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# Reducing the Use of Indwelling Urinary Catheters During Cesarean Deliveries

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*Walden University*

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# Walden University

College of Health Sciences

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Michelle Borland

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Walden University  
2016

Abstract

Reducing the Use of Indwelling Urinary Catheters During Cesarean Deliveries

by

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MS, Waynesburg University, 2013

BS, Waynesburg University, 2011

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

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## Abstract

One concern for medical professionals and women experiencing cesarean deliveries is the use of indwelling urinary catheters, which is associated with a delay in first void time, slower ambulation time, increased discomfort, longer hospital stays, and an increased risk for urinary tract infections. The purpose of this project was to determine if a practice change regarding the use of urinary catheters among pregnant women decreases the number of women receiving a catheter prior to having a cesarean section in a small community hospital. The knowledge to action and Rosswurm and Larabee's models were used to guide this project, which was comprised of 2 phases. Phase 1 included a team of 10 experts that created the needs assessment that would establish hemodynamic stability using a 4-point scale. The items for inclusion in the needs assessment included primary cesarean, repeat cesarean, no urinary tract infection present, no fetal distress present, no systemic disorders present, no hypertensive disorders present, and no contraindications for anesthesia. Phase 2 was the implementation and evaluation of the needs assessment and new practice guidelines. Statistical analysis was performed using the Mann Whitney U test. There was 98% compliance ( $p < 0.001$ .) with the use of the assessment in women undergoing a cesarean delivery and a 64% reduction in the length of time an indwelling catheter was left in place. However, there was no significant change in the number of women receiving a catheter prior to cesarean delivery after a needs assessment was performed ( $p = 0.805$ ). This project has potential implications that would support social change by reducing the use of indwelling catheters among hemodynamically stable women undergoing cesarean deliveries.

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## Table of Contents

Section 1: Nature of the Project .....	1
Introduction.....	1
Problem Statement.....	3
Purpose Statement.....	5
Project Objectives .....	5
Nature of the Doctoral Project .....	6
Significance.....	6
Summary.....	8
Section 2: Background and Context .....	9
Introduction.....	9
Concepts, Models, and Theories.....	9
Relevance to Nursing Practice .....	11
Local Background and Context .....	12
Role of the DNP Student.....	13
Summary.....	14
Section 3: Collection and Analysis of Evidence.....	16
Introduction.....	16
Practice-Focused Question.....	17
Sources of Evidence.....	17
Findings for Use of Indwelling Catheters.....	18
Nonuse of Indwelling Catheters.....	19

Patient Outcomes .....	19
Summary of the Evidence.....	19
Analysis and Synthesis .....	20
Phase 1: Creation of Needs Assessment and Practice Guideline.....	20
Phase 2: Implementation and Evaluation of Practice Guideline.....	21
Data Analysis .....	22
Project Evaluation.....	23
Summary .....	23
Section 4: Findings and Recommendations.....	25
Introduction.....	25
Findings and Implications.....	25
Summary of Findings: Phase 1 .....	25
Creation of the Needs Assessment.....	26
Phase 2: Implementation and Evaluation.....	27
Discussion.....	28
Implications.....	29
Recommendations.....	30
Project Strengths and Limitations of the Project .....	31
Strengths .....	31
Limitations .....	31
Section 5: Dissemination Plan .....	32
Analysis of Self.....	32

Summary .....	33
References.....	36
Appendix A: Literature Review .....	41
Appendix B: Demographic Data Collection .....	47
Appendix C: Hemodynamic Data Collection .....	48
Appendix D: Assessment and Catheters Post Intervention.....	49
Appendix E: Needs Assessment Pre and Post Intervention.....	50
Appendix F: Indwelling Catheters Pre and Post Intervention .....	51
Appendix G: Length of Time Indwelling Catheters are Left in Place .....	52
Appendix H: 3-month Cesarean Deliveries Data Collection .....	53



## Section 1: Nature of the Project

### Introduction

The history of cesarean delivery dates back to the time of Julius Caesar (National Institute of Health, 2014). The purpose of a cesarean was to deliver an infant from women who were dying or who were already considered dead, in the attempt to save the unborn child. Roman law decreed that any woman fated to die before or during childbirth should be cut open, cesarean. Prior to the 16th century, the procedure was termed a *cesarean operation*, and Jacques Guillimeau published the change of terms, from cesarean operation to *cesarean section*, in a 1598 publication on midwifery (Sewell, 2014). It was not until the 19th century that the cesarean section (or *C-section*) was used to save a mother's life, as well as that of her infants (Sewell, 2014).

The trend toward medically managed pregnancies and childbirth, which had accelerated quickly in the 1940s, gave rise to a new focus on women's health. Research flourished during that time with advances in anesthesia and care of the mother during cesarean deliveries (Sewell, 2014). With the rise in cesarean sections and the use of anesthesia during deliveries, medical practitioners identified complications from this type of delivery. Complications from cesarean deliveries include infections, longer hospital stays, delayed ambulation time, heavy blood loss, and blood clots (Acharya, Uprety, Pokharel, Amatya, & Rai, 2012).

The use of indwelling catheters prior to performing a cesarean delivery has become common practice among women having cesarean deliveries (Saju, 2014). In a small community hospital, located in a rural area, the current policy regarding the

placement of an indwelling catheter prior to a cesarean procedure has been in place for over 30 years.

Urinary catheters should never be used for the convenience of staff or because of tradition (Pellowe, 2009). Current evidence-based guidelines have supported that the decision for a urinary catheter should be individual, based on the needs of the patient. During assessment of the patient and their need for a urinary catheter, the risk of catheter-associated urinary tract infection (CAUTI) should be considered. The introduction of an indwelling catheter into the bladder bypasses the body's normal defense mechanisms and will enable microorganisms to enter the bladder (Pellowe, 2009). Once a catheter is in place, bacteria in the urinary drainage bag or introduced via the catheter create a film on the surface of the catheter lumen, a precursor to CAUTI (Barford & Coates, 2009). The risk to patients who have indwelling catheters in place for the development of bacteriuria is 3% to 6% at 24 hours and cumulatively increases with the catheter remaining in place (Pellowe, 2009).

CAUTIs are the second most common type of hospital-acquired infections (HAIs) and account for 15% of the infections that acute care hospitals have reported (Centers for Disease Control and Prevention [CDC], 2014). Urinary tract infections (UTIs) are the most common health care-associated infection reported to the National Healthcare Safety Network (NHSN), a tracking system for health care-associated infections that provides organizations with data to identify problem areas and measures progress of prevention efforts (CDC, 2014). A major risk factor for acquiring a CAUTI is prolonged use of

indwelling catheters. Therefore, catheters should only be used for appropriate situations and removed as soon as possible (CDC, 2014).

There is little research to compare the use versus nonuse of catheters during C-sections for the national average. In the targeted organization, the use of indwelling catheters among women undergoing cesarean sections had been 100%, regardless of need. This project has potential implications that would support social change by reducing the use of indwelling catheters among hemodynamically stable women undergoing cesarean deliveries.

### **Problem Statement**

In the targeted organization, the use of indwelling catheters among women undergoing cesarean sections was 100%, regardless of need. Research has demonstrated that the use of indwelling urinary catheters for women experiencing a cesarean delivery should be based on individual considerations and indicated nonuse of an indwelling catheter among women who are hemodynamically stable (Pandey, Mehta, Grover & Goel, 2015).

Current nursing guidelines in the targeted organization include the insertion of a Foley catheter prior to cesarean delivery to provide better visualization of the lower segment of the uterus and decrease the risk for trauma to the bladder from the incision (Maureen, Bryan, Jeffrey, Weitzen, & Myers, 2005). The placement of the catheter is completed prior to the procedure and remains in place for 24 hours. The physician completes the orders for the insertion and length of time an indwelling catheter is utilized; however, the order is not placed as a result of the nurse's assessment. This

guideline did not take into consideration that there may not be a medical need for the insertion of a catheter. Thus, indwelling catheters have been inserted without a needs assessment for all women undergoing a cesarean delivery within this community hospital. The current guidelines in this hospital dictate that the catheter is left in place for 24 hours post delivery, first void time should occur within 6 hours after removal of the catheter, and ambulation of the patient occurs with the removal of the catheter at 24 hours post procedure. During the last quarter of 2014, all indwelling catheters were removed at 24 hours and first void time average was 9 hours after removal. Ambulation time for patients with cesarean deliveries was greater than 24 hours post procedure. Moreover, the occurrence of UITs associated with the use of indwelling catheters among women having a cesarean section was 9.6%, or 8 infections among 83 women with indwelling catheters.

Research has demonstrated that the use of indwelling urinary catheters for women experiencing a cesarean delivery should be based on individual considerations. In a randomized control study performed at multiple hospitals, Nasr et al. (2009) compared the use versus nonuse of catheterizations in women undergoing cesarean delivery. First void time without catheters was 7.64 hours post procedure and ambulation time was 7.7 hours post procedure (Nasr et al., 2009). Moreover, discharge from the hospital was timelier in the non catheterized group at 21.8 hours post delivery compared to the catheter group at 45 hours (Nasr et al., 2009). The American College of Obstetrics and Gynecology (2014) and The Association of Women's Health, Obstetrics and Neonatal Nursing (2014) guidelines for cesarean deliveries listed indwelling catheterizations as optional. These guidelines did not include recommendations that all cesarean deliveries

need catheterizations prior to the procedure, yet catheter use has become common practice in many organizations (Association of Women's Health and Obstetrics and Neonatal Nursing, 2014).

### **Purpose Statement**

The purpose of this project was to determine if a practice change regarding the use of urinary catheters among pregnant women decreases the number of women receiving a catheter prior to having a cesarean section in a small community hospital. The meaningful gap in practice that was addressed related to the 100% use of indwelling urinary catheters among women undergoing cesarean delivery regardless of the patient's individual need. Current evidence-based research supported the use and nonuse of indwelling urinary catheters for these women based upon their individual need (Pandey, et al., 2015). The implementation of new practice guidelines related to a needs assessment for the use of indwelling catheters among women undergoing cesarean deliveries addresses the gap in practice.

### **Project Objectives**

1. Create a new practice guideline in order to change practice regarding the use of urinary catheters among pregnant women.
2. Establish the content validity of the practice change among experts.
3. Implement the practice guideline among staff.
4. Determine if there is a decrease in the number of women who have an indwelling catheter inserted prior to C-section following implementation of the guideline.

### **Nature of the Doctoral Project**

This doctoral project utilized evidence that addressed the use of indwelling urinary catheters among women undergoing cesarean deliveries and the use or nonuse of indwelling catheters as a pre procedure intervention. The purpose of this project was to determine if a practice change regarding the use of urinary catheters among pregnant women would decrease the number of women receiving a catheter prior to having a cesarean delivery in a small community hospital. This project included the use of scientific underpinnings for practice through research and implementation of the most current evidence-based practice to support change in patient care. This, in turn, would promote change in the care of women undergoing cesarean deliveries; incorporate interprofessional collaboration for improving patient outcomes through the coordination of health care professionals (nurses, managers, directors, physicians) to implement and encourage change in how health care professionals care for these women, which meets the objectives for the Essentials of Doctoral Education (American Association of Colleges of Nursing, 2006). The translation of evidence into practice is a vital role for the doctorate-prepared nurse and, as a student, this was my focus for a project related to the use of indwelling urinary catheters during cesarean deliveries.

### **Significance**

The most frequent adverse event that occurs in the health care system is HAIs (CDC, 2014). Within the small community hospital in which this project was focused, specifically on its obstetric unit, the number of HAIs in 2014 was 10%. The average for HAIs in that hospital's state was 2.2% in 2010, placing this facility at a high risk for

infection rates. The CDC reported that among HAIs, UTIs are the most common. HAIs are a significant problem for health care organizations, reducing their reimbursement for patient care. In comparison to other organizations in the state, the facility of interest was higher than the average 2.2%. The annual financial losses that have been attributed to HAIs has been \$6.5 billion in patient care (World Health Organization, 2014).

It is important for health care providers to continuously improve patient outcomes and satisfaction through quality improvement and evidence-based guidelines. Improving patient outcomes is a strategic goal set by the Agency for Healthcare Research and Quality (2014). Health care organizations rely on quality patient care to drive reimbursement. This project was aimed at developing guidelines that would reduce the use of indwelling catheters in women undergoing cesarean deliveries. The stakeholders that may be impacted by addressing this problem include physicians, nurses, and women undergoing cesarean deliveries. The significance of this project was to implement new guidelines that would improve patient care.

The use of evidence-based research is essential in the delivery of safe, quality care to patients. The role of the DNP-prepared nurse is to utilize the evidence-based research to translate research into practice, to evaluate practice, and to improve practice and outcomes (Terry, 2012). To achieve positive health outcomes, the use of evidence-based research is imperative. The significance of evidence-based research is to support a change in how health care organizations care for women undergoing a cesarean delivery. The use of evidence-based research was reflected in a change in policy, which translated to a change in nursing practice that could be implemented throughout the targeted hospital.

Therefore, the importance of utilizing evidence-based research becomes vital in promoting a change in how these women were cared for, prior to receiving a cesarean section.

### **Summary**

UTIs are the most common health care-associated infection reported to the NHSN (CDC, 2014). The use of indwelling catheters prior to a cesarean delivery has become common practice among women undergoing cesarean deliveries in the community hospital of this study. Research has identified that patient outcomes will be improved by reducing the number of UTIs associated with indwelling catheters, improving first void times, improving ambulation times, and reducing length of hospital stay (Nasr et al., 2009). Current evidence-based research supported the nonuse of indwelling catheters during cesarean sections in women who are hemodynamically stable (Pandey et al., 2015). The current policy regarding the placement of an indwelling catheter prior to a cesarean delivery, without a needs assessment, has been in place for over 30 years in the small community hospital of this study. Indwelling catheters should never be used for convenience, but be used in those women who are not hemodynamically stable as established by current evidence-based guidelines. Current evidence-based guidelines demonstrated that the use of a catheter should be placed on an individual basis, based upon the needs of the patient. The evidence in this project supported the establishment of new patient guidelines regarding the use of indwelling catheters to close the gap in practice. Improving patient care involves the physicians and nurses caring for women undergoing cesarean deliveries.



## Section 2: Background and Context

### **Introduction**

The purpose of this project was to determine if a practice change regarding the use of urinary catheters among pregnant women decreases the number of women receiving a catheter prior to having a cesarean section in a small community hospital. Current practice within the targeted organization had been that 100% of women undergoing cesarean deliveries receive indwelling urinary catheters prior to the procedure, regardless of their need. This section reviews the models, relevance to nursing practice, local background, and the role of the DNP student.

### **Concepts, Models, and Theories**

The knowledge to action (KTA) model (White & Dudley-Brown 2012) was used for this project. The model allows the producer to create activities tailored to the learners and the outcomes desired. The activities are deliberate to facilitate change. White and Dudley-Brown (2012) described the processes of KTA as follows: identify the problem, adapt the use to learners, assess any barriers that may be present, select the interventions to promote new knowledge, monitor the use of the new knowledge, and sustain the use of new knowledge. The application of KTA in reducing the use of indwelling urinary catheterization among those women undergoing cesarean deliveries included the identification of the problem as the use of catheterization without assessment of need. The barriers that may be present include staff's knowledge of the reason for the use of catheterizations; it is what they have always done, and the current practice states the insertion of an indwelling catheter for all women prior to a cesarean delivery. Ajzen

(1991) stated that behavior is guided by the following considerations: behavioral belief, motivation to change, and the power to change. When change involved the nursing staff, it was important that the staff's beliefs were taken into account and interventions to promote the change put into place for positive change to occur.

Strategies to reduce the routine use of indwelling catheters prior to cesarean deliveries were the translation of evidence-based research that supported decreasing the number of indwelling catheters inserted. Changing the current practice for many nurses was a difficult and challenging task. With the use of Rosswurm and Larrabee's model for evidence-based practice change, a six-step model that facilitates the implementation of evidence-based changes into practice, new practices were implemented (Hodges & Videto, 2011). In an article by Wilson et al. in 2009, the use of education, ongoing monitoring of infection rates, monitoring the need for reinforcement of education, and the skills for use of catheterizations through the use of KTA were a successful approach to reduce complications from indwelling catheters. The six steps of KTA are as follows: assess the need for change in practice, link the problem with interventions and outcomes, synthesize the best evidence, design a change, implement and evaluate the change, and integrate and maintain the change (White & Dudley-Brown, 2012).

For the practice problem, use of indwelling catheters prior to cesarean deliveries, the reason for change included the following: increased time to first void, delayed ambulation time, UTIs, and poor control of pain. Reducing the use of indwelling catheters improves first void time, leads to earlier ambulation, decreases UTIs, and decreases discomfort, fulfilling the second step of linking the problem to an intervention.

Step 3, synthesizing the best evidence found in research, was completed using CINAHL with the terms of *cesarean delivery*, *CAUTI*, *C-section complications*, and *indwelling catheters*. Step 4, design change, was the development of new practice guidelines, which included a needs assessment.

### **Relevance to Nursing Practice**

The use of indwelling catheters has become common practice for women undergoing cesarean deliveries. As health care providers, it is important to continuously improve patient care, outcomes, and satisfaction through quality improvement and evidence-based guidelines. Improving patient outcomes is a strategic goal set by the Agency for Healthcare Research and Quality (2014). The relevance to the practice of nursing and this project was to improve patient care and outcomes for women undergoing cesarean deliveries.

The use of indwelling urinary catheters should never be used for the convenience of staff or because of tradition (Pellowe, 2009). Current evidence-based guidelines demonstrated that the need for a urinary catheter should be individualized. During assessment of the patient and their need for a urinary catheter, the risk of CAUTI should be considered. The introduction of an indwelling catheter into the bladder bypasses the body's normal defense mechanisms and will enable microorganisms to enter the bladder (Pellowe, 2009). Once a catheter is in place, bacteria in the urinary drainage bag or introduced via the catheter create a film on the surface of the catheter lumen, which is a precursor to CAUTI (Barford & Coates, 2009).

CAUTIs are the second most common type of HAI, accounting for 15% of the infections reported by acute care hospitals (CDC, 2014). UTIs are the most common health care-associated infection reported to the NHSN (CDC, 2014). The targeted hospital for this project rated 2% higher among other hospitals within the state for the number of cesarean deliveries performed and 10% higher in HAIs. A major risk factor for acquiring a CAUTI is prolonged use of indwelling catheters. Therefore, catheters should only be used for appropriate situations and removed as soon as possible (CDC, 2014). Therefore, the relevance of this project for nursing practice was advocating best care for patients and the nurses' role in continuous quality improvement in patient care.

Recommendations to improve the rate of HAIs, specifically UTIs, would be to implement new practice guidelines that would reduce the number of indwelling catheters inserted and reduce the length of time they are left in place. Strategies that have been used to reduce the use of indwelling urinary catheters were identified in the research. Utilizing a needs assessment prior to a cesarean delivery for the need of an indwelling urinary catheter identified women who were hemodynamically stable and did not need a catheter inserted, thus reducing the number of indwelling catheters used and potentially reducing the number of UTIs and infection rates for the organization.

### **Local Background and Context**

The use of indwelling catheters, prior to performing a cesarean delivery, has become common practice among women having cesarean deliveries. In a small community hospital, located in a rural area, the current policy regarding the placement of an indwelling catheter prior to a cesarean procedure has been in place for over 30 years.

Current nursing guidelines include the insertion of a Foley catheter prior to cesarean deliveries to provide better visualization of the lower segment of the uterus and decrease the risk for trauma to the bladder from the incision. The placement of the catheter is completed prior to the procedure and remains in place for 24 hours. The physician completes the orders for the insertion and length of time an indwelling catheter is utilized; however, the order is not placed as a result of the nurse's assessment. This guideline did not take into the fact that there may not be a medical need for the insertion of a catheter. Thus, indwelling catheters have been inserted without a needs assessment for all women having a cesarean delivery.

In the targeted organization, the use of indwelling catheters among women undergoing cesarean sections is 100%, regardless of need. The current guidelines in this hospital indicate that the catheter is left in place for 24 hours post delivery, first void time should occur within 6 hours after removal of the catheter, and ambulation of the patient occurs with the removal of the catheter at 24 hours post procedure. During the last quarter of 2014, all indwelling catheters were removed at 24 hours and first void time average was 9 hours after removal. Ambulation time for patients with cesarean deliveries was greater than 24 hours post procedure. Moreover, the occurrence of UTIs associated with the use of indwelling catheters among women having a cesarean section was 9.6%, or 8 infections among 83 women with indwelling catheters.

### **Role of the DNP Student**

As a DNP student, my role with this project included using scientific underpinnings for practice through research and implementation of the most current

evidence-based practice to support change in patient care. I did this to promote change in the care of women undergoing cesarean deliveries and incorporate interprofessional collaboration to improve patient outcomes through the coordination of health care professionals (nurses, managers, directors, physicians). This would implement and encourage changing how health care professionals care for these women, meeting the Essentials of Doctoral Education objectives ([www.aacn.nche.edu/dnpessentials](http://www.aacn.nche.edu/dnpessentials)). The translation of evidence into practice is a vital role for the doctorate-prepared nurse and as a student; this is the focus for a project related to the use of indwelling catheters during cesarean deliveries (Terry, 2012).

Having worked for this organization and on the obstetric unit, I was familiar with the protocols present for women undergoing cesarean deliveries. I have spent my nursing career as an advocate for quality patient care, and the motivation to focus this DNP project on women undergoing cesarean deliveries stems from this desire to provide quality care and improve patient outcomes. My previous relationship with the unit and organization, as a nurse, paved the way for implementing my DNP project. There were no biases present for the implementation of this project.

### **Summary**

In a small community hospital, the rise in cesarean deliveries placed the organization 2% above the national average for women undergoing cesarean deliveries over a 3-month period in 2014. With the rise in cesarean deliveries, there was an increase in the number of women receiving indwelling catheters prior to the procedure. The use of indwelling catheters prior to performing a cesarean delivery has become common

practice among women having cesarean deliveries. The current policy regarding the placement of an indwelling catheter prior to a cesarean procedure has been in place for over 30 years, and the use of indwelling catheters is 100%, regardless of need. Current evidence-based guidelines demonstrated the need for a urinary catheter should be individualized (Acharya et al., 2012). During assessment of the patient and their need for a urinary catheter, the risk of CAUTI should be considered.

### Section 3: Collection and Analysis of Evidence

#### **Introduction**

The purpose of this project was to determine if a practice change regarding the use of urinary catheters among pregnant women decreases the number of women receiving a catheter prior to having a cesarean section in a small community hospital. The use of indwelling catheters prior to performing a cesarean delivery has become common practice among women having cesarean deliveries. In a small community hospital, the current policy regarding the placement of an indwelling catheter prior to a cesarean procedure has been in place for over 30 years. The use of indwelling catheters for cesarean births is associated with a delay in first void time, slower ambulation time, increased discomfort for the patient, longer hospitalization, and an increased risk for UTIs (Acharya et al., 2012).

This section focuses on the problem of using indwelling catheters among all women undergoing cesarean deliveries regardless of need. Research has demonstrated that the use of indwelling urinary catheters for women experiencing a cesarean delivery should be considered on an individual basis (Pandey et al., 2015).

The use of a literature review supported and substantiated the translation of current evidence-based research into practice at a small community hospital. The literature review for this project included articles that examined the relationship between the use and nonuse of indwelling catheters during cesarean deliveries.



### **Practice-Focused Question**

The purpose of this project was to determine if a practice change regarding the use of urinary catheters among pregnant women decreases the number of women receiving a catheter prior to having a cesarean section in a small community hospital. The practice change for this project included the establishment of a needs assessment by a team of experts and implementation of the assessment to reduce the number of women receiving an indwelling catheter prior to a cesarean delivery.

The use of indwelling catheters, prior to performing a cesarean delivery, has become common practice among women having cesarean deliveries. In a small community hospital, the current policy regarding the placement of an indwelling catheter prior to a cesarean procedure has been in place for over 30 years. Regardless of need, all women undergoing cesarean deliveries have an indwelling catheter inserted prior to the procedure. The practice-focused question guiding this project was this: Will a needs assessment for hemodynamic stability prior to a cesarean section decrease the number of women having an indwelling catheter inserted prior to undergoing a cesarean delivery in a small community hospital?

### **Sources of Evidence**

The literature and guideline search was performed by utilizing the CDC website, Cochrane, Medline, National Guideline Clearinghouse, PubMed, EBSCO, and The Agency for Healthcare Research and Quality. The Medical Subject Headings (Mesh) terms used for the search were *indwelling catheters*, *catheters*, *Foleys*, *catheterizations*, *C-sections*, *cesarean delivery*, and *urinary tract infections*. Article inclusion criteria

included full-text, systematic reviews, randomized control trials, meta-analysis, English language, clinical guidelines, and articles published between the years 2009 and 2015. The search resulted in 50 articles related to the criteria mentioned above. Of the 50 articles, 11 articles were found to be relevant and selected for the literature review (Appendix A).

This review was conducted to establish the most current evidence-based research available to translate the evidence into practice in a small community hospital in regards to the use of indwelling catheters during C-sections. Only those articles that rated at moderate to high grading were determined to meet the inclusion criteria. The importance of using articles that have a high grade is that they provide evidence for or against the use of a particular intervention and reinforce decision making and practice. The Cochrane and Joanna Brigg Institute review was utilized to locate articles to include in the findings.

### **Findings for Use of Indwelling Catheters**

A review of the literature indicated that the first void time for women with catheters inserted and left in place for 24 hours was 9 hours and ambulation time was greater than 24 hours post delivery (Nasr et al., 2009). In women who had C-sections without the insertion of an indwelling catheter, first void time was 7.64 hours post procedure and ambulation time was 7.7 hours post procedure (Nasr et al., 2009). Thus, the use of indwelling catheters for cesarean births is associated with a delay in first void time, slower ambulation time, poor pain management and increased discomfort for the patient, longer hospital stays, and an increased risk for UTIs (Acharya et al., 2012).

### **Nonuse of Indwelling Catheters**

The use of urinary catheters should never be used for the convenience of staff or utilized based on old evidence (Pellowe, 2009). Current evidence-based guidelines should be implemented when determining best practices for all patients. The nonuse of catheterization during C-sections is supported by improved patient outcomes such as improved ambulation time; earlier first void time; shorter hospital stays; and decreased UTI symptoms (Acharya et al., 2012; Nasr et al., 2009). Support for changing patient guidelines is evident with improved postnatal activity when catheterization was not used during C-sections in hemodynamically stable women (Dube, Kshirasagar, & Durgalwale, 2013; Li, Wen, Wang, Li, & Li, 2010).

### **Patient Outcomes**

Improving patient experiences and outcomes has value to patients and organizations through the implementation of HCAHP scoring. When catheterization is performed during a cesarean delivery, reducing the length of time it is left in place is supported by the evidence with a reduction in UTIs, decreased pain, and earlier first void and ambulation times (Zhou, Lin, & Huang, 2012). General guidelines for the use of indwelling catheters support the use of nursing interventions to reduce utilization of indwelling catheters (Bernard, Hunter, & Moore, 2012; Meddings, Krein, Mohamad, Olmsted, & Saint, 2013).

### **Summary of the Evidence**

The consistent findings from these articles, guidelines, and best practices suggest that there was evidence to support the implementation of catheter guidelines with women

who undergo cesarean deliveries (Acharya et al., 2012; Dube et al., 2013; Li et al., 2010; Nasr, 2010; Nasr et al., 2009; Zhou et al., 2012). The nonuse of catheterization during C-sections was supported by improved patient outcomes such as improved ambulation time; earlier first void time; shorter hospital stays; and decreased UTI symptoms (Acharya et al., 2012; Nasr et al., 2009).

Support for changing patient guidelines was evident with improved postnatal activity when catheterization was not used during C-sections in hemodynamically stable women (Dube et al., 2013; Li et al., 2010). Improving patient experiences and outcomes has value to patients and organizations through the implementation of HCAHP scoring. When catheterization is performed during a cesarean delivery, reducing the length of time it is left in place was supported by the evidence with a reduction in UTIs, decreased pain, earlier first void, and ambulation times (Zhou et al., 2012). General guidelines for the use of indwelling catheters support the use of nursing interventions to reduce utilization of indwelling catheters (Bernard et al., 2012; Meddings et al., 2013).

### **Analysis and Synthesis**

The purpose of this project was to determine if a practice change regarding the use of indwelling catheters among pregnant women decreases the number of women receiving a catheter prior to having a cesarean delivery in a small community hospital. The project was completed in two phases.

#### **Phase 1: Creation of Needs Assessment and Practice Guideline**

The practice change and needs assessment was developed from the current evidence-based guidelines, which was shared with the experts through web learning

activities and presentations. Once the guideline had been developed, a team of experts established the content validity of the guideline using Polit and Beck's (2006) method. The team of experts indicated which assessment areas should be addressed to improve the use or nonuse of indwelling catheters. Once all items had been indicated, the team rated the relevance of the item, and those items that computed as relevant were included (Polit & Beck, 2006). A team of 10 content experts including obstetric physicians, staff nurses, manager, and the director of the unit were invited to review the practice guidelines and the items that would be included in the needs assessment using a 4-point scale (1 = *not relevant*, 2 = *somewhat relevant*, 3 = *relevant*, and 4 = *highly relevant*). From this, the I-CVI and S-CVI were calculated (Polit & Beck, 2006).

### **Phase 2: Implementation and Evaluation of Practice Guideline**

Once content validity of the practice guideline and needs assessment was established, the education and dissemination of the practice guideline and needs assessment was implemented. First, a retrospective chart review of the past 3 months was completed using a data abstraction tool (Appendix D) to establish a baseline for the number of cesarean deliveries with the use of indwelling catheters. Following the data collection, nurses from the obstetric unit were invited to attend an educational intervention or review an online webinar geared towards assessing the need for catheterization based on the practice guideline and providing the assessment findings for the catheter to the physician (Oman et al., 2011). The educational intervention was held on the unit across all three shifts over the course of 1 week. The project director was also available to answer any questions that the nurses may have had. No identifying

information was collected from the nurses during the time of the educational intervention. Following the implementation of the practice guideline and needs assessment, a second retrospective chart review was implemented to extract data using a data collection form (Appendix B) as well as information as to whether the patient received a catheter prior to the cesarean delivery.

For the protection of the patient's rights, de-identified data were collected from existing records (patient age, number of births, and whether a catheter was used). The unit only obtains the statistical data for quality improvement purposes in regard to type of delivery and the number of catheters inserted. The statistical data do not include the patient name, nationality, or any hospital identification numbers. It is required by the state of Pennsylvania that all births and type of birth be recorded, which is a reliable number for the purpose of this project. The data that were collected already exist, such as data, documents, records, and if these sources recorded in such a manner that subjects cannot be identified, directly or through identifiers linked to the subjects are exempt under 45 CFR 46.101 (Ethical and Independent Review Services, 2014). Data were collected for 1 month prior to the translation of evidence and 2 months following the education.

### **Data Analysis**

Descriptive statistics were used to describe the sample population and Mann Whitney U test was used to determine if there was a difference in the number of women who had an indwelling catheter inserted prior to a cesarean deliver following the practice

change and implementation of a needs assessment. Control charts were created to display patterns (Polit & Chaboyer, 2011).

### **Project Evaluation**

The short-term objectives/goals for this project were to identify a unit need, synthesize the evidence, and translate the evidence. Outcome evaluation was another important program evaluation tool. This evaluation assesses the outcome of the project and was vital for demonstrating the importance of translating the evidence to improve patient safety and quality of care. Outcome evaluations are performed to demonstrate the success of a program and whether the goals were achieved (Kettner, Moroney, & Martin, 2013). For this project, the outcome evaluation that the organization is interested in was whether education of current evidence affected patient quality care.

### **Summary**

The translation of the evidence into practice was done through two phases. The first phase included presenting the evidence to an expert team and the establishment of practice changes and needs assessment. With the use of web learning and presentations, current evidence-based guidelines and practice change were shared with a team of experts. The team of content experts included obstetric physicians, staff nurses, manager, and unit director. During Phase I, the team of experts established new practice guidelines and a needs assessment using a 4-point scale. From this scale, the I-CVI and S-CVI were calculated.

The second phase was the implementation and evaluation of the practice guideline and needs assessment. The nurses on the obstetric unit were invited to attend an

educational intervention or webinar review that was geared towards assessing the need to catheterize based on practice guidelines that were established by the content experts in Phase 1. Following the implementation of the practice change, a retrospective chart review was performed to extract data using a data collection form. Descriptive statistics were used to determine if there was a difference in the number of women who had an indwelling catheter inserted prior to a cesarean delivery.

With the translation of evidence that addresses the use of indwelling catheters during cesarean deliveries, I had hoped that this project improved staff knowledge and care of women during cesarean sections and improve when indwelling catheters were used during cesarean deliveries. Although the actual project time for translating the evidence to staff was 1 month, data were collected retrospective for the month prior to the education and 2 months following the intervention.



## Section 4: Findings and Recommendations

### **Introduction**

Routine placement of indwelling urinary catheters for women undergoing cesarean sections has been practiced without assessment of need prior to insertion. Evidence has supported nonuse of indwelling catheters prior to cesarean delivery in hemodynamically stable women. The purpose of this project was to determine if a practice change regarding the use of urinary catheters among pregnant women decreases the number of women receiving a catheter prior to having a cesarean section.

This project included two phases: to establish criteria for hemodynamically stable women and to evaluate if the established criteria reduced the number of indwelling catheters inserted in women prior to cesarean deliveries. All women undergoing cesarean delivery for a 2-month period were included in the data. The dissemination of research and the education were performed using the KTA model. Data collected included the number of cesarean deliveries, number of assessments performed prior to procedure, and the number of women who had or did not have an indwelling catheter inserted prior to their cesarean delivery. Results were analyzed using chi-square and Mann Whitney U test.

### **Findings and Implications**

#### **Summary of Findings: Phase 1**

A total of 10 content experts were invited to participate in the project. The members included four obstetric physicians, four charge nurses, one unit manager, and one unit director. All of the content experts were at least bachelor's-prepared and had 10

years of experience. The practice guideline was based on criteria for a hemodynamically stable obstetric patient (Nasr et al., 2009). The new practice guidelines were based on the current evidence regarding the use of indwelling catheters with hemodynamically stable patients prior to a cesarean delivery, as well as new guidelines for the length of time an indwelling catheter is left in place post procedure. The new guidelines stated that women preparing for a cesarean delivery should be assessed using the needs assessment; if an indwelling catheter is used, the physician must chart the reason for the catheter and the new orders state that it is to be removed within 8 hours post procedure. If the catheter is left in longer than 8 hours, the new guideline states that the physician must chart the reason for leaving the catheter inserted and reassess frequently for removal of the catheter.

### **Creation of the Needs Assessment**

Eleven items were reviewed for the needs assessment tool and included primary cesarean delivery, repeat cesarean delivery, no UTI present, no vaginal bleeding present, no hypertensive disorders present, no systemic disorders present, no fetal distress present, no contraindications for anesthesia present, the patient's age, ethnicity, and the number of previous deliveries (Appendix C). Each member from the expert panel ranked each item on a scale from 1 to 4, with 1 = *not relevant*; 2 = *somewhat relevant*; 3 = *relevant*; 4 = *highly relevant*. Primary cesarean sections, absence of fetal distress, absence of vaginal bleeding, absence of hypertensive disorders, absence of systemic disorders, and no contraindications for anesthesia scored a 4 from all experts and the I-CVI for each was a 1.0. Repeat cesarean section and the absence of a UTI scored a 3 or 4 from all experts and

the I-CVI for each was a 1.0. Patient's age, ethnicity, and the number of previous births scored a 1 or 2 from all the experts and the I-CVI for each was a 0.0. The items that were included in the needs assessment each scored an I-CVI of 1.0 and those items that were excluded from the needs assessment tool scored an I-CVI of 0.0. On average, the I-CVI was 1.0 for those items that were included for the assessment tool to establish hemodynamic stability. The S-CVI score for the needs assessment tool was 0.73 (Appendix C).

### **Phase 2: Implementation and Evaluation**

Following the educational intervention, a retrospective chart review was completed in order to compare pre intervention and post intervention data. The pre intervention data included 27 cesarean deliveries with indwelling catheters being utilized in all 27 cases and left in place for 24 hours post procedure. Post intervention, there were 53 cesarean deliveries. The average age was 26 (SD = 3.85) with a range of 20 to 37. Fifty-two of the women were assessed for hemodynamic stability and the need for an indwelling catheter. One woman was not assessed due to an emergency situation where time did not allow for the needs assessment. Fifty of the 53 women (94.3%) received indwelling catheters and all of the catheters were removed within 8 hours of the procedure. Two of the women, who met the hemodynamically stable criteria, requested an indwelling catheter related to prior cesarean experience.

Chi-square was used to analyze post intervention data regarding whether there was a significant difference between the use of the new patient assessment tool and a reduction in the use of indwelling urinary catheters. A Mann Whitney U test was used for

the  $p$ -value for analysis of the data for pre and post intervention as the two groups were independent of each other. There was no significant difference between those receiving a needs assessment and those who did not have an indwelling catheter inserted ( $p = 0.805$ ) (Appendix D). A statistically significant change ( $p < 0.001$ ) in provider compliance was found as evidenced by a 98% compliance of the needs assessment (Appendix E). However, there was not a significant difference ( $p = 0.685$ ) between those who received an indwelling catheter before and after the educational intervention (Appendix F). Although there was no significant reduction in the number of indwelling catheters inserted post assessment, there were new patient guidelines developed that reduced the length of time the catheter is left in place (Appendix G).

## **Discussion**

With the translation of evidence that addresses the use of indwelling catheters during cesarean deliveries, I hoped that this project would improve staff knowledge and care of women during cesarean sections and decrease the use of indwelling catheters during cesarean deliveries. IRB approval was obtained from Walden University Institutional Review Board (03-30-16-0464167).

The use of urinary catheters should never be used for the convenience of staff or because of tradition (Pellowe, 2009). Current evidence-based guidelines demonstrated that the need for a urinary catheter should be individual, based on the needs of the patient. During assessment of the patient and their need for a urinary catheter, the risk of CAUTI should be considered. The introduction of an indwelling catheter into the bladder bypasses the body's normal defense mechanisms and will enable microorganisms to enter

the bladder (Pellowe, 2009). The risk to patients who have indwelling catheters in place to the development of bacteriuria is 3% to 6% and cumulatively increases with the catheter remaining in place (Pellowe, 2009).

The most frequent adverse event occurring in the health care system is HAIs (CDC, 2014). It is a priority for health care providers to be continuously improving patient outcomes and satisfaction through quality improvement and evidence-based guidelines. This project was aimed at reducing the use of indwelling catheters in women undergoing cesarean deliveries and reducing the length of time they are inserted when used. The significance of this project is that it focused on improving patient care through the implementation of new guidelines.

Health care organizations rely on quality patient care to drive reimbursement. Improving patient outcomes is a strategic goal set by the Agency for Healthcare Research and Quality (2014). Reducing the number of HAIs related to indwelling catheters becomes significant for a small community hospital. Moreover, the implementation of guidelines to reduce the use of indwelling catheters during cesarean deliveries becomes significant in that it will improve patient outcomes and increase patient satisfaction. Current evidence-based guidelines demonstrate that the need for a urinary catheter should be individual, based on the needs of the patient

### **Implications**

The purpose of this project was to determine if a practice change regarding the use of urinary catheters among pregnant women decreases the number of women receiving a catheter prior to having a cesarean section in a small community hospital.

With the establishment of new guidelines for the use of indwelling catheters during and after cesarean deliveries, patient outcomes can be improved. Post intervention, 98% of the women undergoing cesarean deliveries were assessed. The dissemination of current research resulted in new practice guidelines that included a reduction in the length of time an indwelling catheter is in place post cesarean delivery. Although there was no significant reduction in the number of indwelling catheters inserted post assessment, there were new patient guidelines developed that reduced the length of time the catheter is left in place (Appendix G).

### **Recommendations**

Routine placement of indwelling catheters among hemodynamically stable women undergoing cesarean delivery is not necessary. Moreover, those women needing catheterization should be selectively chosen through assessment and, when utilized, catheters should be used for shorter durations to provide quality patient care. However, to have better evaluation of the needs assessment and the use of indwelling catheters, larger sample sizes are needed.

Recommendations for further research are to focus upon patient outcomes from the reduction in time the indwelling catheter was left in place, such as effect on first void time, ambulation time, and patient satisfaction scores. The current literature supported the nonuse of indwelling catheters among hemodynamically stable women undergoing cesarean delivery and early removal of the catheter when used. Although there was not a significant change in reducing the use of indwelling catheters, there was a significant change in assessment for an indwelling catheter and a reduction in the length of time the

catheter is left in place, which does follow current literature. The research supported the nonuse of indwelling catheters in women undergoing cesarean deliveries and this project supported that all women continue to have a needs assessment and, when it is established that the woman is hemodynamically stable, nonuse of an indwelling urinary catheter is considered.

### **Project Strengths and Limitations of the Project**

#### **Strengths**

The strength of this project was the establishment of new patient guidelines through the dissemination and education of current evidence-based research regarding women undergoing a cesarean delivery. Through the dissemination of current research, the criteria for determining a hemodynamically stable patient was established, and the length of time an indwelling catheter is left in place post cesarean delivery was reduced by 67% (24 hours to 8 hours).

#### **Limitations**

Limitations of this project were the size of the population due to the duration of data collection. The population included women who underwent cesarean deliveries for a 2-month period following the establishment of new patient guidelines regarding the use of indwelling catheters. Causes for the difference between what the evidence supported and what is currently being practiced may be due to education and the continuation of what has always been done. One reason for the continuation of catheterizations prior to cesarean deliveries may be that the guidelines state a urinary catheter may be used during cesarean sections (Berghella, 2014).

## Section 5: Dissemination Plan

The dissemination of this evidence to the organization will occur in two sessions. The audience for the first session will be the obstetric physicians that practice in the organization and local area. The presentation to the medical staff will occur at a monthly meeting. It is important that the physicians who place the orders based on their patients' needs receive the findings from this project to support change. The second session will be to present the project and the findings to the organization through poster presentations and the organization's web-based learning site. This will allow for a larger number of staff to review the findings.

### **Analysis of Self**

The dissemination of research is a vital role for the doctorate-prepared nurse, and my self-assessment as a scholar and practitioner would be that I was effective and successful in bringing the evidence to the experts that assisted in the establishment of new patient guidelines. The challenge for me as a practitioner was analyzing the data and further discovery was needed to complete the analysis. As a project developer, I was prepared to identify a unit based need for change and locate current evidence-based research that would support the change, as well as develop the education that was needed. The challenge as a project developer was how best to implement the education for all staff members and required help from the unit director. As a professional, I was able to engage all staff members, regardless of educational level or title, into the process of establishing and implementing patient guidelines.



The completion of the project was one of fulfillment and joy. I felt a sense of accomplishment in bringing the evidence to a community hospital and having patient care changed. Challenges that were present included the belief and knowledge about cesarean sections in a rural area, current use or nonuse of best evidence-based research, unwillingness to change what always worked, and fear to change. Currently the evidence-based research has not changed the requirement of placing an indwelling catheter prior to a cesarean delivery. For change to occur, the use of evidence-based research is paramount, as well as educating staff and disseminating the evidence. Improving patient outcomes is a strategic goal set by the Agency for Healthcare Research and Quality (2014). I have gained insight throughout this scholarly journey about how staff functions in a community hospital and the importance of involving all levels of professionals in the development and implementation of new guidelines.

### **Summary**

The purpose of this project was to determine if a practice change regarding the use of urinary catheters among pregnant women decreases the number of women receiving a catheter prior to having a cesarean section in a small community hospital. This was a 2-phase study to establish criteria for hemodynamic stability in women undergoing cesarean delivery and establish if the assessment criteria would reduce the number of women receiving an indwelling catheter for the procedure. The KTA model was used to disseminate the evidence and educate staff regarding the needs assessment. Phase 1 established criteria for a needs assessment to determine hemodynamic stability among women undergoing a cesarean delivery. Content validity using Polit and Beck's

(2006) method for the establishment of criteria for hemodynamically stability was used. Items that met the inclusion criteria scored an I-CVI of 1.0 and S-CVI of 0.73 based on Polit and Beck's method. The items for inclusion included primary cesarean delivery, repeat cesarean delivery, absence of UTI, absence of vaginal bleeding, absence of hypertensive disorders, absence of systemic disorders, no contraindication for anesthesia, and the absence of fetal distress.

Phase 2 was the implementation of the needs assessment and evaluation of the project. Fifty-three women underwent a cesarean delivery over a 2-month period. There was significant change for the use of the needs assessment ( $p < 0.001$ ) as evidenced by a 98% compliance. There was no significant change ( $p = 0.805$ ) between the number of assessments performed and those women not receiving an indwelling catheter based on the assessment. There was no significant difference between the number of women having an indwelling catheter inserted between the pre and post intervention groups ( $p = 0.685$ ). There was a 64% decrease in the length of time an indwelling catheter was left in place after the education intervention was implemented. The findings supported reducing the length of time an indwelling catheter is left in place.

The current literature supported the nonuse of indwelling catheters among hemodynamically stable women undergoing cesarean delivery and early removal of the catheter when used. Although there was not a significant change in reducing the use of indwelling catheters, there was a significant change in assessment for an indwelling catheter and a reduction in the length of time the catheter is left in place, which does follow current literature. Future research on the needs assessment and the use of

indwelling catheters among women undergoing cesarean deliveries is needed that includes a larger sample size over a longer period of time.

This project included scientific underpinnings for practice through research and implementation of the most current evidence-based practice to support change in patient care, promoting change in the care of women undergoing cesarean deliveries. The project also included incorporating inter professional collaboration for improving patient outcomes through the coordination of health care professionals to implement and encourage changing how they care for these women. The translation of evidence into practice is a vital role for the doctorate-prepared nurse. This project has given me a sense of accomplishment in bringing the evidence to a community hospital and having patient care changed as a result. Challenges were present that were related to the staff's beliefs and knowledge about cesarean sections in a rural area, current use or nonuse of best evidence-based research, unwillingness to change what always worked, and the fear of change. For change to occur, the use of evidence-based research is paramount, as well as educating staff and disseminating the evidence. I have gained insight throughout this scholarly journey about how the staff functions in a community hospital and the importance of involving all levels of professionals in the development and implementation of new guidelines.

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## Appendix A: Literature Review

Citation	Sample	Design	Objective/ Outcome	Strength/ weakness	Level of Evidence
Abdel-Aleem, Aboelnasr, Joyousi, & Habib (2014)	Meta analysis of 5 articles; sample: 1065 women	Meta-analysis of Randomized controlled trials	Objective: To assess the effectiveness and safety of indwelling bladder catheterization for intraoperative and postoperative care in women undergoing CS. Results: Insertion of indwelling catheters increases the risk of urinary tract infections. More rigorous RCTs needed to evaluate nonuse of catheters	No inconsistencies were noted, no apparent biases within search criteria or with inclusion or exclusion	GRADE system-high quality
Acharya, Uprety, Pokharel, Amatya, & Rai (2012)	Prospective randomized controlled trial	150 women	Objective: Determine feasibility and safety of cesarean section without urethral catheterization. Results: No reports of injuries from nonuse of catheters; no first void	No inconsistencies present, no biases apparent within the study and no serious limitations. Sample size.	GRADE guidelines - high quality

			difficulties with earlier first void time; no increased signs & symptoms of UTIs; earlier ambulation times and shorter hospital stays with women who did not have catheters inserted versus those who did.		
Bernard, Hunter, & Moore (2012)	Systematic review		Objective: Locate strategies to decrease the length of time of catheter placement and the effects of strategies on the incidence of UTIs. Findings support nurse-led interventions and use of informatics to reduce the use and length of time of catheterizations.	No serious limitations or inconsistencies	GRADE guidelines - high quality
Dube, Kshirasagar, & Durgalwale (2013)	Quasi-experimental study	500 women	Objective: Evaluate the effect of planned early ambulation on selected postnatal activities of post cesarean	No apparent biases or inconsistencies Large sample size.	GRADE guidelines - high quality

			patients. Results were that there was a decrease in postnatal activity related to UTIs from indwelling catheters versus those who did not have UTIs		
Li, Wen, Wang, Li, & Li (2010)	Systematic review of randomized control trials and nonrandomized control trials	Women undergoing cesarean deliveries	Objective: Assess whether it is necessary to use indwelling catheters routinely in cesarean sections, and to determine the effects of catheters on UTIs, retention, and intra-operative difficulties or complications. Results: The conclusion was that the use of indwelling catheters in cesarean sections of hemodynamically stable women was not necessary.	No inconsistencies or serious limitations were apparent. No apparent biases.	GRADE guidelines - high quality
Meddings, Krein, Mohamad, Olmsted, & Saint (2013)	Literature review	Strategies to reduce use of urinary catheters	Objective: Identify the best strategies to reduce the use of urinary catheters to	No biases, inconsistencies or limitations were apparent	GRADE guidelines - high quality

			prevent UTIs. Results: the use of “bladder bundles”, as alternative measures to catheterization, assessment of need, frequent assessment of need, and early removal are effective measures.		
Nasr , ElBigawy, Abdelamid, Al-Khulaidi, Al-Inany, & Sayed (2009)	Multi-center randomized controlled trial	420 women	Objective: Investigate the effects on UTIs with indwelling catheter placement during cesarean deliveries. Results: Those women who did not receive an indwelling catheter prior to cesarean delivery had increased time to ambulation and first void times; shorter hospital stay and no intraoperative complications were recorded.	No serious limitations, inconsistencies, or biases present. Large sample size and performed in multiple centers.	GRADE guidelines - high quality
Zhou, Lin, & Huang (2012)	Randomized controlled trial	138 women	Objective: study the effect of extubation time of indwelling urinary catheters on postoperative		GRADE guidelines -high quality

			recovery after cesarean section. Results: Those women who had their catheter removed within 8 hours after cesarean delivery experienced a significant decrease in UTIs ( $p < 0.05$ ); earlier first void times and a higher degree of comfort after removal of the catheter versus those who had the catheter removed after 24 hours.		
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## Appendix B: Demographic Data Collection

	Month prior to implementation	2 Month post implementation
Cesarean delivery	27	53
Indwelling catheter	27	50
Demographics	23-35 years of age	20-37 years of age
Age		
Ethnicity	Not identified	Not identified

## Appendix C: Hemodynamic Data Collection

Criteria	Experts										I-CVI	
	1	2	3	4	5	6	7	8	9	10		
Primary cesarean	4	4	4	4	4	4	4	4	4	4	4	1.0
Repeat cesarean	4	4	3	4	3	3	3	3	3	3	3	1.0
No UTI	4	4	3	3	3	3	3	3	4	4	4	1.0
No vaginal bleeding	4	4	4	4	4	4	4	4	4	4	4	1.0
No hypertensive disorders	4	4	4	4	4	4	4	4	4	4	4	1.0
No systemic disorders	4	4	4	4	4	4	4	4	4	4	4	1.0
No fetal distress	4	4	4	4	4	4	4	4	4	4	4	1.0
No contraindications for anesthesia	4	4	4	4	4	4	4	4	4	4	4	1.0
Patient's age	1	1	1	1	1	1	2	2	1	1	1	0.0
Ethnicity	1	1	1	1	1	1	1	1	1	1	1	0.0
Number of births	1	1	1	1	2	2	2	1	1	1	1	0.0
											S-CVI	
											0.73	

## Appendix D: Assessment and Catheters Post Intervention

	Assessed	Not Assessed	Total
Cathed	49	1	50
Un-cathed	3	0	3
Totals	52	1	53
<i>p</i> -value			<i>p</i> = 0.805



## Appendix E: Needs Assessment Pre and Post Intervention

Use of Needs Assessment	Before Educational Intervention (N = 27)	After Educational Intervention (N = 53)	P-value
No	27	1	< 0.001
Yes	0	52	< 0.001

## Appendix F: Indwelling Catheters Pre and Post Intervention

Use of Indwelling Catheter	Before Educational Intervention (N = 27)	After Educational Intervention (N = 53)	P-value
No	0	3	0.685
Yes	27	50	0.685

## Appendix G: Length of Time Indwelling Catheters are Left in Place

	Before Educational Intervention ( <i>N</i> = 27)	After Educational Intervention ( <i>N</i> = 53)
Average Time	24 hours	8 hours

## Appendix H: 3-month Cesarean Deliveries Data Collection

	1 month pre intervention	1 month post intervention	2 months post intervention
Cesarean Delivery	27	26	27