Prevention of catheter associated urinary tract infections

Abstract

CAUTIs is the second most common hospital-acquired infection (HAI). Identifying barriers to implementation of CAUTI prevention programs and evaluating the effectiveness will help decrease CAUTI rates. The purpose of this review is to appraise two studies, one qualitative and one quantitative regard to Catheter-Associated Urinary Tract Infections (CAUTIs). The qualitative study was found on the Journal Medical Association (JAMA) search engine. The quantitative study was found on the EBSCO host engine under Rutgers University libraries. Both studies were peer-reviewed and current within five years of 2018, in English, full text, creditable publishers. The quality of evidence met the criteria of the level of evidence pyramid. Minimal studies existed in the literature for CAUTI, which can cause studies to produce insignificant results. However, identifying key barriers to adherence of programs designed to help decrease the occurrence of CAUTI initiated possible solutions to the barriers determined from the qualitative study. Establishing standard CAUTI programs and assigning a leader to monitor is crucial in order to reduce the rate of CAUTIs. Health-care providers (HCPs) following guidelines, documentation, efficient communication with physicians, and educating nursing staff on updated evidenced-based practices will reduce the occurrence of such infections.

Keywords: CAUTI, CCU patients, reduction, prevention, prevention bundles

Introduction

Urinary Tract Infections (UTIs) are common and potentially lethal infections that are responsible for millions of healthcare visits each year. UTIs account

for approximately 40 percent of all hospital-acquired infections annually, with fully 80 percent of these hospital-acquired urinary tract infections attributable to indwelling urethral catheters, CAUTIs (Institute for Healthcare Improvement, 2018). CAUTIs are costly, adding $500-$1000 to the direct care cost of acute-care hospitalization and dangerous causing high institutionalized death rates (Safe Campaign, 2018). In 2008, there were major changes in Medicare policies for CAUTIs to not be reimbursed, forcing healthcare professionals (HCPs) to adhere to a strict protocol for catheter indication. With CAUTI being the second most common nosocomial infection, it is important to identify barriers when implementing CAUTI prevention programs and to evaluate effective current CAUTI prevention programs.

Background

Evidenced-based research has shown that patients with indwelling catheters have a higher risk of developing CAUTI per day of indwelling time. Therefore, catheter indication should only be used when patients are unable to drain their bladders. Queens University School of Medicine, (n. d.). states indications for short-term and long-term indwelling catheterization. For short-term indwelling catheterization:

- Post-surgery and in critically ill patients to monitor urinary output.
- Prevention of urethral obstruction from blood clots with continuous or intermittent bladder irrigations.
- Instillation of medication into the bladder.
- Surgical procedures involving pelvic or abdominal surgery repair of bladder, urethra, and surrounding areas.

- Urinary obstruction (e. g. enlarged prostate), acute urinary retention.

For long-term indwelling catheterization:

- Refractory bladder outlet obstruction and neurogenic bladder with urinary retention.
- Prolonged and chronic urinary retention.
- To promote healing of perineal ulcers where urine may cause further skin breakdown.

For the issue of CAUTI, there are gaps that exist such as a lack of research on standard CAUTI protocol, limited CAUTI prevention programs, limited data to measure necessary/unnecessary catheter use, and HCPs different perspective about the level of importance on CAUTI.

Methods

The article, " Barriers to Reducing Catheter Use" was found on the Journal of the American Medical Association (JAMA) search engine. JAMA is a peer-reviewed medical journal. The article, " A quasi-experimental study to test a prevention bundle for catheter-associated urinary tract infections" was found on the EBSCO host search engine under Rutgers University libraries. Both article's search criteria were within five years of 2018, must be in English, full text, credible publishers, reduction, nursing intervention, nursing strategies, etc. For the article, " Barriers to Reducing Catheter Use" the inclusion criteria were hospitals that did and did not use various practices to prevent CAUTI, hospital size, medical school affiliation, collection data to measure necessary/unnecessary catheter use, and type of unit that implemented Bladder Bundle (intensive care units, medical/surgical floors, or

entire hospitals) (Forman, Harrod, Kowalski, Krien & Saint, 2013). For the article, “ A quasi-experimental study to test a prevention bundle for catheter-associated urinary tract infections” the inclusion criteria were patients from critical care unit (CCU), patients were over 18 years old, those who had indwelling catheters, those who had been admitted without an UTI but developed an UTI after two calendar days, and patient without suprapubic catheters or intermittent catheterizations (Blanck, Brentlinger, Donahue, Stinger & Polito, 2014).

Analysis

The article “ Barriers to Reducing Catheter Use” purpose is to use qualitative assessment to examine the key challenges to implementing the Bladder Bundle program from the perspective of participating hospitals (Forman et al., 2013, p. 882). Qualitative research concepts include the ideas, experiences, situations or events (Burns, Gray & Grove, 2015, p. 156). For this qualitative study, the concept was to understand the experience of hospitals implementing the Bladder Bundle program (Forman et al., 2013, p. 885). This study would be considered as a Phenomenological design. The researchers wanted to gain a more holistic understanding of implementation at each site and to test or further explore issues identified by the telephone interviews (Forman et al., 2013, p. 882). There were 18 semi-structured telephone interviews and 24 onsite interviews. The information was digitally recorded and lasted 30-60 minutes. Both telephone and onsite interviews were transcribed and analyzed into extensive summaries for each of the research team members to recognize and determine preliminary themes.

The methods that were used to recruit participants were surveys sent to infection preventionists. At the time of the study survey, 54 of the 103 responding hospitals in the state of Michigan were implementing the Bladder Bundle and served as the sampling frame for the qualitative phases of the study (Forman et al., 2013, p. 882). Forman et al. (2013) presented their Sample in Table 2 (Selected Characteristics of Bladder Bundle Implementation) and discussed it throughout the narrative of the article. The Sample “ Primary champion” and “ Team Participants” had the same characteristics (Infection control, Nurse or preventionist, Nurse manager, Quality manager, Hospital epidemiologist, Infectious diseases physicians, and None). The “ Implementation” (On the floor only, in an intensive care unit, or hospital-wide) referred to where the Bladder Bundle program was put into effect.

The outcomes of the study were sufficient. Researchers were able to identify key barriers with the Bladder Bundle implementation (1) difficulty with nurse and physician engagement, (2) patient and family request for indwelling catheters, and (3) the role of the emergency department (ED) in catheter insertion (Forman et al., 2013, p. 883). Along with key barriers identified from interviews, participants in the study suggested potential solutions to help decrease CAUTI. Some of the findings were unexpected such as patient or family requests with catheter use and indication in the ED. Forman et al. (2013) suggest patient/family education is needed to understand the risks and complications. From their analysis, Forman et al. (2013) stated that hospitals identified the need for strategies in targeting catheter insertion in the ED.

The article, “ A quasi-experimental study to test a prevention bundle for catheter-associated urinary tract infections” purpose was to test the use of a bundled approach of catheter care practices for a 3-month period to reduce the occurrence of CAUTIs in adult critical care patients who had indwelling urinary catheters (Blanck et al., 2014, p. 101). The key concepts were clearly defined. The main design for this study was to reduce the incidence of CAUTI in CCU patients within a three-month period. The methods of data collection, sampling, and calculations were identified clearly throughout the article. The study was a Quasi-Experimental study design in a quantitative research approach.

The Quasi-experimental design was to identify a cause-effect relationship between two or more variables where the researcher didn’t assign groups or manipulated the independent variable, and the control groups were identified and exposed to the variable (Quantitative Approaches, 2012). The results were then compared. This study had two groups: pre-intervention group and intervention group. There were 317 participants in the pre-intervention group, and 310 in the intervention group. The Sample size was based on the number of catheter days for all the patients combined and the correspond CAUTI incidence rate (Blanck et al., 2014, p. 105). The outcome was not statistically significant, with p = . 285, but it was clinically significant (Blanck et al., 2014, p. 106). There was a 50 % reduction rate as it was shown in Table 2 (CAUTI incidence rates during pre and post-intervention).

Both studies have similarities with the samples of the ICU patients. Forman et al. and Blanck et al. also mentioned bundle programs were used to conduct their studies. In addition to bundle programs, both groups of

researchers mentioned the need for a leadership position. The role of a leader is important because he/she will be the driving force behind implementing CAUTI prevention programs.

Forman et al. and Blanck et al. both had strengths in their studies. Forman et al. strength was using Bladder Bundle, a successful program that resulted in a reduction of 30% in urinary catheter use and is currently serving as a model nationwide (Forman et al., 2013, p. 882). Forman et al. also addressed the issue of perceptions/misperceptions of safety measures. For example, some HCPs viewed urinary catheters to prevent falls, others saw catheters as a potential fall hazard (Forman et al., 2013, p. 885). Forman et. al included HCPs as participants who had experience with CAUTI. Forman et al. findings were also linked to quotes and addressed differences in findings by sample characteristics. In Blanck et al. article, there was only one study. However, one of the strong points in this study was the process of their data collection method. It was closely monitored. For example, to ensure that catheter care was provided, there would be designated person to make sure that the disposable wipes were placed in the same spot each room and can be easily seen. The researchers also used many reliable tools in their study. For example, the Wilcoxon signed rank test was used to compare CAUTI rates and used of NHSN formula to calculate the incidence rate for CAUTIs (Blanck et al., 2014, p. 105). NHSN formula is the number of new CAUTIs divided by the total number of catheter days multiplied by 1000 (Blanck et al., 2014).

Both groups of research presented strong points, but there were also a few weaknesses in their studies. In Forman et al. (2013) study, the researchers mentioned limitations in their study. Researchers mentioned their findings

addressed barriers within local settings and can only be applied outside the study sample if the reader recognizes the phenomenon described (Forman et al., 2013, p. 886). Potential bias with HCPs perspective about Bladder Bundle initiative was also mentioned as a limitation (Forman et al., 2013, p. 886). In Blanck et al. (2014) study, there was one weakness that all patients were in CCU, so the population was limited. Also, patient' condition was not clearly specified, such as their cognitive status, ethnicity, literature level. One inconsistent factor in this study was the chlorhexidine wipes. It was mentioned in the article that chlorhexidine wipes were only used in the late stage of the study, so it may or may not have an impact on reducing the infection rate.

Results

Based on our analysis, Forman et al. qualitative study presented with strong and convincing evidence. The Bladder Bundle program serves as a model for reducing CAUTI and is considered by Forman et al as the foundation for quality improvement. Forman et al. (2014) stated their qualitative findings especially the solutions identified to overcome key barriers-can be used to enhance CAUTI prevention-related activities worldwide (Forman et al., 2013, p. 886). The article by Blanck et al. did not have strong and convincing evidence regarding our topic. Due to previously mentioned limiting factors such as patient population and use of chlorhexidine wipes, the study would not be reliable. In addition, it was mentioned in the article that for ethical reasons, standard catheter care could not be withheld from CCU patients, thus eliminating the possibility of a true control group for this study (Blanck

et al., 2014, p. 106). The study was too inconsistent to be applied to all of the patient population.

Discussion

There are not many studies exist in the literature that supports specific nursing care to prevent the occurrence of CAUTIs for patients with an indwelling catheter (Blanck et al., 2014, p. 107). Even though the research by Blanck et al. was only limited to CCU setting, it was evidenced that reducing the rate of CAUTI is achievable through the effort of health care providers. The CAUTI prevention that was mentioned in Blanck et al. research provided standardize care for patients with an indwelling urinary catheter. The initiative to have every healthcare team member and a primary champion on all units are needed for CAUTI prevention. The issue of CAUTI needs to be treated with a high level of importance from all HCPs. The next step for nursing regarding the prevention of CAUTI should not only include the adherence to current guidelines, but to meticulously document data pertaining to catheters, reminding physicians of the catheter and discussing potential removal, and to actively seek new and updated evidence-based practices regarding the care of catheters and prevention of CAUTI.

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