers to identify health problems while developing quality improvements as well as tracking their effectiveness (White, 2015). Improved knowledge and competence on catheter insertion have prompted nurses to respond to their duty of removing unnecessary catheters. Removing unnecessary catheters is crucial because empirical research has shown that each day that the catheter remains, the patient experiences a 3 to 7% risk of developing an infection (Donelli & Vuotto 2014).

The design of the educational program may facilitate transferability of the intervention to other settings with similar patients. I have provided essential details regarding the nature of the project to facilitate replication in other settings. Replication of the program in other settings can facilitate a culture change towards best practices for insertion and maintenance of urinary catheters.

Social Change

In order to create positive social change at the project site, a culture of change in this setting for indwelling catheter insertion and maintenance must involve a shift in practice (Theurer et al., 2015). The staff education program addressed the provision of evidence-based care to catheterized patients and has the potential to begin a new movement of social change at the facility. Through the educational program and mentoring of individual nurses, this evidence-based project shifted the clinical performance in a positive direction as each provider was able to insert and remove indwelling catheters appropriately. This has led to improved clinical practice, promoting positive social change by reducing the morbidity, readmission, and mortality rates associated with the incorrect insertion and management of CAUTI.

Summary

The use of urinary catheters is a common procedure carried out by nursing staff for the treatment of urinary retention and a variety of other health conditions. In spite of the potential benefits, the use of urinary catheters presents severe risks to the patient if used for an extended duration or inserted inappropriately. It can lead to the development of CAUTI, which leads to increased hospital readmission, morbidity, healthcare costs, and at times death of the patient (CDC, 2019; Nicolle, 2014). At the healthcare facility, licensed nurses are not providing care based on recommended practices for prevention of CAUTI. Consequently, the goal of this project was to develop an educational program to instruct nurses on EBPs in the insertion and management of urinary catheters for the reduction of CAUTI rates. In Section 2, I present a review of the background and context related to this project.

Section 2: Background and Context

Introduction

The practice problem was that the nurses working in the nursing home had inadequate knowledge and expertise for appropriate insertion and maintenance of urinary catheters. As a result, they were not able to provide care consistent with best practices for CAUTI prevention. For instance, the nurses were unable to recognize and remove catheters that were no longer needed by the patients, which can easily lead to infections. The recommendation by experts is that the use of urinary catheters should be limited and placed only if appropriate (CDC, 2015).

The purpose of this project was to develop and implement an educational intervention to guide nurses on EBP in the insertion and maintenance of urinary catheters to reduce CAUTI rates at the nursing home. In this section, I provide an overview of the theories, models, and concepts supporting the development of this educational program. This is followed by a discussion of the relevance of this project to nursing practice, the background, and the role of the project leader and project team. I then conclude with a summary.

Concepts, Models, and Theories

According to Zaccagnini and White (2015), theoretical frameworks are essential to guide nursing processes and define nursing roles. Theoretical principles are required for both nursing research and practice because they help support health and philosophical beliefs (Melnik & Fineout-Overholt, 2011). The theoretical framework for this study was based on Lewin's 3-step change model. Through the knowledge and competence derived from the educational program, the nursing staff providing care to catheterized patients is expected to experience change.

Lewin developed the change theory in the 1940s, and the phases steps include unfreezing, change, and refreezing, which are steps that require prior behavior to be abandoned and replaced (Cummings, Bridgman, & Brown, 2016). The key concepts of this theory include driving forces, equilibrium, and restraining forces. Driving forces facilitate change by pushing it in the desired direction while restraining forces bar the change from taking place. Equilibrium is a state in which the driving and the restraining forces exert equal force, and no change occurs at this point (Burnes, 2017).

Before change can be adopted, the facility has to go through the initial step of unfreezing. Considering that most people naturally resist change (Cummings et al., 2016), the goal during this step should be creating awareness of why the current practice requires modification. Emphasis was placed on the impact of non-EBP on CAUTI rates and how they were hindering the facility from accomplishing its mission of providing safe and quality care.

The next step was the transitioning or moving phase, and it is at this stage that the organization transits to a new state (Burnes, 2017). It is in this phase that change becomes real and employees struggle with the new reality. In this stage, the nurses received information on EBP and rationale for the practice. To prevent potential restraining forces such as resistance to change, the multimodal educational program allowed for a question and answer session to clarify all myths regarding urinary catheters. It is at this phase that nurses learned new behaviors and ways of acting in accordance with best practices.

The last stage is refreezing and involves solidifying and stabilizing the new state of following change. It is at this phase that changes are made to organizational processes and structures become the new norm (Shirey, 2013). At this phase, the project champion nurses

ensured that appropriate protocols were followed on each shift to ensure that catheters were inserted properly and were only used when necessary to prevent CAUTI. Data about reductions in CAUTI were collected and shared during internal meetings where nurses following the recommended practices were acknowledged and encouraged. This step is critical to ensure that the nurses do not revert to their previous ways of inserting and maintaining catheters (Burnes, 2017).

Definition of Terms

Catheter associated urinary tract infection (CAUTI): An infection that occurs in a patient who had an indwelling catheter in place for 2 days or 48 hours before the onset of the urinary tract infection (CDC, 2015).

External catheter: A urine containment device that adheres to the external genitalia and is attached to a urinary drainage bag (CDC, 2020).

Hospital acquired infections (nosocomial infections): Infections that were not present when the patient was admitted to the nursing home prior to the insertion of the catheter (CDC, 2020).

Indwelling urinary catheter (IUC): A drainage tube that is inserted into the urinary bladder through the urethra and is connected to a collection system.

Urinary tract infection (UTI): Infection involving any structure or organ of the urinary tract system, which includes urethra, bladder, ureters, and the kidneys (CDC, 2019).

Relevance to Nursing Practice

Prior to the widespread introduction and adoption of Foley catheters in the 1930s, catheterization was almost exclusively a procedure for treatment of urinary retention in males.

Early catheters were in most cases rigid and were designed for intermittent catheterization (Feneley, Hopley, & Wells, 2015). The introduction of indwelling catheters made both short term and long term catheterization feasible for both men and women, opening up a new era of management of urinary incontinence (Feneley et al., 2015). The catheters are also commonly used to determine urinary outputs in critically ill patients and patients with skin problems who experience pressure ulcers. The devices are also used for patients with spinal problems as well as patients receiving a large volume of diuretics or infusions while undergoing an operation (Wald, Ma, Bratzler, & Kramer, 2008).

Though useful in draining the bladder that fails to empty, the use of urinary catheters has been associated with the development of nosocomial infections in healthcare facilities (Feneley et al., 2015). The risk of developing a CAUTI increases with extended usage and incorrect insertion of the catheter (Mody et al., 2015). As a result, various organizations with a goal of reducing the prevalence of CAUTI have developed best practice guidelines to provide guidance to healthcare professionals as an attempt to decrease CAUTI rates. Nevertheless, CAUTI rates remain significantly high across healthcare facilities despite the presence of evidence-based guidelines for reducing the incidence rates (Meddings et al., 2017).

As a result, Centers for Medicare and Medicaid Services (CMS) added CAUTI to the list of largely preventable patient safety incidents that should not occur if preventative measures have been adopted, acknowledging that most incidents of CAUTI are preventable (Feneley et al., 2015). Consequently, healthcare facilities with unexpected high rates of CAUTI and readmission no longer receive reimbursements. With the non reimbursement policy for high CAUTI rates, hospitals are faced with significant and new financial challenges (Meddings et al.,

2012). Moreover, the action plan by the United States Department of Health and Human Services (2014) called for a 25% decrease in the number of symptomatic CAUTI per 1,000 urinary catheter-days in the hospital as a national prevention target. CMS also requires acute care hospitals taking part in their Inpatient Prospective Payment systems to report CAUTI incidences (Saint et al., 2016).

According to Yoon et al. (2013), though the use of indwelling catheters has been present over decades, healthcare facilities are not properly auditing catheterized patients, and some practitioners are not aware that their patients have an indwelling urinary catheter. This was the state of practice at the project site where nurses hardly reviewed the need for the use of catheter, hence failing to remove them when there was no indication for it. Meddings et al. (2017) found that nurse-led interventions, systematic and regular monitoring of patients, and timely removal of unnecessary catheters led to reduced CAUTI rates.

Likewise, intervention studies by Adams et al. (2014), Bell, Alaestante, and Finch (2016), Blondal et al. (2016), Donelli and Vuotto (2014), and Saint et al. (2016) found supporting evidence for the use of educational interventions to decrease CAUTI rates. The interventions provided in the above studies focused on correct insertion, minimizing use, and timely removal of catheters no longer needed by the patient. The nurse-driven protocols led to statistically significant reductions in CAUTI rates. Therefore, it is evident that an educational program based on best practices empowered nurses to properly insert and independently remove indwelling catheters that threatened the wellbeing of the patient results in reduced CAUTI rates and better patient outcomes.

Local Background and Context

Health needs assessment is imperative to determine unmet needs and provide a baseline for gauging the effectiveness and efficiency of interventions developed to address the identified issues (Pennel, McLeroy, Burdine, Matarrita-Cascante, & Wang, 2016). The need for this project was determined by evaluating the entire facility's infection control data, and there was an emphasis on the data from the skilled nursing floor. All nurses working in the facility were invited for training. The skilled nursing floor has the highest prevalence of CAUTI and was characterized by poor practices in the provision of care to catheterized patients. Specifically, the nurses at the skilled nursing floor had verbally reported they did not feel comfortable and lacked the expertise in insertion and maintenance of catheters. Additionally, the facility infection control data indicated that nurses allowed the catheters to stay for a longer period than needed by the patient. A conversation with some of the nurses revealed their myths about urinary catheters usage, such as how it can stay in the patient longer for their own convenience. Therefore, there was a need for an educational program to promote EBP at the bedside to correct non-EBP relating to the use of urinary catheters and to reduce CAUTI rates.

The project was implemented in a 36-bed skilled floor located in a 200-bed facility in the United States. On average, about 30 patients are attended to on this floor daily. Most of the patients seeking care at this nursing home are elderly, with an estimated average age around 70 years. The floor has 20 licensed nursing staff, with the entire nursing home having 80 nurses. The skilled floor currently has the highest rate of nosocomial infection in the nursing home. CAUTIs are higher than other healthcare-associated infections and are particularly more common for patients with indwelling catheters (CDC, 2015).

Role of the DNP Student

I have worked as a nurse in acute care settings for over a decade, and the Doctorate of Nursing program has given me the skills necessary to identify and address such practice problems. I sought to make use of the skills gained to develop a cost-effective program grounded on theory and best practices to reduce the incidence of CAUTI at the nursing home. My role as the DNP student was that of the project leader in this nursing home where the educational program was implemented. I took the responsibility to design and implement the program while ensuring that it reflects best practices for prevention and management of CAUTIs.

As the project leader, I had to work with project champions in monitoring the progress and compliance with the new practices. I also provided mentorship and guidance on EBP. It is essential that the nurses comprehend and are able to make use of best evidence to provide safe and effective care (Zaccagnini & Pechacek, 2019). The facility has many nurses providing care based on traditions, myths, and anecdotal evidence rather than on the basis of best available empirical evidence and patient needs.

As a result, my motivation is to bridge the gap between research evidence and practice by developing an educational program rooted in best practices for prevention of CAUTI. It is my desire that the nursing home will have zero CAUTI rates considering that most of these incidents are preventable. I do not hold any bias that would have negatively affected the program. However, I held assumptions such as nurses at the facility were trying to provide the best quality of care, would be receptive to their new practice and implementation of the project would lead to improved practices and reductions in CAUTI rates.

Role of the Project Team

A team of professionals from within the organization was selected to guide, review, and provide feedback regarding the development of the educational program. Potential benefits of involving team members include gaining unique insights of various issues that may aid the decision-making process (Banfield, Yen, & Newby, 2017). Failure to involve the team members in the development of this program would have denied the DNP candidate an opportunity to understand their point of view. It is anticipated that each team member would bring unique knowledge and insights in the development of the program.

The members of the project team included the project leader, project champions (nurse practitioners passionate about reducing CAUTI rates), unit managers, nurses, and local nursing experts from the facility. As the project leader, I designed the required materials and invite the panel of experts to review the content and relevance of the program. The unit manager assisted by encouraging staff nurses to attend the educational classes followed by ascertaining compliance with the new practices and providing space to hold the project meetings. The local nursing experts reviewed and provided their feedback regarding the appropriateness of the content and nature of the educational practice to ensure that the project has the potential to promote practice change. The local nursing experts included nurse practitioners working with the facility and experts in prevention and management of nosocomial infections. They had appropriate educational qualifications such as Master's preparation or Doctorate of Nursing Practice.

Nurses providing care to catheterized patients were involved in the review process to ensure that the project addressed their needs and met their expectations. CAUTI champions

assisted in distributing educational materials about CAUTI and demonstrating best practices for its prevention. The project team was presented with background information during our first project meeting. I then summarized internal and external evidence to provide the rationale and convince the project team on the need for practice change. The local nursing experts were provided with copies of the educational materials to give nurses an opportunity to critically appraise the content and relevance of the program. The team members were requested to provide their feedback regarding the content and relevance of the project within two weeks. The use of Lewin's theory of planned change to provide a theoretical framework was also discussed with the project team.

Summary

Section 2 provided a review of background and context related to this project. The gap in practice is that the staff nurses were not providing care based on best practices for CAUTI prevention. The theory of planned change by Lewin provided the theoretical framework for the development of the project. The project is of significance to nursing practice because it had the potential to promote practice change at the healthcare facility. The identified practice problem demonstrated the need for an effective intervention to reduce CAUTI rates. It is anticipated that the project resulted in the adoption of best practices in insertion and management of urinary catheters at the healthcare facility. This was expected to lead to reduced CAUTI rates, patient morbidity, and readmissions to the facility caused by nosocomial infections. Section 3 discusses collection and analysis of evidence to inform the development of the program aimed at addressing the identified practice problem.

Section 3: Collection and Analysis of Evidence

Introduction

The practice problem was that nurses working at the facility were not assessing the need for urinary catheters nor were they reducing their time of duration in the patient. The practice problem was due to the inadequate knowledge and competence of the nursing staff regarding CAUTI prevention. The purpose of this project was developing and implementing an educational intervention to guide nurses on EBP in the insertion and maintenance of urinary catheters to reduce CAUTI rates at the nursing home. Evidence from intervention studies suggested that educational programs were effective ways of promoting practice change and decreasing CAUTI rates. In Section 3, I present the practice-focused question, outline sources and analysis of evidence, and conclude with a summary.

Practice-Focused Question

The local problem was that nurses did not have sufficient knowledge and expertise for the appropriate insertion and maintenance of urinary catheters. The gap in practice was that the nursing staff were not providing care based on the best available evidence for prevention of CAUTI. The guiding practice-focused question was as follows: Will the implementation of an evidence-based educational program among nurses about CAUTI prevention in a nursing home improve their knowledge on the insertion and care of indwelling urinary catheters within 2 months?

Sources of Evidence

The main source of evidence for this project was a critical literature review. A search for literature on best practices for CAUTI prevention was conducted across major health electronic

databases, including PubMed, CINAHL, Cochrane Library, and EMBASE. An additional search was carried out across electronic websites of organizations such as CDC, Infectious Diseases Society of America, the Joint Commission, and the Association for Professionals in Infection Control and Epidemiology that are already known to have an interest in reducing the prevalence of CAUTI in acute care settings.

CDC (2017) guidelines guided the development of the educational intervention. The organization recommended that catheters should only be inserted for appropriate indications and be left in place only as long as needed. The use of urinary catheters should be minimized and duration reduced, particularly in patients at a high risk of CAUTI. Catheters should be used in operative patients only as needed instead of routinely. In addition, the use of urinary catheters in patients and nursing home residents for incontinence should be avoided.

Search terms used in the process included *best practices, catheter urinary tract infections, evidence-based guidelines, prevalence reduction, CAUTI rates, decreasing CAUTI, nurse-led interventions, educational interventions, and indwelling urinary catheters*. The search was performed across the databases, and the terms were used either by itself or in combination with each other. Different literature search techniques including citation and footnote chasing were used to identify appropriate articles cited in the references section of the included materials.

The recommended practices in the prevention of CAUTI included timely removal of catheters, limiting their use, introducing reminder systems, and developing nurse-driven protocols to empower nurses to remove unnecessary catheters. The CDC (2015) recommended avoiding or immediately removing urinary catheters that are no longer needed. Empirical evidence has revealed that insertion of catheters and increased length of usage is a risk factor for

CAUTI (Vincitorio et al., 2014). The CDC requires nurses to be vigilant and carry out the daily assessment to determine and remove catheters that are no longer needed by the patient.

Nevertheless, even with CDC (2015) guidelines, nurses must be well educated, skilled, and have the right attitude to insert and remove catheters competently. A promising and a cost-effective approach to promoting adoption of EBP in CAUTI prevention is developing an educational intervention to increase nurses' knowledge and competence for CAUTI prevention. Mori (2014) found that a 1-month educational program involving both online and face-to-face instructions decreased catheter days by 10%. CAUTI rates dropped from 77% to 0.35%, and the results were statistically significant ($p < 0.001$).

The findings are in agreement with those of a previous study conducted by Blondal et al. (2016), whose educational intervention decreased inpatient days from 44% to 41% ($p = 0.006$). The intervention also significantly reduced the proportion of catheter days without appropriate indication ($p < 0.001$) (Blondal et al.). Consistent findings have also been presented by Bell et al. (2016) and Meddings et al. (2017), who reported statistically significant reductions in CAUTI rates following educational interventions aimed at empowering nurses to provide evidence-based care to catheterized patients. All these studies provide evidence supporting the development of an educational program to create awareness about best practices to reduce CAUTI rates at the nursing home.

Data Collection

Participants

Participants in this project included a convenience sample of nurses working at the skilled nursing floor from all shifts. The inclusion criteria included all licensed nurse working in

the nursing home. The nurse needed to be willing to be involved and available at the time of data collection. Exclusion criteria included nurses on vacation, nursing students, and those who have been employed less than a month. The exclusion criteria were developed to ensure that data would be available and prevent attrition. Clinical educators and the manager at the unit were not included in the sample. The skilled nursing floor has nurses who work 8-hour shifts, and all eligible nurses were invited to participate. I obtained the roster from the staffing coordinator to identify all of the nursing employees and narrowed it down to the nurses who worked on the skilled nursing floor to ensure they obtained proper training. Additionally, fliers were distributed throughout the building to spread awareness of the training. Personal reminders were sent to the nurses so they could save the date for the required training. Clinical educators assisted in delivering the educational classes while the manager assisted in the monitoring of the program.

Data Collection Procedures

As the project leader, I met the director of nursing and other leadership team at the facility to seek support and formal approval of the project. Afterwards, I developed the staff education program, including the content, and determined how each aspect of the program would be delivered. The contents of the educational program were reviewed by a panel of experts to determine if they were appropriate in addressing the practice problem at the project site. The panelists used an anonymous questionnaire to review the project, and their feedback was used to revise the staff education program plan and improve its content. All resources essential for implementation of this project were secured prior to implementation.

Upon obtaining Institutional Review Board approval, I administered pretest questionnaires to collect demographic data and established the baseline level of knowledge for

the nurses taking part in the project. The results of the pretests were reviewed and used to make adjustments to the content of the program before administering it to the staff. Upon review of the results, a 1-hour Power Point presentation was made each week, with a focus on the insertion and removal techniques to prevent the development of CAUTI.

The current guidelines by the CDC for insertion, removal, and maintenance of indwelling catheters were discussed during the sessions. Specifically, the educational program focused on the magnitude and risk of CAUTI as practice problem, indications for indwelling catheters, proper insertion and maintenance techniques as well as alternative devices including external (condom) catheters. A pocket reference guide was provided to each nurse attending the educational sessions. The results of the pretest questionnaires provided the baseline data. At the end of the 4-week implementation period, a posttest questionnaire was administered to determine nurses' knowledge at the end of the implementation period.

Instruments

The first tool was a demographic data form that was used to collect data on work experience, educational level, gender, and job status to effectively describe the characteristics of the participants. The second tool was a multiple choice questionnaire composed of true or false items that was used to assess the level of knowledge of the nurses in the prevention and management of CAUTIs. The questionnaire was developed based on the best practices for CAUTI prevention and management recommended by National Healthcare Safety Network (NHSN) and the CDC.

To establish the content validity and establish if the tool was reliable, a panel of four nursing experts in CAUTI prevention and management was requested to rate the test questions

on a Likert scale of 1 to 5, with 1 representing *least appropriate* and 5 representing *most appropriate*. Items were revised and reworded in line with the suggestions made by the reviewers to improve their content-validity. This is consistent with Polit and Beck's (2006) recommendations that a minimum of three and a maximum of 10 experts have to be involved in determining the content validity of a tool.

Protection of Human Subjects

The educational intervention was aimed at improving practice at the nursing home. I completed a web-based training course entitled "Protecting Human Research Participants." I also applied for IRB approval to ensure that the project was compliant with research ethics. All the participants in the educational program were informed about the purpose of the data collection. All data were anonymous to protect the confidentiality and privacy of the nurses taking part in the program. The questionnaires did not capture personal identifiable details such as the names of the participants. All the hard copies were locked in a private cabinet that only I had access to in order to uphold the confidentiality of the data. The data were entered into a password protected computer and kept in a private office. All the data will be destroyed after 5 years.

Analysis and Synthesis

The goal of the project was to develop an educational program to address the identified practice problem by providing education regarding best practices in CAUTI prevention. The results of the pre- and post-test knowledge questionnaire were entered into an MS Excel spreadsheet and imported into the Statistical Package for Social Sciences (SPSS, Version 22) for data analysis. Data collected on the demographic sheet questionnaire were used to describe the characteristics of the population. A comparison was made for the pretest and posttest scores to

establish changes in knowledge and skills following the implementation of the educational program.

Descriptive statistics were used to calculate the means, frequencies, and percentages. T-tests were used to compare the pretest and posttest results to establish if the changes in knowledge scores are statistically significant. Retrospective data regarding CAUTI rates from the facility database three months before the program were analyzed and compared with that collected three months following the intervention.

Summary

Section 3 presented an analysis of the practice focused question, sources of evidence, and collection and analysis of the evidence to inform the development of the educational program. Existing evidence indicates that nurses lack knowledge and competence regarding the use of EBPs to prevent CAUTI. The recommended practices include removal of catheters that are no longer needed, limiting their use, and ensuring that they are appropriately inserted and maintained. The identified clinical problem can be addressed by developing an educational program based on the best available evidence for prevention of CAUTI. In section four, I will present the results and discuss the implications emanating from the process of developing the education program.

Section 4: Findings and Recommendations

Introduction

The overarching purpose of this scholarly project was developing and implementing an educational intervention aimed at guiding nurses on the insertion and maintenance of urinary catheters to decrease CAUTI rates in a nursing home. The project was developed and implemented to explore the impact of nursing education based on the EBP for catheter insertion, maintenance, and removal. The overall goal was to improve the knowledge of the nurses regarding catheter care as well as decreasing CAUTI rates in the nursing home. The practice-focused question was as follows: Will the implementation of an evidence-based educational program among nurses about CAUTI prevention in a nursing home improve their knowledge on the insertion and care of indwelling urinary catheters within 2 months? The purpose of this section is to provide a summary of the findings and their implications for practice and future projects.

Findings and Implications

All nurses with active licenses were invited to take part in this project. In total, 62 nurses took part in the educational intervention. During the recruitment phase, the project manager posted recruitment materials on the educational board and nursing lounges. Before the commencement of the educational intervention, I collected data regarding pre intervention CAUTI rates. Upon recruitment of the participants, I held educational sessions for 1 month. All the meetings were held by me, and pocket reference guides were provided to each nurse attending the educational sessions. After the implementation of the project, a posttest questionnaire assessing the knowledge of the participants was issued. Demographic data were

collected using a demographic questionnaire that captured demographic details, including age, educational preparation, years of work experience at the nursing home, and type of license held. CAUTI rates were calculated post intervention rates per 1,000 urinary catheter days as recommended by the NHSN protocols (Horan, Andrus, & Dudeck, 2008).

Characteristics of the Participants

All participants who took part in this project were licensed nurses working in the nursing home. A total of 72 enrolled in this study, with 62 completing the educational intervention. Four nurses went on vacation during the project while the others did not attend the educational sessions. The demographic data of the participants were entered into MS Excel and analyzed in four categories, including age, gender, educational level, licensure, and years of work experience. The average age of the participants was 38.26, with the age range varying from 20 to 60 years. There were more female nurses ($n = 54$) as compared to male nurses ($n = 8$). The educational preparation of the nurses varied from Licensed Practical Nursing, Associate Degree Nursing, and Baccalaureate Degree. Years of experience at the facility ranged from 1 to 30 years. Table 1 provides a summary of the characteristics of the participants in this project.

Table 1

Participants Demographic Characteristics (N = 62)

Variables	Level	Frequency
Age	20-30	12 (19.4%)
	31-40	25 (40.3%)
	41-50	15 (24.2%)
	51-60	10 (16.1%)
Gender	Male	8 (13%)
	Female	54 (87%)
Highest level of education	LPN	30 (48.4%)
	RN Associate Degree	17 (27.4%)
	RN BSN	15 (24.2%)
Years of experience	1-5 years	20 (32.3%)
	6-10 years	14 (22.6%)
	11-14 years	8 (12.9%)
	15- 20 years	10 (16.1%)
	21- 25 years	6 (9.7%)
	25 years and over	4 (6.5%)

Reductions in CAUTI Rates

One of the main goals of this project was decreasing CAUTI rates. For this goal, the CAUTI rates reported by the quality control department in the past 3 months before project implementation were used. The head of the department provided me with the preintervention and

postintervention CAUTI rates. The rates of CAUTI 3 months before the project were 3.4, with analysis at the end of the project showing that the rate had decreased to 1.5. The data show that the project led to a decrease in CAUTI rates by 1.9 (55.88%), highlighting the importance of educational intervention in reducing CAUTI rates (Figure 1). The decrease in CAUTI rates demonstrates that the catheters were inserted and maintained in line with the recommended practice. In addition, the results revealed that indwelling urinary catheters were inserted when needed and removed as soon as they were not required. Figure 1 shows the difference in CAUTI rates before and after implementation.

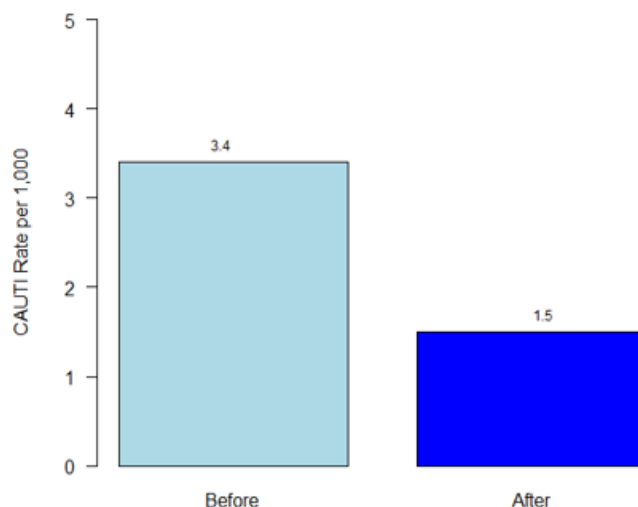


Figure 1. This is a sample of a figure caption, with the figure number in italics and the caption in plain type, sentence case.

Improvements in Knowledge

Another objective of this project was improving the understanding of the participating nurses regarding the insertion and maintenance of urinary catheters. A total of 62 nurses took

part in the pretest and posttest. Data analysis indicated that there were substantial improvements in the knowledge of the participants following their participation in the educational sessions ($p < 0.05$). The pretest posttest questionnaire had 15 questions assessing the knowledge of the nurses before and after. The pretest score of the group (Figure 2) was a mean of 85.2%, standard deviation of 7.7%, and range of 70 to 100%. The posttest score of the group (Figure 2) was a mean of 96.6%, standard deviation of 4.7%, and range of 85 to 100%. This represents an improvement in the knowledge scores of 11.4%, which can be attributed to the provision of educational sessions. Analysis carried out using a paired t test to compare the mean pretest and posttest scores indicated that the difference between the means were statistically significant with a 95% confidence interval of 9.7 to 13.0% and a p -value < 0.001 . Therefore, it can be concluded that the educational intervention on CAUTI prevention practices was effective in enhancing the knowledge of the nurses taking part in this project.

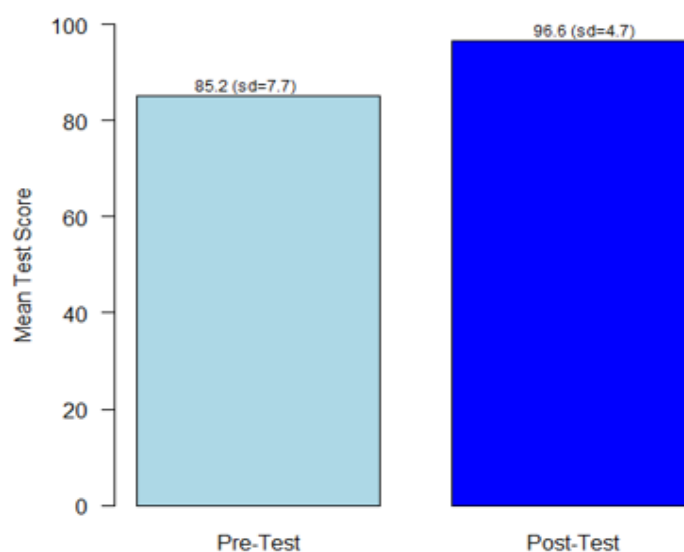


Figure 2. Knowledge test scores for participating nurses.

Implications of the Findings

Implications for Practice

Educating nurses regarding EBPs in the prevention of CAUTI should be promoted to empower nurses to make use of alternatives if an indwelling catheter is not required and to remove the catheters as soon as they are not needed. To reduce the unsuitable usage of indwelling catheters, healthcare organizations need to develop training programs to support nursing practice and research. Nurses are always at the forefront of patient care and can drive to positive or adverse patient outcomes. The CDC, among other organizations, has developed guidelines and strategies to reduce hospital-acquired infections, including CAUTIs. The guidelines emphasize recommendations for usage, insertion, maintenance, removal, and alternatives to the use of the indwelling catheters. In line with these recommendations, healthcare providers should facilitate the translation of evidence-based knowledge into clinical practice by supporting EBPs while providing them with the needed leadership support.

In the recent past, there has been a paradigm shift towards zero tolerance for CAUTIs and nosocomial infections, with the current guidelines requiring healthcare organizations to report their CAUTI rates. Unacceptably higher rates of CAUTI not only result in poor patient outcomes but also lead to decreased CMS reimbursements, with some hospitals receiving financial penalties due to preventable CAUTI incidences (Sarah, Baggs, Gould, Scott, & Jernigan, 2014). To obtain positive patient outcomes and improve their CMS reimbursements, it is essential that organizations support the development and implementation of quality improvement programs promoting the adoption of best care practices.

The findings of this project indicate that the lack of knowledge regarding the proper insertion and maintenance of urinary catheters can be addressed by developing an educational intervention to improve their practice. The educational intervention, together with strong support from the management, is key to assisting nurses in improving their practice regarding insertion and maintenance of indwelling catheters. The intervention, in this case, led to a statistically significant decrease in CAUTI rates and improvements in the knowledge of the nurses regarding catheter insertion, maintenance, and removal. The findings reinforce that an evidence-based project improves the ability of nurses to correctly insert, manage, and remove catheters when not needed to improve patient outcomes and decrease the likelihood of developing CAUTIs. Therefore, the findings of this project can provide the basis for reviewing and changing practices in similar settings.

Implications for Policy

Health care policies provide a framework that has the potential to facilitate or hinder the provision of health care services. Therefore, it is imperative that doctoral degree prepared nurses are able to engage in the policy development and review to create a healthcare system meeting the needs of its service users (Zaccagnini & Pechacek, 2019). The current evidence-based project sought to improve the knowledge of nurses in the insertion, maintenance, and timely removal of indwelling catheters in an attempt to decrease CAUTI rates. This project led to a review of evidence-based guidelines regarding CAUTI prevention at the project site. This is a classic example of how an advanced nurse practitioner can influence policy development and implementation in hospital settings. It is essential that healthcare organizations review their policies regarding catheter use frequently to decrease CAUTI rates.

Implications for Research

The findings of this project support the concept that EBPs are essential in improving patient outcomes and that developing and implementing an educational intervention based on the recommended practices can contribute substantially to decreasing CAUTI rates. The findings are in accordance with those presented in the existing body of literature regarding the effectiveness of educational interventions in improving the skills of nurses in catheter insertion, maintenance, and timely removal in an attempt to decrease CAUTI rates (Meddings et al., 2017; Saint et al., 2016).

Future projects are needed to establish if the positive impacts of the educational intervention persist in the long-term. The projects should assess the impact of variables such as the experience of the nurses. For a more robust analysis, it is essential to assess staff compliance regarding the use of the new nurse-driven protocol. A larger sample size made of participants with varying characteristics would be suitable to obtain findings that are representative of a larger population. A longer follow-up period is required to confirm that the findings were not obtained due Hawthorne effect. Besides, the existing body of literature has identified other forms of interventions to decrease CAUTI, such as the use of technological reminders to prompt timely removal of unnecessary urinary catheters. It is important to assess the effectiveness of these interventions to determine their potential in decreasing CAUTI rates.

Implications for Social Change

This project promoted social change by replacing outdated practice with EBP by educating nurses about indications for catheter use and impacting them with skills to properly insert, manage, and remove indwelling catheters when no longer required. The evidence-based

project led to improvements in the knowledge and skills of the nursing staff and decreased CAUTI rates. Infections acquired in hospital settings are no longer reimbursed under CMS program, with hospitals reporting unacceptably high rates receiving financial penalties (Meddings et al., 2017; Sarah et al., 2011). Besides improving the patient outcomes, the project promoted social change by decreasing CAUTI incidences to a rate that is below that of the national average. The nursing staff at the nursing home now has a better understanding of CAUTI, leading to a cultural change in the nursing home.

Recommendations

A number of recommendations regarding how CAUTI rates can be decreased in the healthcare sector emerged from this project. A primary recommendation is that there should be regular training programs aimed at improving the skills of the nurses regarding CAUTI prevention. The training programs can be held each year in an attempt to reinforce practice guidelines regarding CAUTI prevention among nurses taking care of catheterized patients. Besides, all newly hired nurses should be trained in CAUTI prevention practices as part of their orientation process. There should be continuous monitoring to ensure that nurses are appropriately and consistently following the recommended indwelling urinary catheter algorithm. Consistent use of the recommended practices for catheter insertion, maintenance, and removal has the potential to decrease catheter utilization rates and CAUTI rates (Meddings et al., 2017; Saint et al., 2016). Provision of regular training programs on CAUTI prevention will also assist in ensuring that the new practice is sustainable and persists in the long-term.

Another recommendation is that undergraduate nursing programs should find a way of incorporating teachings on EBP in their classes and clinical rotations. Incorporating the concepts

of EBP in nursing programs will go a long way in assisting nurses at all levels to transmit their knowledge and skills into practice. This is imperative to ascertain that nurses have knowledge and skills level of the highest standard before gaining entry into the nursing profession, in an attempt to prevent the poor clinical practice from the start (Zaccagnini & Pechacek, 2019). Future projects can assess the impacts of educational interventions in the long-term. The studies should include large sample sizes and incorporate other healthcare providers, including physicians, assistant physicians, radiologists, and all patient care experiences.

Contribution of the Doctoral Project Team

A multidisciplinary team of healthcare providers was involved in the development of this project. The different members of the group brought their own knowledge and skills in the development and implementation of the educational intervention meant to address the problem of CAUTI. Project team members included assistant nurse manager, DNP student, registered nurses, doctors, and infection prevention nurse. The DNP candidate educated the nurses about the use of the nurse-driven protocol for CAUTI reduction. Working with the team members gave everyone an opportunity to talk about what they thought was contributing to the high CAUTI rates. All the project team members, including the nurses taking part in the project, had a responsibility to ascertain that the staff adhered to the CAUTI prevention protocol.

Strengths and Limitations of the Project

There are several strengths and limitations associated with this project. One of the strengths of this project was the involvement of a multidisciplinary team of healthcare providers in addressing the problem of the unacceptably high rates of CAUTI at the project. The involvement of different healthcare providers allowed for input from different people with

varying backgrounds and expertise. Another strength of this project was about granting me the opportunity to work together with the nursing team to address the practice problem within the facility, including decreasing CAUTI rates by implementing best practices and collaborating with the nurses at the nursing home. The interactions with team members during project implementation were in line with the American Association of Colleges of Nursing (AACN) (2006) recommendation for interprofessional collaboration to improve patient and population health outcomes.

Besides, the program was based on the best-recommended practice and was guided by nursing theory. A literature review had been carried out previously to identify the most effective intervention to address the problem of CAUTI thus the project was informed by best practices in the nursing field. The effectiveness of the program could be attributed to the reliance on evidence-based practice, the use of theory, and the organizational commitment to improving geriatric care.

The sample was generally small, predominantly made of female nurses, thus limiting the statistical power of the findings. Another limitation is that extraneous variables such as the attitude and experience of the nurses may have affected their ability to acquire new knowledge. Another likely shortcoming is that there is a possibility of Hawthorne effect as the participants were aware that they were being monitored for their compliance with the nurse-driven catheter protocol. Lastly, there was no follow-up of the participants upon completion of the project. This makes it challenging to determine if the positive effects of this project persisted in the long-term.

Summary

CAUTIs comprise the majority of infections acquired in healthcare settings. These infections often result in poor health outcomes, which can lead to a delay in the recovery time as well as an increase in the length of hospital. The aim of this project was to decrease CAUTI rates through the implementation of an evidence-based CAUTI prevention program. The findings reinforce that an evidence-based project improves the ability of nurses to correctly insert, manage, and remove catheters when not needed to improve patient outcomes and decrease the likelihood of developing CAUTIs. The findings also showed that the educational intervention was effective in improving the knowledge of the participating nurses regarding CAUTI prevention. The educational intervention that was provided empowered the bedside nurses to become champions in prevention of CAUTI. In the next chapter, I will review how the findings will be disseminated and present an analysis of self before ending with a summary of the entire project.

Section 5: Dissemination Plan

Dissemination of scholarly findings is a crucial part of all nursing projects as it aids in advancing the field. True dissemination of the findings is when nurses are practicing the knowledge they have acquired and providing evidence-based care at the bedside. Scholarly findings can be disseminated in various ways, including journal articles, conferences, websites, meetings, and person-to-person communications (Whitehead & Schneider, 2013). I have shared the findings of this project with key stakeholders at the project site. The presentation was delivered during weekly leadership meetings with key attendants, including the directors, organizational leaders, and nursing managers. I am also planning to attend an annual corporate summit meeting for nurses in the State of Maryland and to present a summary of the findings of this project. Discussing and networking with providers in similar settings has unbounded potential in reducing CAUTI rates across the country (Curtis, Fry, Shaban, & Considine, 2017).

Further dissemination of the findings is publication in a peer-reviewed journal. This allows for the dissemination of the findings to a large group, particularly professionals facing similar issues. I intend to seek publication of a summary of the manuscript in the *International Journal for Quality in Health Care*. I selected this journal courtesy because of its open-access policy, which is a fair way of encouraging healthcare providers and members of the public to access the findings without having to pay for a subscription. CAUTI is a serious hospital problem, thus the need to make the findings of this project accessible to all practitioners. The publication may assist nursing professionals facing similar issues to develop intervention programs to decrease CAUTI rates.

Analysis of Self

The DNP program has acted as an eye-opener to my nursing practice. I have gained essential skills to help me address the contemporary complex healthcare challenges. The DNP journey was enjoyable and had its share of challenges that made me learn how to balance my personal and professional life. I have grown as a nurse practitioner, scholar, and project manager following the completion of the DNP course and this project.

As a Nurse Practitioner

The increasing intricacy of the healthcare environment necessitates providers with the highest level of expertise to guarantee quality and safety of care (AACN, 2006). I started practicing in 2009 after receiving my associate degree. I have always maintained a desire to provide care of the highest quality and have attended numerous training programs to improve my knowledge and skills as a nurse. The current project gave me an opportunity to make use of my skills and knowledge acquired during the DNP program.

I was able to develop an evidence-based project meant to decrease CAUTI rates in a nursing facility by educating nurses about best practices in catheter insertion, maintenance, and early removal. The project demonstrates my ability to develop and evaluate projects based on nursing theories and theories from other disciplines, an aspect required of a doctoral prepared nurse (Zaccagnini & Pechacek, 2019). I was also able to carry out a literature search and critically review the existing body of evidence regarding various types of interventions that can be used to address the problem of CAUTI. The exercise gave me an opportunity to hone my analysis skills, which will be vital in my new role as an advanced nurse practitioner.

As a Scholar

The journey towards the completion of this DNP program has been challenging but quite rewarding. According to AACN (2006), DNP students should carry out a practice-focused project to demonstrate the knowledge and skills they have acquired through the program. This project demonstrated my scholarly competence and showed that I am well-equipped as a doctoral degree prepared nurse to move the profession forward. As a scholar, I managed to carry out a literature search and identified best practices to address the problem of CAUTI. I critically reviewed the literature materials and identified strong empirical evidence to support my project. This exercise contributed to the improvement of my critical analysis skills, which are essential scholarly skills for a doctoral degree prepared nurse. In future, I will be able to apply the skills in critically reviewing guidelines recommendations in the field of nursing, observing how they were developed, and even taking part in the guideline development process and policymaking to improve the nursing field.

Equally important, the project helped me to understand and apply the concepts of data collection and analysis. This gave me a good start, and I will continue to grow in this phase of my nursing career. It is essential that nurses are able to collect and analyze data to be in a position to analyze intricate practice and organizational issues. In addition, I learned about the dissemination of scholarly findings, which is a crucial way of improving nursing practice and outcomes. I shared the findings of this project at the nursing home, and I plan to seek publication of a summary of the manuscript so that the findings can be accessible to a larger audience.

Project Manager

In any project, the developer is expected to assume a number of roles and responsibilities to ensure effective development and implementation of the project. Examples of these roles include project design and development activities, as well as providing leadership and involving key stakeholders in the project activities (Kerzner, 2013). As the project manager, my responsibilities on this project were immense. I had to convince the nursing managers and other leaders at the nursing home of the need to have an educational intervention to improve the skills of the nurses working there. I also had to involve the frontline nursing staff and other stakeholders to gain buy-in and obtain different perspectives for effective implementation of this project.

I was able to develop smart goals for this project, and effective project management required ascertaining that the multidisciplinary team had a full understanding of the goals and activities to be involved. I was able to hone my project leadership skills by communicating and collaborating with different stakeholders. Listening to the concerns raised by the nurses, taking into consideration the views of leaders at the organization, and empowering the registered nurses working at the facility were key to the successful implementation of this project. This is in line with Zaccagnini and Pechacek's (2019) recommendation that doctorate nurses should be prepared in team leadership and play a crucial role in the development of interprofessional teams.

Summary

Urinary tract infections constitute more than 40% of all the infections acquired in hospital settings (Meddings et al., 2017). Of all infections acquired in hospital settings, CAUTIs are the

most common with the infections, being mostly attributed to the inappropriate use of indwelling urethral catheters. CAUTIs continue being a leading cause of preventable harm in hospital settings (Mody et al., 2015). CAUTI prevention requires a multifaceted approach, including prompt removal of unnecessary catheters, proper catheter insertion, hand hygiene practices, and minimizing the use of indwelling catheters by considering alternatives. Increasing empirical evidence has shown that educational interventions promoting the use of best practices for catheter insertion and maintenance are effective in decreasing CAUTI rates (Adams et al., 2014; Meddings et al., 2017; Saint et al., 2016).

The educational intervention was developed based on the best available evidence regarding CAUTI prevention and the needs of the participating staff. Data collected before and after project implementation showed that the intervention was effective in improving the knowledge of the participating nurses regarding CAUTI prevention. The project also led to a decrease in CAUTI rates from 3.4 to 1.5, demonstrating the effectiveness of the intervention in decreasing CAUTI rates. There should be regular training programs to enhance the competence of nurses in providing care to catheterized patients. In addition, newly hired nurses should always be trained on evidence-based CAUTI prevention as part of their orientation process. Future projects should involve a longer follow-up period to establish if the effects of the educational intervention persist in the long-term.

References

- Adams, D., Bucior, H., Day, G., & Rimmer, J. A. (2014). HOUDINI: Make that urinary catheter disappear—nurse-led protocol. *Journal of Infection Prevention, 13*(2), 44-46.
<https://doi.org/10.1177/1757177412436818>
- American Association of Colleges of Nursing. (2006). *The essentials of doctoral education for advanced nursing practice*. Washington, DC. Retrieved from <http://www.aacn.nche.edu>
- Banfield, M., Yen, L., & Newby, L. (2017). *Stakeholder involvement in primary health care research: report and recommendations*. Australian Primary Health Care Research Institute: Canberra.
- Bell, M. M., Alaestante, G., & Finch, C. (2016). A multidisciplinary intervention to prevent catheter-associated urinary tract infections using education, continuum of care, and systemwide buy-in. *The Ochsner Journal, 16*(1), 96–100. PMID: PMC4795513
- Blondal, K., Ingadottir, B., Einarsdottir, H., Bergs, D., Steingrimsdottir, I., Steindorsdottir, S., Gudmundsdottir, G. Hafsteinsdottir, E. (2016). The effect of a short educational intervention on the use of urinary catheters: A prospective cohort study. *International Journal for Quality in Health Care, 28*(6), 742-748.
<https://doi.org/10.1093/intqhc/mzw108>
- Burnes, B. (2017). Kurt Lewin: 1890–1947: The practical theorist. *The Palgrave handbook of organizational change thinkers* (pp.1-15). Cham: Palgrave Macmillan
- Centers for Disease Control and Prevention. (2015). Operational guidance for acute care hospitals to report catheter-associated urinary tract infection (CAUTI) data to CDC's NHSN for the purpose of fulfilling CMS's hospital inpatient quality reporting (IQR)

requirements. Retrieved from <https://www.cdc.gov/nhsn/pdfs/cms/FINAL-ACH-CDI-Guidance.pdf>

Centers for Disease Control and Prevention. (2016). Catheter-associated urinary tract infection (CAUTI) targeted assessment for prevention (TAP) facility assessment tool. Retrieved from <https://www.cdc.gov/hai/pdfs/tap/CAUTI-TAP-Facility-Assessment-Tool-v2-May2016-Reader-Enabled.pdf>

Centers for Disease Control and Prevention. (2019). Guideline for prevention of catheter-associated urinary tract infections. Retrieved from <https://www.cdc.gov/infectioncontrol/pdf/guidelines/cauti-guidelines-H.pdf>

Centers for Disease Control and Prevention. (2020). Urinary tract infection (catheter-associated urinary tract infection [CAUTI] and non-catheter-associated urinary tract infection [UTI]) and other urinary system infection [USI] events. Retrieved from <https://www.cdc.gov/nhsn/pdfs/pscmanual/7pscgaucurrent.pdf>

Cummings, S., Bridgman, T., & Brown, K.G. (2016). Unfreezing change as three steps: Rethinking Kurt Lewin's legacy for change management. *Human Relations*, 69(1), 33-60. <https://doi.org/10.1177/0018726715577707>

Curtis, K., Fry, M., Shaban, R. Z., & Considine, J. (2017). Translating research findings to clinical nursing practice. *Journal of Clinical Nursing*, 26(5-6), 862–872. doi:10.1111/jocn.13586

Donelli, G., & Vuotto, C. (2014). Biofilm-based infections in long-term care facilities. *Future Microbiology*, 9(2), 175-188. DOI: 10.2217/fmb.13.149

Fekete, T. (2016). Catheter-associated urinary tract infection in adults. *Calderwood S, Bloom A,*

editores, 1-150. Retrieved from <https://www.uptodate.com/contents/catheter-associated-urinary-tract-infection-in-adults>

- Feneley, R. C. L., Hopley, I. B., & Wells, P. N. T. (2015). Urinary catheters: history, current status, adverse events and research agenda. *Journal of Medical Engineering & Technology*, *39*(8), 459–470. <http://doi.org/10.3109/03091902.2015.1085600>
- Horan, T., Andrus, M., & Dudeck, M. (2008). CDC/NHSN surveillance definition of health care associated infection and criteria for specific types of infections in the acute care setting. *American Journal of Infection Control*, *36*(5), 309–332. <http://dx.doi.org/10.1016/j.ajic.2008.03.002>
- Institute of Medicine (US). (2011). Committee on the Robert Wood Johnson Foundation Initiative on the Future of Nursing. *The future of nursing: Leading change, advancing health*. Washington, DC: National Academies Press. Retrieved from <https://www.nap.edu/read/12956/chapter/8>
- Kerzner, H. (2013). *Project management: A systems approach to planning, scheduling, and controlling* (10th ed.). Hoboken, N.J.: John Wiley & Sons.
- Jain, M., Dogra, V., Mishra, B., Thakur, A., & Loomba, P. S. (2015). Knowledge and attitude of doctors and nurses regarding indication for catheterization and prevention of catheter-associated urinary tract infection in a tertiary care hospital. *Indian Journal of Critical Care Medicine*, *19*(2), 76–81. <http://doi.org/10.4103/0972-5229.151014>
- Meddings, J. A., Reichert, H., Rogers, M. A. M., Saint, S., Stephansky, J., & McMahon, L. F. (2012). Impact of non-payment for hospital-acquired catheter-associated urinary tract infection: A statewide analysis. *Annals of Internal Medicine*, *157*(5), 305–312.

<http://doi.org/10.7326/0003-4819-157-5-201209040-00003>

- Meddings, J., Saint, S., Krein, S. L., Gaies, E., Reichert, H., Hickner, A.,Mody, L. (2017). Systematic review of interventions to reduce urinary tract infection in nursing home residents. *Journal of Hospital Medicine, 12*(5), 356-368. doi:10.12788/jhm.2724.
- Melnyk, B. M., & Fineout-Overholt, E. (Eds.). (2011). *Evidence-based practice in nursing & healthcare: A guide to best practice*. Philadelphia, PA: Lippincott Williams & Wilkins.
- Mitchell, B. G., Fasugba, O., Gardner, A., Koerner, J., Collignon, P., Cheng, A. C., ... Gregory, V. (2017). Reducing catheter-associated urinary tract infections in hospitals: Study protocol for a multi-site randomised controlled study. *BMJ Open, 7*(11), e018871. <http://doi.org/10.1136/bmjopen-2017-018871>
- Mody, L., Meddings, J., Edson, B. S., McNamara, S. E., Trautner, B. W., Stone, N. D., ... Saint, S. (2015). Enhancing resident safety by preventing healthcare-associated infection: A national initiative to reduce catheter-associated urinary tract infections in nursing homes. *Clinical Infectious Diseases: An Official Publication of the Infectious Diseases Society of America, 61*(1), 86–94. <http://doi.org/10.1093/cid/civ236>
- Mori, C. (2014). A-voiding catastrophe: Implementing a nurse-driven protocol. *Medsurg Nursing, 23*(1), 15-21. Retrieved from <https://www.ncbi.nlm.nih.gov/pubmed/24707664>
- National Healthcare Safety Network. (2013). NHSN CAUTI definitions. Retrieved from https://healthinsight.org/Internal/assets/Hospital/Resources/NHSN_CAUTI_12_16_11.pdf
- Nicolle, L. E. (2014). Catheter associated urinary tract infections. *Antimicrobial Resistance and Infection Control, 3*, 23. <http://doi.org/10.1186/2047-2994-3-23>

- Pennel, C. L., McLeroy, K. R., Burdine, J. N., Matarrita-Cascante, D., & Wang, J. (2016). Community health needs assessment: Potential for population health improvement. *Population Health Management*, 19(3), 178-186. DOI: 10.1089/pop.2015.0075
- Polit, D. F., & Beck, C. T. (2006). The content validity index: Are you sure you know what's being reported? Critique and recommendations. *Research in Nursing & Health*, 29(5), 489-497.
- Saint, S., Greene, M. T., Krein, S. L., Rogers, M. A., Ratz, D., Fowler, K. E., ... & Faulkner, K. (2016). A program to prevent catheter-associated urinary tract infection in acute care. *New England Journal of Medicine*, 374(22), 2111-2119. DOI: 10.1056/NEJMoa1504906
- Sarah, H. Y., Baggs, J., Gould, C. V., Scott, R. D., & Jernigan, J. A. (2014). Medicare reimbursement attributable to catheter-associated urinary tract infection in the inpatient setting: a retrospective cohort analysis. *Medical Care*, 52(6), 469-478.
- Shirey, M. R. (2013). Lewin's theory of planned change as a strategic resource. *Journal of Nursing Administration*, 43(2), 69-72. DOI: 10.1097/NNA.0b013e31827f20a9
- Trautner, B. W., Cope, M., Cevallos, M. E., Cadle, R. M., Darouiche, R. O., & Musher, D. M. (2009). Inappropriate treatment of catheter-associated asymptomatic bacteriuria in a tertiary care hospital. *Clinical Infectious Diseases*, 48(9), 1182-1188.
- Theurer, K., Mortenson, W. B., Stone, R., Suto, M., Timonen, V., & Rozanova, J. (2015). The need for a social revolution in residential care. *Journal of Aging Studies*, 35, 201-210.
- United States Department of Health and Human Services. (2009). HHS action plan to prevent healthcare-associated infections. Retrieved from <http://chfs.ky.gov/NR/rdonlyres/26602C0F-C49F-4E35-B342->

7FC4047C5C3B/0/HHS ACTION PLAN TO PREVENT HAIs 01062009.pdf

- Vincitorio, D., Barbadoro, P., Pennacchietti, L., Pellegrini, I., David, S., Ponzio, E., & Prospero, E. (2014). Risk factors for catheter-associated urinary tract infection in Italian elderly. *American Journal of Infection Control*, 42(8), 898-901.
- Wald, H. L., Ma, A., Bratzler, D. W., & Kramer, A. M. (2008). Indwelling urinary catheter use in the postoperative period: Analysis of the national surgical infection prevention project data. *Archives of Surgery*, 143(6), 551-557. doi:10.1001/archsurg.143.6.551
- Wenger, J. E. (2010). Cultivating quality: reducing rates of catheter-associated urinary tract infection. *The American Journal of Nursing*, 110(8), 40-45.
- White, K. (2015). *The Doctor of Nursing Practice Essentials*. Burlington, MA: Jones & Bartlett Publishers.
- Whitehead, D., & Schneider, Z. (2013). Writing and presenting research findings for dissemination. *Nursing & Midwifery Research: Methods and Appraisal for Evidence-Based Practice*, 372-386.
- Yoon, B., McIntosh, D. S., Rodriguez, L., Holley, A., Faselis, C. J., Liappis, A. P. (2013). Changing behavior among nurses to track indwelling urinary catheters in hospitalized patients. *Interdisciplinary Perspectives on Infectious Diseases*, 2013, 1-4.
<http://dx.doi.org/10.1155/2013/405041>
- Zaccagnini, M., & Pechacek, J. M. (2019). *The doctor of nursing practice essentials: A new model for advanced practice nursing* (2nd Ed.). Burlington, MA: Jones & Bartlett Publishers.
- Zaccagnini, M.E., & White, K.W. (2015). *The doctor of nursing practice: A new model for*

advanced practice nursing (2nd Ed.). Burlington, MA: Jones & Bartlett Learning.
