Confidence and Perceived Benefit of Nurses Participating in a Simulation-Based Learning Experience for Male Urethral Catheterization:

A Quality Improvement Project

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Abstract

Introduction

Men undergoing urethral catheterization are at increased risk of urethral trauma, infection and long-term sequela resulting from insufficient training, depleting skills, or lack of knowledge by nurses who perform this procedure. The use of simulation and training oversight by an experienced urology nurse practitioner has the potential to address loss of competency in practicing nurses' skills and improve confidence in male catheterization thereby decreasing iatrogenic urethral injuries and infection.

Purpose

The aim of this quality improvement project was to assess nurses' skills, knowledge, and confidence in male Foley and coudé catheter placement utilizing clinical simulation to improve future outcomes for men undergoing this procedure.

Methods

Fifty Registered Nurses (RNs) practicing in the perioperative department were invited to participate in a clinical simulation-based learning experience for male catheterization. Prior to simulation, the hospital's policy and procedure checklist was provided to each RN for review. A 5- point Likert scale survey assessing respondent characteristics, confidence, skills, and perceived benefits of simulation training was administered before and at the completion of the educational experience. Skills assessed included the use of sterile technique, and methods for catheter placement in a male patient.

Results

The project outcomes showed discrepancies in knowledge and skills for techniques in male catheterization including failing to insert the Foley catheter to the bifurcation, failing to obtain urine output prior to balloon inflation, uncertainty about how to insert a coudé catheter and sterile draping and cleansing the urethral meatus when using the catheter insertion kit. Finally,

RNs were found to be unfamiliar with their hospital's policy for this skill. Results of a Wilcoxon signed rank test revealed a highly significant increase ($p<.001$) in both performing male urethral catheterization, as well as nurse confidence after the simulation educational intervention.

Discussion

This educational intervention showed clinically significant outcomes in increasing nurses' confidence and skills in performing male catheterization and identified gaps that could compromise the care of male patients undergoing urethral catherization.

Keywords*: Foley catheterization, simulation education, nursing skills and confidence*

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Introduction

Placement of a Foley catheter is a common nursing procedure. Approximately one-fourth of patients will have an indwelling Foley catheter placed during their hospitalization (Ingram et al., 2021). Indications for indwelling Foley catheter placement include acute urinary retention, surgical procedures, hospice and palliative care, measurement of strict urine output, immobilized patients, urological emergencies, patients with incontinence and perineal or sacral wounds (Agency for Healthcare Research and Quality [AHRQ, 2015]). While not all male patients are injured during urethral catheterization, a subset of patients is at a higher risk for difficult urethral catheterization. These include men with benign prostatic hyperplasia (BPH) or a history of urethral strictures (Lee et al., 2018). Placement of urinary catheters can be associated with negative events in healthcare including infections, trauma to the urinary tract, as well as patient discomfort and anxiety (Wooler et al., 2018).

In nursing education, urinary catheterization is a nursing skill that requires knowledge of sterile technique and the demonstration of competency in the skills lab prior to performing these skills on a live patient. It is commonplace for students to be taught the principles of sterile technique and urethral catherization during the first semester of nursing school. Validation of skills is achieved once the nursing student can demonstrate skills competency in a skills lab checkoff. Furthermore, reassessment of nursing skills in the simulation lab setting is typically not a part of the nursing curriculum (Gonzales & Sole, 2014).

In the clinical setting, nursing education faces many barriers to skills acquisition and mastery. The shortage of nursing instructors and high student to instructor ratios can be barriers to learning. Also, limited clinical sites and nursing short staffing at the clinical sites can be barriers to hands-on skills learning opportunities (Öztürk & Dinç, 2013). A survey of the

perceptions of pre-licensure nursing students in the United Kingdom found that nursing students do not have consistent opportunities for clinical skills development in clinical placements which can influence learning and competency development (Stayt & Merriman, 2013). In addition, due to the coronavirus pandemic, in-person education and clinicals for students were stopped or altered, therefore traditional hands-on learning had to be accomplished via distance education (Aksoy & Pasli Gurdogan, 2022).

Simulation in nursing is a common training modality for skills and critical thinking acquisition. Nursing simulation aids in critical thinking and increases confidence prior to performing the same interventions or skills on real-life patients (Ingram et al., 2021). Schmidt, E., et al (2013) in a systematic review of simulation and patient outcomes found evidence in a variety of health care settings to indicate individuals trained in simulation-based exercises achieved greater technical and procedural performance (p. 426) . Issenberg and colleagues (2005) in their systematic review of medical simulations and effective learning found educational feedback was a critical component to effective learning in a simulation-based environment. In addition, healthcare simulation has not only been shown to help facilitate learning for clinicians and change in practice, but also improves patient outcomes and safety (Zigmont, et al., 2011).

Background

It is estimated that iatrogenic urethral catheterization injuries occur in approximately 13 per 1,000 catheterizations with the most common urethral injuries resulting from unintentional catheter balloon inflation within the urethra or creation of a false urethral passage (Davis, Bhatt, MacCraith et al., 2019). Inadvertent urethral catheterization injuries can result in temporary as well as permanent genitourinary sequalae that can cause patient discomfort and contribute to higher healthcare costs. Approximately one-third of urethral injuries secondary to urethral catheter placement requires urological intervention (Lee et al., 2018). Short-term complications can include urinary retention resulting in acute kidney injury, urosepsis, and bleeding (Davis,

Bhatt, MacCraith et al., 2019). Long-term complications of inadvertent urethral injuries include a higher risk of developing urethral stricture disease potentially requiring reconstructive interventions (Davis, Quinlan et al., 2016).

The potential cost of inadvertent urethral catheterization injuries in the acute care hospital setting is staggering. Davis, Quinlan et al. (2016) reported, "The calculated cost of managing thirty-seven iatrogenic urethral injuries in an acute inpatient hospital setting was estimated to be $371,790 (p. 1475). This cost does not account for the long-term management of complications and follow up appointments. In addition to healthcare expenditures, litigation can result due from urethral injuries. In fact, a review of malpractice claims in the past 50 years found that 48% of claims were due to traumatic catheter placement and over half of all plaintiffs were male (Awad et al., 2016).

By providing healthcare educational training through simulation-based learning and following evidence-based hospital policy and procedure guidelines regarding proper male urinary catheterization, nurses can be empowered to recognize and redress clinical deficiencies to positively impact nursing practice and improve patient care for men undergoing urethral catheterization in the hospital setting.

Problem Statement

Urethral catheterization is a skill that if not correctly performed will continue to result in injury and infection in men who must undergo this procedure. Complications from urethral injuries result in increased medical costs and long term sequalae. Interventions to educate, train and maintain clinical skills of nurses who perform urethral catherizations in men are essential for effective clinical practice improvement and patient outcomes.

Organizational "Gap" Analysis of Project Site

Currently RNs working in the preoperative unit of an urban healthcare system in Alabama receive training for male urethral catheterization in the form of in unit training (see-

one-do-one) from his or her preceptor during orientation. Any repeat training takes place in the form of annual competency checkoffs where the skill of male catheterization is observed by an RN peer. The short and long term implications of iatrogenic urinary catheter injuries include patient morbidity and increased health care costs for patients and health care institutions. Nurse educators, hospital administration and clinical leaders should play an active role in educating, training and continuously updating the evidence based knowledge of nurses within the hospital setting in order to prevent the long term consequences of urethral injuries in men undergoing urethral catherization.

Review of Literature

Literature Search

The review of literature began by identifying clinical practice guidelines for male urethral Foley catheterization. Three expert and peer vetted validated checklists were identified. The European Urology Nurses Association's male Foley catheter checklist was created after an extensive literature search and blinded review conducted by urology nurses and physicians hailing from various geographic locations. The literature was then appraised based on the Oxford Centre for Evidence-based Medicine (Geng et al., 2012). A Foley catheter insertion article from the *Society of Urologic Nurses and Associates* is a peer reviewed article regarding the Foley insertion process (Flagg et al., 2021). Additionally, the development of a standardized checklist for Foley catheterization using the Delphi method allowed for expert review to create a standardized checklist for the steps of male Foley catheterization (Berg et al., 2013).

The initial review of background literature utilized Google Scholar search engine. Keywords utilized in the literature search included: urethral catheterization AND injuries, nurse urethral catheterization AND injuries, traumatic urinary catheterization, AND insertion, and male urethral catheterization procedure. The search excluded articles greater than ten years old. Each search yielded between 9,980 and 37,400 articles. Articles with the following key terms

were excluded from consideration: pelvic fractures, intermittent catheterization, penile prosthesis, safety device, balloon pressure, spinal cord injury. Other exclusionary terms included the following: male children, blunt multi-trauma, trauma, YouTube, urethral obstruction, sonourethrography, buried penis, and male urethral diverticula. Articles with pediatric and obstetrical patients were also excluded. The articles retrieved provided supportive background knowledge about urethral injuries for the project.

A search of the literature was also performed through CINHAL search engine entering the search terms nurse AND urethral catheterization NOT children searching articles published in the last five years. This search yielded 105 articles which were then further narrowed by excluding articles related to the following: pediatric, long-term catheterization, and intermittent catheterization. Additionally, articles have been found via searching reference lists of relevant academic articles.

Article Analysis

Three systematic reviews were retrieved regarding simulation and safety checklist. Regarding the use of safety checklist in the hospital setting, no high-level evidence was found to support the use of checklist, but more studies need to be performed to make any definitive conclusions regarding their use (Ko et al., 2011). The systematic review regarding simulation notes that self-efficacy was reported improve with the implementation of simulation learning (Cant & Cooper, 2017). A systematic review assessing the use of checklist for certification of clinical skill competencies finds that two key clinical procedural factors, infection control and safety, were not addressed in procedural skills checklists (McKinley et al., 2008). Furthermore, a development of a standardized checklist for Foley catheterization using the Delphi method allowed for expert review to create a standardized checklist for the steps of male catheterization (Berg et al., 2013).

The articles selected included three prospective studies regarding the incidence of urethral catheterization injuries pre- and post- simulation and didactic educational intervention in a population of intern physicians and nursing staff. The additional prospective studies evaluated the monetary cost, complications, as well as long-term outcomes of iatrogenic urethral catheterization injuries which establish the need for the project. The study by Bhatt et al. (2017), noted that there was a slight decrease in iatrogenic urethral catheterization injuries post education, however the hospital length of stay status post catheterization injury did not change, and inferred that simulation does not adequately replicate urethral catheterization. Additional prospective studies that assessed cost, short- and long-term complications, and clinical outcomes for iatrogenic urethral injuries were limited in their findings due to the possibility of a previously undiagnosed urethral stricture.

The literature review yielded two level III studies that pertained to urethral catheterization injuries. One study implemented a nurse driven protocol for the use of Foley catheters to decrease the incidence of traumatic urethral injuries because of catheterization. Post implementation of the nurse driven protocol noted a 46% decrease in incidence of catheterization related injury (Laborde et al., 2021). The second level III study utilized a computerized flow chart when a catheter placement order was entered into the system to identify male patients whom a coude-tip catheter needs to be utilized. This flow chart did not significantly change the number of traumatic or non-traumatic urology difficult catheter consults (Lee et al., 2018). Limitations identified in these studies highlighted the importance of the experience and skill of the person who inserted the catheter and the chance that data would not be collected if a urology consult was not placed, or if the urethral injury was not reported.

For standardization of skills, a quantitative study using a convenience sample of new graduate nurses notes the need for standardization of competency validation to improve uniformity in the practice of skills, but once again notes the need for further research regarding

simulation, self-efficacy, and skill training (Cohen et al., 2016). Additionally, the literature search for urinary catheter insertion guidelines yielded the European Association of Urology Nurses (EAU) guidelines for male Foley catheter insertion which standardizes insertion procedure with rationale for all actions related to catheter insertion (Geng et al., 2012).

Finally, two qualitative studies measured the confidence of new graduate nurses in a residency program before and after a didactic and simulation educational session regarding proper Foley catheter placement. One study found that there was a 35% overall increase in content knowledge (Ingram et al., 2021). This study demonstrates that there is a potential need for further education of nursing staff, other than traditional nursing education, to ensure confidence and competence regarding male indwelling Foley catheter placement. The drawback of this study is that there was a limited number of study participants and lack of knowledge regarding assimilation of the curriculum into nursing practice (Ingram et al., 2021). The second study noted similar results, with a positive perception of training usefulness, but it is unknown if the training was assimilated into nursing practice (Cohen et al., 2016). The review of literature demonstrates that iatrogenic Foley catheterization injuries is a problem that results in costly injuries as well as short- and long-term complications in male patients who undergo Foley catheterization. Preventing catheterization injuries via the introduction of quality improvement training for proper male Foley catheterization techniques can improve health outcomes by decreasing the overall number of iatrogenic male urethral injuries, CAUTIs and improve patient care.

Evidence based Practice: Verification of Chosen Option

Simulation-based education and training supported by leadership and clinical experts in the hospital setting increases confidence and empowers nurses' to correctly perform male urethral catherization. A quality improvement project that involves an educational intervention in the hospital setting will address clinical deficiencies and improve patient care by preventing

the long- and short-term complications associated with urethral catherization in the hospital setting in over a three-week period.

Theoretical Framework or Evidence Based Practice Model

Quality of care and safety should be the highest priority for hospital leadership to secure commitment among physicians, nurses, and administrators to improve patient health. The Model for Improvement is the model that best addresses the clinical issue and the study approach for this quality improvement project. Developed by the Institute for Healthcare Improvement, this improvement model uses a cycle process named Plan-Do-Study-Act (PDSA) to trial the effects of smaller changes and apply those changes to allow for safer clinical practice (AHRQ, 2013). The Model for Improvement will allow for applying small changes by providing the proper training on how to safely place a male urethral Foley catheter that will improve nursing practice and decrease unnecessary patient harm. This model incorporates the goal that we are trying to accomplish and will aid in determining if the intervention results in an increase in perceived confidence and skill in male Foley catheter placement (AHRQ, 2013).

Goals, Objectives, Expected Outcomes

The primary goal of this quality improvement project was to improve the competency and confidence of perioperative RNs in performing male urethral catheterization in a community health system. By providing an easily reproducible simulation-based training founded on the healthcare systems' evidence-based policies and procedures and oversight from an expert urology nurse practitioner, nurses can achieve this goal. Expected outcomes are improvement in nurses' clinical skills and confidence in performing urethral catherization in male patients leading to improved patient care by preventing urethral damage, surgical repair, increased length of hospital stays and chronic stricture disease.

Setting Facilitators and Barriers

Facilitators were the factors that promoted a positive transition to ensure favorable project outcomes. These factors included supportive nursing leadership and champions, location, a well-designed strategy, evidence-based guidelines for urethral catherization, resources, and time to develop and implement the project in the hospital setting. Barriers included time constraints, knowledge gaps of nurse participants and leadership, lack of buy-in from targeted units RN staff, turn-over of RN staff, and lack of adequate staffing to allow for program participation.

Methods

The purpose of the project was to educate nurses in performing male urethral catherization to prevent negative outcomes related to this procedure. Inclusion criteria for participation were nurses 18 years and older working in a setting where frequent urethral catherizations were performed. Exclusion criteria included age less than 18 years, and non-English speaking. When eligibility was confirmed, informed consent was obtained.

Project Design

The project design was a quality improvement educational intervention utilizing simulation-based training with oversight by a urology nurse expert to improve clinical nursing practice in hospital units where placement of a Foley catheter is a required procedure. Recruitment strategies included collaboration with the perioperative nurse educators to allow for participation. Quantitative data was obtained in the form of a pre- and post-survey Likert scale to assess skills and confidence in proper male Foley catheterization. Qualitative data in the form of participant observation and urology nurse expert feedback were collected and monitored to understand how participants were using their new skill and to improve the ongoing educational intervention.

Project Site and Population

The setting for this scholarly project was the perioperative department of a not-for-profit 538 bed hospital and medical complex serving the western region of Alabama. Stakeholders for the study included the project director, who is a urology nurse practitioner, and two perioperative nurse educators who helped facilitate access for study participants by ensuring assignment coverage was available for nurses wishing to participate. The study population included RNs working in the health systems' perioperative department which consists of five separate units: the pre-operative care unit, post-operative care unit, operating room services, a 23- hour observation unit, and a pre-admission testing unit. Clinical site resources available for project implementation included Foley catheters for demonstration purposes and study participants. Implementing simulation training and a skills checklist based on hospital policy and procedure would decrease healthcare costs and negative patient outcomes which lessened barriers to project implementation at the clinical site.

Measurement Instruments

After informed consent was obtained, pre- and post-surveys were administered to assess perceived confidence and skills of the perioperative RNs in male Foley catheterization, as well as participant years of experience and number of Foley catheters placed over the last 12 months. A 5-point Likert scale was used to measure program effectiveness. Louangrath (2018) noted the validity and reliability of a 5-point Likert type scale has 90% reliability and 89% validity (p.50).

Data Collection Procedures

Pre-Intervention (Plan)

Two operating room (OR) nurse educators at the two regional hospital locations were approached and agreed to assist with the study. A task trainer for male urinary catheterization was obtained and the OR education classrooms were scheduled for the dates for the simulation activity. Flyers announcing the simulation were posted in the OR breakrooms one week prior to the study (see Appendix A). The OR nurse educators also announced the voluntary educational

opportunity in their weekly rounds. The OR educators assisted in the rotation of the RNs who wished to participate by allowing nurses to rotate through the training during his or her workday. Informed consent was obtained, and the pre-survey was provided to each participant (see Appendix B).

Intervention (Do)

Data was gathered for participants' perceived confidence and skill regarding male Foley catheter technique, coudé catheter placement, and overall confidence regarding male catheterization prior to the simulation-based training.

The project director presented each participant with the health system's policies and procedures for male Foley catheter placement (see Appendix C) and briefly reviewed the guidelines with the study participants. A short educational session took place on the proper insertion of a Foley and coudé catheter, information on catheter sizes, and how to prevent paraphimosis of the uncircumcised male. Nurses were again reminded of the hospital policy stating that RNs may not insert coudé catheters without a physician's order (Lippincott, 2021). All questions put forth by the participants regarding the project were addressed.

Each participant demonstrated sterile technique, draping the patient, and cleansing the urethral meatus using the sterile catheter tray. Constructive feedback and guidance from the program director included the need to verbalize urine return and placing the catheter to the bifurcation (hub) utilizing the steps presented in the checklist to ensure knowledge regarding proper placement. As this was a simulated patient, there was a need to verbalize that urine return has been noted prior to inflation of the catheter balloon. Once the simulation portion of the study was completed, the post-survey (see Appendix D) was administered.

Post Intervention (Do)

The final portion of the study was the completion of the anonymous post intervention survey which allowed for data collection regarding program effectiveness.

Study (Data Analysis)

The quantitative data consisted of pre and post scores from the Likert scale surveys assessing perceived improvement in skills and confidence in the ability to perform male urethral catherization. The data was analyzed and compared using SPSS software and the Wilcoxon signed rank test to obtain pre- and post-intervention scores for each participant. The results were examined to assess if there was a perceived improvement in skills and confidence to help to determine if the project was successful in achieving the projects goals.

Act

Based on what was learned, a plan of action was developed to approach leaders and administration to seek approval for annual training to incorporate the simulation into other departments of the hospital in which high volumes of Foley catheters are placed.

Cost/Benefit Analysis/Budget

The costs to the institution were those associated with having two Foley catheter insertion kits for simulation purposes which were provided by the perioperative department. The cost of these supplies was offset by the potential savings to the hospital in the decrease in catheter associated urinary tract infections (CAUTIs), urethral injuries, and days of hospitalization associated with improper male Foley catheter placement. Two coudé Foley catheters for demonstration and didactic purposes were provided by the program director's clinical site. The University of Alabama College of Nursing simulation equipment was loaned at no cost to the study investigator. The education sessions took place during regularly scheduled work hours for leadership who were reimbursed with their usual salary. The cost to the program director was time in developing and setting up the simulation and working with the hospital and community to obtain needed resources.

Timeline

Project implementation began after obtaining IRB approval through the University of Alabama IRB in late September 2022 (see Appendix E) and concluded within the expectations of The University of Alabama Capstone College Doctor of Nursing Practice Program. Additional timeline information can be found in Table 1 (see appendix F).

Ethical Considerations/Protection of Human Subjects

The University of Alabama Institutional Review Board approval was obtained prior to initiating the project. All participants were protected by the Health Insurance Portability and Accountability Act of 1996 (HIPAA) which, among other guarantees, protects the privacy of patient's health information (Health and Human Services Department, 2013). Additionally, Standards of Care for practice in the hospital setting were carefully followed. All information collected as part of the evaluation of this project was aggregated data from the project participants and did not include potential patient identifiers. The participants were at low risk and participated without external influence. Risks were no different than those experienced by other nurses participating in an educational simulation. Participant confidentiality was protected as no identifiers were used only unique identification numbers. The list of participants and their identifying numbers were kept in a locked filing cabinet in the project coordinators office and were only accessible by the project coordinator. Any electronic files containing identifiable information were stored on the HIPAA secure UA Box which was password protected to prevent access by unauthorized users.

Results

A simulation-based learning experience was conducted at a regional community health system in western Alabama to assess and improve skills and perceived confidence level of nurses who agreed to participate in this evidence-based project. Likert scales were developed to assess level of competence and confidence in male Foley catheter placement before and after reviewing

a health system policy and procedure-based checklist for male Foley catheter placement (see Appendix C).

Project Participants

The study group for this project included fifty registered nurses working in the perioperative services department. Participant nursing years of experience ranged from less than one year (2%) to greater than 10 years (58%) (see Appendix G, table 2). Of these, 9 (18%) had never placed a Foley catheter in a male patient, while 27 (54%) had placed 5 or more in the past 12 months (see Appendix G, table 3). Seventeen nurses (34%) had never placed a coudé Foley catheter while 33 (66%) had placed at least 1 coudé catheter during this same time frame. Twenty-one nurses (42%) had never participated in simulation learning while 29 (58%) had some prior experience in simulation.

Pre-Simulation Results

The pre-survey assessing confidence level of the participants for Foley catheter placement indicated 14 nurses (28%) were very confident in their ability to perform Foley catheterization in a male patient, while 36 (72%) self-reported as being extremely confident in this procedure prior to the simulation-based training.

Post-Survey Results and Analysis

Following the simulation training, 48 nurses (96%) felt extremely confident, and 2 nurses (4%) felt very confident indicating a highly significant improvement (Wilcoxon sign rank test ($Z= -5.669$) ($p=<.0001$) in their confidence to place a Foley catheter. There was no statistically significant relationship between nursing experience and perceived level of confidence in male Foley catheterization. (see appendix G, table 4).

The participants commented that the simulation reinforced previously established knowledge about male urethral catheterization. Furthermore, many participants were unaware of the health system policies and procedures addressing coudé catheter placement. Several nurses

did have further questions regarding placing the catheter to the bifurcation (hub) and having urine output prior to catheter balloon inflation. Many nurses noted that they felt that they learned something about Foley catheters that they did not know before the simulation-based activity.

Perceptions of RN Participants in Simulation Based Training for Foley Catheterization

Forty-six nurses (92%) considered the simulation to be extremely beneficial with the remaining participants indicating the simulation was very beneficial increasing both their confidence and skill in placing a Foley catheter (see Appendix G, table 5). All participants strongly recommended simulation training as a method for teaching Foley catheter placement skills. The nurses noted that the brief, 10-minute simulation session was adequate for learning, and not disruptive of his or her workday. Participants also noted that the activity was more relevant to their practice due to the integration of the hospital policy and procedure into the male Foley catheter checklist. It was also noted that the review of how to properly place a coudé catheter was useful as many nurses had not placed a coudé catheter frequently in practice.

The OR nurse educators, urology team leader and the primary stakeholders, were key in the coordinating and implementing this project. They assisted in obtaining Foley catheter kits and securing classrooms or spaces for the training to take place as well as helping with assignment coverage to allow for RN staff participation. The stakeholders noted that the staff left the training feeling like their knowledge of Foley catheter placement was improved because of attendance. Additionally, having the low fidelity male mannequin allowed for a more visual and "hands-on" learning experience. The nurse educators also noted that the simulation-based training length of time was adequate for the learning experience, yet not disruptive of the perioperative workflow. Finally, the integration of the facilities' male Foley catheterization policy and procedures allowed for the training to be more relevant to the study site.

Implications

The purpose of this quality improvement project was to assess nurses' skills, knowledge, and confidence in male Foley catherization utilizing clinical simulation to improve future outcomes for men undergoing this procedure and to improve perioperative nurses' perceived confidence and skill regarding male Foley catheter placement to decrease the risk of inadvertent urethral injuries as result of male Foley catheter placement. Hendlin et al., (2009) studied the physical properties of Foley catheters and noted the force used to place the urethral Foley catheter can vary among inserting clinicians, which can affect the risk of urethral injury (p.171). The results of this quality improvement study suggest that providing a 10-minute checklist and simulation-based learning opportunity can improve the skill and confidence of nurses performing male Foley catheterization. The study showed that by implementing the plan-do-study-act cycle, small changes, such as increasing knowledge regarding a common nursing skill, can lead to bigger clinical practice changes and decrease patient harm. The study also shows that even experienced nurses can improve upon their nursing skills by increasing their knowledge base as they continue their careers. Additionally, the findings that not all nurses have performed male Foley catheter placement indicates that consideration should be given to decreasing that knowledge gap by including Foley catheter placement in annual competency training. Participants reported a lack of experience in coudé catheter placement indicating this training should also be included in this annual competency training. This study also emphasizes that even brief, low-fidelity simulation training can improve and reinforce male Foley catheter placement confidence and skills. Simulation is an educational tool that has been proven to improve clinical performance (Ingram et al., 2021). The CDC also strongly recommends periodic in-services and training regarding properly Foley catheter use and techniques, further addressing the need for periodic Foley catheter training (Gould et al., 2019).

This study also highlights the need for nursing skills refresher courses to ensure that nursing skills, such as Foley catheter insertion, are adherent to health system policy and

procedures. Additionally, it should be noted that this pilot study could be implemented in other health systems or facilities where Foley catheters are inserted. Lastly, this study has implications for decreasing patient injury, social burden, cost of care and cost of litigation because of urethral injury due to male urethral Foley catheter placement.

Limitations

Study limitations include the small sample size. The study was also completed in only one specialty unit of the health system which resulted in a homogeneous population. Short-staffing and staff turnover were barriers to implementing this quality improvement project. Additionally, study findings may not be generalizable to other hospital units or health systems. The study was completed at one study site and may not be generalizable to other geographical locations and was piloted over a period of three weeks limiting recruitment. Furthermore, we do not know if the study improvement in skills and confidence in the setting of simulation-based training will translate into nursing practice. Nurses were unfamiliar with coudé catheters as hospital policy requires permission to perform this procedure.

Conclusion

Improper male Foley catheterization can result in urethral injuries, urinary tract infections, pain and increasing healthcare costs. Addressing the knowledge, skills, and confidence of RNs in a community health care system by implementing simulation-based training in Foley catherization has the potential to increase perceived confidence and skill proficiency. This scholarly project underpins the importance for new graduate RNs to participate in skills training for Foley catherization in male patients. It also demonstrates the need for continuing education of nursing staff to ensure confidence and competence regarding this procedure (Ingram et al., 2021). Improving male Foley catheter skills proficiency in high volume catheter placement units can improve nursing practice and decrease patient harm.

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Appendix A: Study Flyer

INCREASING KNOWLEDGE AND CONFIDENCE IN MALE FOLEY CATHETER PLACEMENT

WHEN

OCTOBER 3RD & 6TH- MAIN OR 8A-4P

OCTOBER 13TH- SAME DAY SURGERY 8A-4P

OCTOBER 20TH- NORTHPORT 8A-4P

WHERE
Unit Classrooms

Duration

Approximately 10 minutes

Snacks will be provided for participants.

Any questions, contact Chelsey Roberts at ext. 7359 or Chelsey.roberts2@dchsystem.com

UA IRB Approved Document
Approval date: 9/29/22
Expiration date: 9/28/23

ALL REGISTERED NURSES WHO INSERT OR WANT AN UPDATE ON HOW TO INSERT MALE FOLEY CATHETERS.

UNIVERSITY OF ALABAMA DNP PROJECT
Collecting data to see if simulation training improves knowledge and confidence in male Foley catheter placement

PRE- AND POST-SURVEYS AND SIMULATION ACTIVITY
Led by Chelsey Roberts, MSN, CRNP - University of Alabama DNP Student and West Alabama Urology CRNP

Capstone College of Nursing
THE UNIVERSITY OF ALABAMA®

Appendix B: Study Pre-Survey

Study Pre-test
Unique ID :

(Circle Answers Where Appropriate)

1. In the past **twelve months**, approximately how many **MALE** Foley catheters have you inserted?

None	1 – 5	5 – 10	10 – 15	Greater Than 15

2. How many years of experience do you have as a Registered Nurse (RN)?

Less Than 1	1 – 3	3 – 5	5 – 10	More Than 10

3. Have you used simulated learning in male Foley catheter insertion in the past?

Yes	No

4. On a scale of 1 – 5, how confident are you with insertion of a Foley catheter in a male patient?

1	2	3	4	5
Not Confident	Slightly Confident	Somewhat Confident	Fairly Confident	Completely Confident

5. Have you ever inserted a coudé catheter before?

Yes	No

6. On a scale of 1 – 5, how confident are you regarding insertion technique for coudé catheter?

1	2	3	4	5
Not Confident	Slightly Confident	Somewhat Confident	Fairly Confident	Completely Confident

Study Pre-test
Unique ID :

7. On a scale of 1 – 5, what would you say your level of skill is in performing male Foley catheter insertion?

1	2	3	4	5
Not Skilled	Slightly Skilled	Somewhat Skilled	Fairly Skilled	Completely Skilled

Appendix C: Male Foley Catheter Placement Checklist

Male Foley Catheter Insertion Checklist

DCH Policy

- RN's and LPN's may insert Foley catheter with a physician's order
- If the catheter is traumatically removed, it must be inspected by the RN to ensure the catheter is intact and the physician must be notified.
- The RN or LPN must not reinsert catheter without a physician's order.
- If allergic to betadine, must cleanse with antibacterial soap.
- After **TWO** unsuccessful catheterization attempts, have a second nurse attempt insertion.

Equipment

- Foley catheter insertion kit
- Clean gloves

Implementation

1. Verify Foley catheter insertion order
2. Check for allergies, including to latex and iodine
3. Gather the necessary equipment and supplies
4. Perform hand hygiene
5. Confirm patient's identity using two patient identifiers.
6. Provide privacy
7. Explain the procedure to the patient and family (if appropriate)
8. Raise the bed to waist level to prevent back stain
9. Put on gloves to comply with standard precautions
10. Position the patient supine with the legs extended flat on the bed or with knees raised and flexed.
11. Place waterproof pad on the bed between the patient's legs and under the hips to prevent soiling the bed.
12. Open the outer packaging of the catheter kit and place between the patient's legs
13. Wash the patient's periurethral area using the soap containing wipes or water and soap using a washcloth. Rinse and dry thoroughly.
14. Remove your non-sterile gloves.
15. Re perform hand hygiene.
16. Using sterile technique, open the insertion kit wrap.
17. Put on sterile gloves.
18. Place the under-pad drape underneath the patient careful not to contaminate your sterile gloves.
19. Place a sterile fenestrated drape over the patient's lower abdomen so only the genitals are exposed.
20. Tear open antiseptic swabs or saturate antiseptic on the swabs or cotton balls.
21. Open the lubricant and deposit on the insertion tray kit.
22. Open the catheter and place it on the tray with the lubricant.

23. If the drainage bag is not pre-connected to the catheter, do so currently.
24. Attach the sterile water syringe to the inflation port. DO NOT inflate the balloon prior to insertion (Can cause microtears, which increases risk of infection).
25. Hold the patient's penis with your non dominant hand and stretch the penis to a 90-degree angle to straighten the urethra
    - If uncircumcised, retract the foreskin
26. Use your dominant hand to clean the glans of the penis with antiseptic swab or cotton ball in a circular motion, starting at the meatus and working outward.
    - Repeat this twice
27. Maintaining sterile technique, pick up the catheter with your dominant hand and ensure the catheter is lubricated.
    - May consider adding additional lubricant to the urethra to prevent trauma to the lining of the urethra and aid in insertion.
28. Hold the catheter 2 to 3 inches from the tip and insert into the urinary meatus and advance the catheter.
    - Ask the patient to practice diaphragmatic breathing to further relax the pelvic floor.
29. Continue to advance catheter to the bifurcation or "hub" **AND ENSURE** urine flow
    - If foreskin was retracted, release it to prevent compromised circulation and blood flow
30. Once urine begins to flow, inflate the balloon with sterile water syringe. Gently pull back to catheter until balloon is against bladder neck.
    - **NEVER** inflate the balloon without establishing urine flow **AND** inserting to the hub, which ensures the catheter is in the bladder.
31. Secure the catheter with stat-lock device to the patient's upper thigh. Ensure that there is not tension on the catheter. Tension can result in urethral and bladder neck trauma.
32. Hang the draining bag below the level of the patient's bladder to prevent backflow of urine into the bladder. Do not allow the bag to hang on the floor.
33. Return the bed to the lowest position.
34. Discard used supplies and sterile gloves appropriately.
35. Perform hand hygiene.
36. Document the procedure including any difficulties encountered and catheter size used.

Clinical Pearls:

- If BPH or difficulty passing catheter, the RN will need to obtain a physician's order to insert a coudé catheter per DCH Policy.
    For coudé catheter insertion, the catheter tip should be inserted "upwards" or anteriorly towards the patient.
- The balloon port of the catheter has a cover the denotes the catheter size. The sizes are color coded.
- If there is any question regarding if the catheter is in the bladder or concern about it coiling in the urethra, stop the procedure.
    - Signs include complaints of severe pain during insertion, inability to pass the catheter due to meeting resistance, and NO urine drainage.

References

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Appendix D: Study Post-survey

Study Posttest
Unique ID :

(Circle Answers Where Appropriate)

1. On a scale of 1 – 5, how confident are you with **male** Foley catheter insertion AFTER the simulation activity?

1	2	3	4	5
Not Confident	Slightly Confident	Somewhat Confident	Fairly Confident	Completely Confident

2. On a scale of 1 – 5, how confident are you regarding your ability to insert a coudé catheter insertion **AFTER** the simulation activity?

1	2	3	4	5
Not Confident	Slightly Confident	Somewhat Confident	Fairly Confident	Completely Confident

3. On a scale of 1-5, what would you say your level of skill is in performing male Foley catheter insertion AFTER the simulation?

1	2	3	4	5
Not Skilled	Slightly Skilled	Somewhat Skilled	Fairly Skilled	Completely Skilled

4. On a scale of 1 – 5, how beneficial was the **hands-on simulation** component of this training to your understanding of the subject matter?

1	2	3	4	5
Not Beneficial	Slightly Beneficial	Somewhat Beneficial	Fairly Beneficial	Completely Beneficial

5. On a scale of 1 – 5, how likely are you to recommend this simulation training to a peer?

1	2	3	4	5
Not Recommended	Slightly Recommended	Somewhat Recommended	Fairly Recommended	Completely Recommended

Appendix E: IRB Approval Letter

THE UNIVERSITY OF ALABAMA® | Research & Economic Development
Office for Research Compliance

September 28, 2022

To: Ms. Chelsey Roberts
Doctor of Nursing Practice Program
Capstone College of Nursing
Box 870358

From: Carpantato T. Myles, MSM, CIM, CIP
Director & Research Compliance Officer

Re: **Notice of Approval**

IRB Application #:	e-Protocol 22-05-5656
Project Title:	"Improving Nurse Competency and Confidence in Male Urethral Foley Catheter Placement"
Submission Type:	New
Approval Date:	September 29, 2022
Expiration Date:	September 28, 2023
Funding Source:	None
Review Category:	Exempt
Approved Documents:	Informed Consent, DCH IRB Letter, Male Foley Catheter Insertion Checklist, Final Pre-Test Survey, Final Post-Test Survey, Study Flyer, Nurse Educator Script, Signature Assurance Sheet

Dear Ms. Roberts:

The University of Alabama Institutional Review Board has approved your proposed research. Therefore, your application has been approved according to 45 CFR part 46. *as outlined below:*

(2) Research that only includes interactions involving educational tests (cognitive, diagnostic, aptitude, achievement), survey procedures, interview procedures, or observation of public behavior (including visual or auditory recording) if at least one of the following criteria is met…:

> *(iii) The information obtained is recorded by the investigator in such a manner that the identity of the human subjects can readily be ascertained, directly or through identifiers linked to the subjects, and an IRB conducts a limited IRB review to make the determination required by 46.111(a)(7).*

The approval for your application will lapse, as noted above. If your research will continue beyond this date, please submit the Continuing Review to the IRB as University policy requires before the lapse. Please note any modifications made in research design, methodology, or procedures must be submitted to and approved by the IRB before implementation. Please submit a final report form when the study is complete.

Please use reproductions of the stamped IRB-approved informed consent/assent form to obtain consent from your participants.

All the best with your research.

166 Rose Administration Building | Box 870127 | Tuscaloosa, AL 35401 | 205-348-8461 | rscompliance@ua.edu

Appendix F: Timeline

Table 1.

Timeline	Project Task
Prior to project implementation September 29th, 2022	**Obtain IRB approval**
1 week prior to implementation September 30th-October 7th, 2022	**Place flyers in Perioperative Areas**
1 week prior to implementation November 29th-October 7th,2022	**Nurse Educators to announce in rounds**
3 weeks of project implementation October 3rd, 6th, 13th, and 20th, 2022	**Project Implementation**
4 weeks post implementation October – November 2022	**Data analysis**
6 months post implementation April 2023	**Study findings and dissemination**

Appendix G: Tables

Table 2.

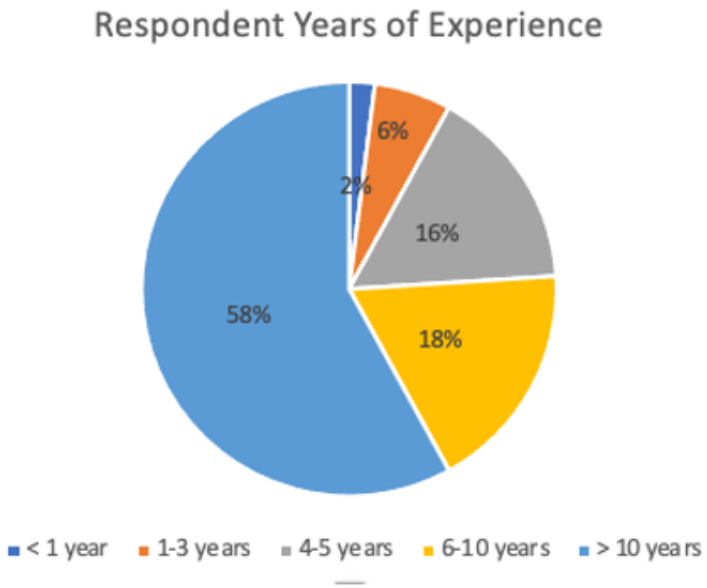
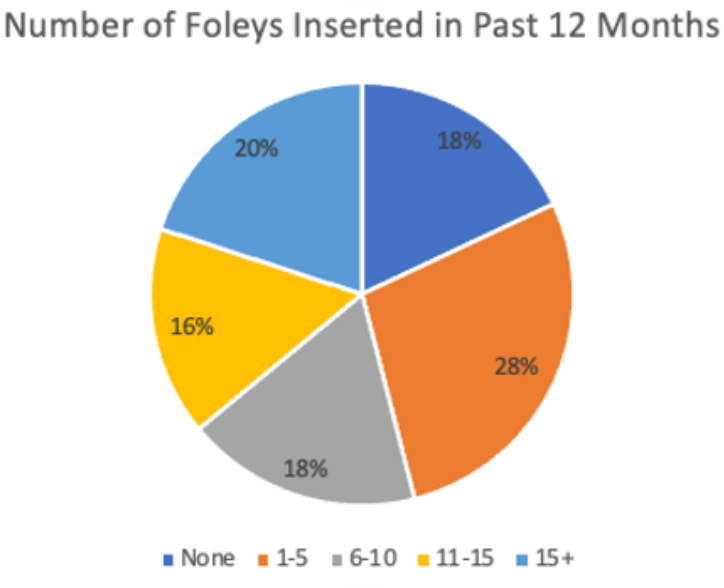


Table 3.



Appendix G: Tables (Continued)

Table 4.

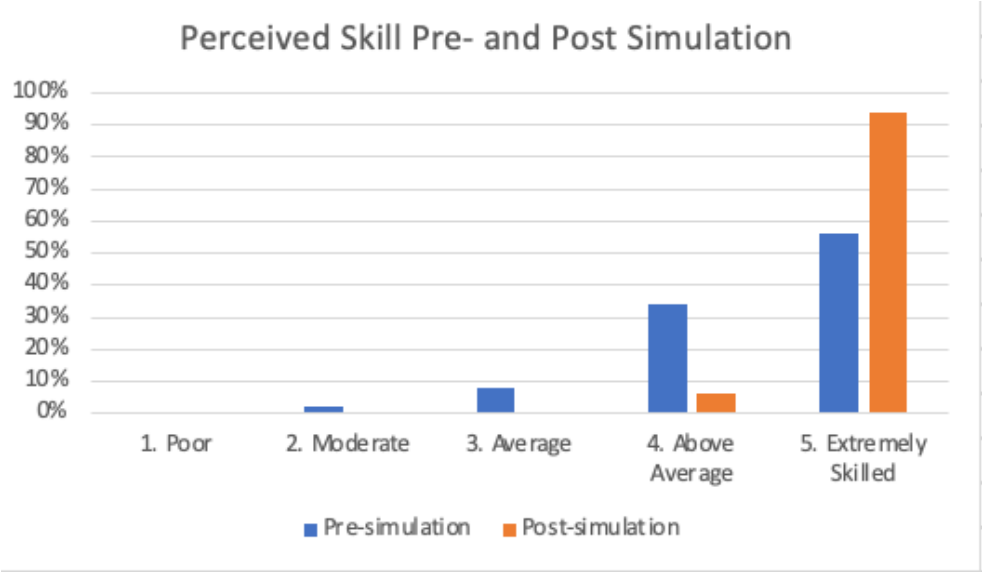


Table 5.