DOI 10.32782/2077-6594.2.1.2022.258916
УДК 616.62-008.22-084:615.472.7

Babecka J.[1], Gulasova I.[2]

Urinary incontinence and nurses knowledge toward prevention of catheter-associated urinary tract infection

[1]Catholic university in Ružomberok,
Faculty of Health, Slovakia
[2]Trnava university, Faculty of Health Sciences
and Social Work, Slovakia

Бабечка Юзеф[1], Гуласова Івіца[2]

Нетримання сечі та знання медсестер щодо профілактики катетер-асоційованої інфекції сечовивідних шляхів

[1]Католицький університет в Ружомбероку,
факультет охорони здоров'я, Словаччина
[2]Трнавський університет, факультет наук про здоров'я
та соціальної роботи, Словаччина

jozef.babecka@ku.sk, ivica.gulasova4@gmail.com

Introduction

Urinary incontinence (UI) has a major impact in longterm care facilities. It is the second leading reason for placement of older adults into institutionalized care and the primary reason why many elderly are not accepted into the less expensive and less environmentally restrictive environment of assisted-living facilities. In long-term care facilities, it has been estimated that 50% of the residents are incontinent of urine6 and that many who are continent at admission tend to become incontinent over time. Despite this highly prevalent condition, basic knowledge about UI and its management are lacking among nursing home staff. Generally, staff are not performing assessments of residents with UI but rather move forward with management or containment of urine leakage without either determining the presence of confounding variables such as transient causes or understanding the underlying causation. The treatment for UI depends on incontinence type and cause, as well as the capabilities and motivation of the resident. Options for managing UI in nursing home residents primarily include behavioral programs and medication therapy. Other measures and supportive devices used in the management of UI may include intermittent catheterization; pelvic organ support devices (pessaries); the use of incontinence products, garments, and external collection systems; and environmental accommodation and/or modification. Assessment of incontinence is the key component of the new CMS guidance and emphasizes identification of the transient cause, especially in a resident with new onset UI and persistent causes of UI. Assessment should include onset, duration, history, and previous treatment. The assessor should consider the side effects of medications. Clinical testing also should be part of the assessment process. Post-void residual (PVR) testing will determine the presence of incomplete bladder emptying.4 Elevated PVR levels (>150 to 200 mL) can increase risk of urinary retention, UTI, or upper tract pathology such as pyelonepthritis. Once the resident is assessed, a plan of care should be developed to optimize bladder function and to prevent the use of an indwelling catheter or UTI. The guidance outlines areas that will be of importance during the survey process. The assessment, care plan, and medical director's orders identifying facility interventions will be scrutinized and corroborated through observations by interview and record review. Surveyors will no longer accept a blanket plan for all residents. Each plan must be specific to the type of incontinence and include the rationale for a specific treatment plan or management system [1].

Urinary bladder catheters are medical devices commonly used for urinary drainage or as a method of collecting urine for measurement. Urinary catheters can be external, urethral (i.e., indwelling, intermittent) or suprapubic. External catheters are considered the least invasive since the device remains outside of the body in the form of a urinary pouch (available anyone) or a penile sheath catheter. External catheters are an effective way to collect urine but are not indicated for management of urinary obstruction. Urethral catheters are more invasive because the device is inserted transurethrally. Indwelling urethral catheters can be used for short-term bladder drainage or for the management of patients with chronic urinary retention. Indwelling urethral catheters are the most common type of catheter used in the hospital setting. Intermittent catheterization involves removing the catheter immediately after the bladder is decompressed and subsequent catheterizations on a scheduled basis. This method can be used for short- and long-term management, depending on the condition being treated. Some patients may not be candidates for intermittent catheterization due to discomfort, obesity, urinary obstruction or an upper-extremity impairment (for self-catheterization candidates). Suprapubic catheters are the most invasive catheter type because they require a surgical procedure for the suprapubic catheter to be placed through the abdominal wall and into the bladder. This mode allows for attempts at normal voiding without the requirement of re-catheterization and may prevent urethral trauma and stricture formation [1].

Figure. The three most common types of urinary catheters are straight, indwelling, and suprapubic
Source: https://www.osmosis.org/learn/Urinary_catheters_and_routine_indwelling_catheter_care:_Clinical_skills_notes, 2022

Indications for catheters. There are several clinical scenarios that are appropriately indicated for catheter use. For example, urinary catheters may be appropriately indicated for the management of urinary retention with or without bladder outlet obstruction, management of immobilized patients (e.g., pelvic fracture), hourly urine output measurement in critically ill patients, and improved patient comfort for end of life care. 2,4 Some evidence shows that catheters are used too frequently without meeting indications for appropriate use or may be used longer than required. 2 Findings from Canadian and international studies indicate that 21 to 50 percent of hospitalized patients receive an unwarranted urinary catheter. In addition, one Ontario hospital reported that 18% of its hospitalized patients were catheterized, 69% of whom lacked an appropriate guideline-based reason. 10 The most common inappropriate indication is management of urinary incontinence via an indwelling catheter. The misuse of catheters puts patients at risk, including an increased risk of urinary tract infections (UTIs). Approximately 80% of health care-associated UTIs are related to the use of indwelling urinary catheters; 11 catheter-associated UTIs have been associated with increased morbidity, mortality, length of stay, and hospital costs.The duration of catheter use is another key contributor to the type of catheter used and risks associated with their use. Generally, short-term catheterization is considered less than a month and long-term catheterization is catheterization for one month or longer (i.e., 28 days or four weeks). Long-term catheterization is considered when other methods are not effective or practical, as long-term use can result in bacteriuria, UTI, blockage and bypassing (leakage around the catheter). 4 In particular, the two main indications for long-term indwelling catheters are urinary retention and urinary incontinence [2].

Providing evidence-based care on catheter use is important to improving patients' outcomes and preventing urinary catheter-related complications. Despite long-term indwelling catheter use being a common treatment plan to manage urinary retention and urinary incontinence, there is a lack of clarity on how to manage patients with long-term indwelling urinary catheters, including policies for replacing long-term urinary catheters. Thus, this report aims to summarize the evidence-based guidelines regarding the management of patients with long-term indwelling urinary catheters [3].

Aim of this study was to assess nurses knowledge and practices toward prevention of catheter-associated urinary tract infection.

Methods

A cross-section, correlational study was conducted with a convenience sample of 67 nurses recruited from medical and intensive care in Slovakia. Knowledge and Practices Questionnaire was completed by participants. It included one part: Level of Knowledge and Extent of Practices Questionnaire. Data collection was carried out from September 2021 to January 2022. Data were analyzed using the SPSS version 22.

Results

The mean age of the nurses' was 31.50±6.15, and around one-third (31.8%) of nurses were less than 30 years old. 65 of nurses were female (99.1%), and 72.2 % were married. Sixty four percent of nurses had a bachelor's degree in nursing, 34% had diploma, and only 2.8% had master or doctorate degree. More than half of nurses (53.2%) had years of experience ranged from 5 to 9 years, while only 0.7% had more than 30 year of experience. Out of 67 nurses who participated in the study, 23.4% nurses were working in the Medical Intensive Care, and 23.4% nurses were working in a Surgical Intensive Care, while 53.2% of nurses were working in a generally hospital department. The majority of nurses (91.2%) attended an educational or training program on urinary catheter procedures while only 8.8% had never attended. Nearly one-third of nurses (32.1%) attended an educational or training program on urinary catheter procedures more than three times. More than half of nurses (77.76%) had low a level of knowledge. While about one-third (35.40%) of nurses had average level of knowledge, and only 0.72% of nurses had high level of knowledge. Regarding the levels of nurses' practices toward catheter-associated urinary tract infection prevention, it was noted that the majority of nurses (89.90%) had a poor level of practices. While 11.10% of nurses had a good level of practices. It was observed that around half (45.2%) of nurses answered correctly most of knowledge questions. Moreover, it was found that around one third (39.5%) of nurses were responds correctly for proper urethral catheter maintenance and around half of nurses (45.1%) were responds correctly for considerations and techniques for catheter insertion while more thanhalf of nurses (54.9%) were responds correctly for different approaches to catheterization and specimen collecting methods. Regarding nurses knowledge of considerations and techniques for catheter insertion; the majority of nurses (88.7%) knew that Silicone is preferable than Teflon-coated and latex catheter materials in reducing the risk of encrustation for long term catheterized patients who have frequent obstruction. More than half (55.8%) of nurses did not know that using alcohol hand sanitizer is comparable to hand washing in preventing catheter-associated urinary tract infection incidence. Furthermore, more than half (55.8%) did not know that routine use of antiseptic lubricants to decrease the risk of infection is not necessary for urinary catheter

insertion. Moreover, more than half of nurses (61.3%) mistakenly considered that antimicrobial prophylaxis offers greater benefit in reducing the incidence of catheter-associated urinary tract infection for patients requiring long-term catheterization. More than half of nurses (54.2%) incorrectly identified that antiseptic lubricants are more beneficial than non-antiseptic lubricants in reducing the incidence of catheter-associated urinary tract infection.Concerning nurses' knowledge of different approaches for catheterization and specimen collecting methods, 70.8% of nurses did not know that meatal cleansing with antiseptic solution post-catheterization does not offer greater advantage in preventing the incidence of catheter-associated urinary tract infection. 67.2% of nurses knew that when obtaining small urine volume for examination, aspirate the urine from the needleless sampling port with a sterile syringe after cleansing the port with a disinfectant. Regarding proper urethral catheter maintenance, two thirds of nurses did not know that silver coated catheters did not increase the risk of urethral irritation and antimicrobial resistance among catheterized patients and adding microbial solutions to drainage bags did not reduce the incidence of acquiring infection 72.4%, 70.1% respectively. In addition, more than half of nurses mistakenly answered that changing indwelling catheters or drainage bags at routine, fixed intervals is recommended for proper catheter maintenance and also, bladder irrigation, instillation, or washout using antiseptic or antimicrobial agent is beneficial in preventing catheter-associated urinary tract infection (64%), (65.2%), respectively. It was observed that more than half (59.8%) of nurses responds correctly to overall practices toward prevention of catheter-associated urinary tract infection. Regarding nurses' practices before catheter insertion, most of the nurses (82.1%) performed hand washing before urinary catheter insertion. More than half of nurses (55.8%) had a good practice due to used sterile gloves when inserting a catheter, but it is alarming that a little more than one third of nurses(47.2%) were not. More than half of nurses (58.7%) had poor practices, while more than one third (41.2%) of nurses had good practices in the number of times of using a single pack lubricant jelly in their catheter insertions. Concerning of nurses' practices during catheter insertion nearly three quarters (72.4%) of nurses had correct practices in keeping the collecting bag and tube free from kinking to maintain an unobstructed urine flow for the indwelling catheter. Finally, regarding nurses' practices after catheter insertion, more than half of nurses (53.8%) incorrectly placed the collecting bag after insertion which is a poor practices. Nearly three quarters (74%) of nurses had good practices on wearing of gown during any manipulation of the indwelling catheter's collecting bag. 62.8% of nurses when draining the catheter, contents of the collecting bag had contact with the collecting container through the drainage spigot. More than half (57.8%) of nurses had good practices on the use of one collecting container for each patient in emptying the collecting bag of the indwelling catheter. More than three quarters (76.8%) of nurseshad good practices on implementing quality improvement strategies to reduce catheter-associated urinary tract infection. There were no significant relation between gender, education level, years of nursing experience, and educational or training program attended on urinary catheter procedures, and the nurses' knowledge with P >0.05. While there was a significant relation between nurses' knowledge and age with P= 0.05. In addition, there were no significant relation between age, gender, education level, years of nursing experience, and educational or training program attended on urinary catheter procedures,andthe nurses' practices with P >0.05. While there was a significant relation between nurses' practicesand participants working in different units with P< 0.001.

Discussion

The current study was aimed to assess nurses knowledge. Nurses in this study had poor knowledge regarding proper urethral catheter maintenance followed by considerations and techniques for catheter insertion and finally, different approaches to catheterization and specimen collecting methods. The findings are contradicted with those found by Opina and Oducado (2014), who stated that the nurses were least knowledgeable about different approaches to catheterization and specimen collecting methods followed by proper urethral catheter maintenance and finally, considerations and techniques for catheter insertion. Regarding considerations and techniques for catheter insertion, the majority of nurses in this study knew that Silicone is preferable than Teflon-coated and latex catheter materials in reducing the risk of encrustation for long-term catheterized patients who have a frequent obstruction. [4]. In addition, more than one-half of the nurses in this study did not know that using alcohol hand sanitizer is comparable to hand washing in preventing catheter-associated urinary tract infection incidence. This finding is consistent with Opina and Oducado (2014), who found that 60% of nurses did not realize that using alcohol hand sanitizer is comparable to hand washing in preventing catheter-associated urinary tract infection, while the result contradicted with Shah et al. (2017), who found that 70% of nurses know that using alcohol hand sanitizeris comparable to hand washing in preventing catheter-associated urinary tract infection. Gould et al. (2017) mentioned that there wasno significant difference between alcohol hand sanitizer and hand washing in reducing catheter-associated urinary tract infection incidence.In this study, more than half of nurses did not know that the routine use of antiseptic lubricants to decrease the risk of infection is not necessary for urinary catheter insertion. This result congruent with the finding of Opina and Oducado (2014), who stated that 66.7% of nurses did not know that routine use of antiseptic lubricants is not necessary for decrease the infection caused byurinary catheter insertion. On the other hand, more than half of nurse in this study incorrectlyidentified that antiseptic lubricants are more beneficial than non-antiseptic lubricants in reducing the incidence of catheter-associated urinary tract infection. According to Mitchell et al. (2011) and Gould et al. (2017), there was no significant difference between antiseptic lubricants and non-antiseptic lubricants in preventing catheter-associated urinary tract infection, despite the fact there is very low-quality evidence advising to use lubricants during indwelling urinary catheter insertion to decrease the risk of catheter-associated urinary tract infection.This study result also revealed that more than half of

nurses mistakenly considered that antimicrobial prophylaxis offers greater benefit in reducing the incidence of catheter-associated urinary tract infection for patients requiring long-term catheterization. Similar to this finding, Opina and Oducado (2014) found that 70% of nurses mistakenly believed that antimicrobial prophylaxis offers greater benefit. In addition, Shah et al. (2017) indicated that 55.7% of nurses mistakenly considered that antimicrobial prophylaxis offers greater benefit, while only 44.3% considered that antimicrobial prophylaxisdoes not provide greater benefit. Moreover, it is not routinely recommended the use of systemic antimicrobial agents to prevent catheter-associated urinary tract infection (Gesmundo, 2016). Regarding proper urethral catheter maintenance, two-thirds of nurses did not know that silver-coated catheters do not increase the risk of urethral irritation and antimicrobial resistance among catheterized patients. This result congruent with the finding of Opina and Oducado (2014), who found that 53.3% of nurses did not know that silver-coated catheters not increase the risk of urethral irritation. According to Gould et al. (2017), there is low-quality evidence recommended a benefit of silver-coated catheters over standard latex catheters in reducing the risk of bacteriuria, but there was no evidence of increased urethral irritation or antimicrobial resistance in studies that stated information regarding microbiological outcomes. Moreover, two-thirds of the nurses did not know that adding microbial solutions to drainage bags not reduce the incidence of acquiring an infection. This result contradicted with Opina and Oducado (2014), who found that 66.7% of nurses knew that adding microbial solutions to drainage bags not reduce the incidence of acquiring an infection. In addition, this result contradicted with Kose et al. (2016), who found that 50% of nurses knew. In this regard, Loveday et al. (2014) mentioned that no effect on catheter-associated urinary tract infection when adding bacterialsolutions to drainage bags. The result of this study revealed that more than half of the nurses had a low level of knowledge toward catheter-associated urinary tract infection prevention. Regarding nurses' practices before catheter insertion, most of the nurses performed hand washing before urinary catheter insertion. This result consistent with Kose et al. (2016), who found that 88.2% of nurses performed hand washingbefore urinary catheter insertion. 100% of the nurses performed hand washing before and after insertion [5]. While contradicted with Shehab (2017), who found that only 36% of nurses performed hand washing before and after insertion. Hand washing before urinary catheter insertion is one step of proper techniquesfor urinary catheter insertion (Gould et al., 2017). More than half of nurses had poor practices in the number of times of using a single pack lubricant jelly in their catheter insertions in this study. This result contradicted with Opina and Oducado (2014), who found that 66.7% of nurses use a single bottle for lubricant in their catheter insertions, In this study, more than half of nurses had good practice due to use sterile gloves when inserting a catheter. This result is similar to the previous studies (Kose et al., 2016) who found that the majority of nurses used sterile gloves when inserting a catheter. Concerningthe nurses practices during catheter insertion, nearly three quarters of nurses had correct practices in keeping the collecting bag and tube free from kinking to maintain an unobstructed urine flow for the indwelling catheter. This finding consistent with Opina and Oducado (2014), who indicated that 73.3% of nurses had correct practices in keeping the collecting bag and tube free from kinking. Regarding nurses' practices after catheter insertion, more than half of nurses incorrectly placed the collecting bag after insertion which is a poor practices in this study. This result contradicted with Opina and Oducado (2014), who found that 100% of nurses placed the collecting bag below the bladder. In addition, Mukakamanzi (2017) indicated that 90.6% of the nurses placed the collecting bag below the bladder. There is association between reflux of urine and infection, therefore as recommended by CDC collecting bag should be place below the level of the bladder all times to make sure that free flow of urine and prevents back flow, in the same time collecting bag should not touch the floor by hung on an appropriate stand [6]. Nearly three quarters of nurses had good practices on wearing of gown during any manipulation of the indwelling catheter's collecting bag. The CDC to use gown during any manipulation of the catheter or collecting bag as standard precautions (Gould et al., 2017). In this study, more than three quarters of nurses had good practices on implementing quality improvement strategies to reduce catheter-associated urinary tract infection through using a system of alerts and reminders for patients with catheter, and assess the need for continued catheterization. The result is contradicted with Opina and Oducado (2014), who found that 96.7% of nurses did not implementing quality improvement strategies to reduce catheter-associated urinary tract infection [7].

Conclusions

One of the most common healthcare-associated infections is catheter-associated urinary tract infection. It is largely preventable if catheterization indications, catheterization care methods, and other preventative measures are carefully followed.In this study, there were knowledge deficitand poor practices about catheter-associated urinary tract infection prevention among nurses. There were no statistical, significant relationbetween nurses' knowledge and practices toward catheter-associated urinary tract infection. Also, there was no significant relation between sociodemographic variables and knowledge or practices mean scores.While there was a significant relation between nurses' knowledge and age and there was a significant relation between nurses'practices and current unit.

References

1. Gulasova, I., Babecka J. (2020). Kvalita života seniorov s inkontinenciou moču. Vyd.: TYPI UNIVERSITAS TYRNAVIENSIS v Trnave, 1. vyd., 2020, s 175., ISBN: 978-80-568-0215-1, EAN: 9788-0568-02151.

2. Marencak J. (2011). Urinary incontinence. Elisabeth o.z., Skalica, 2011, 1st vs., 133 s., ISBN: 978-80-970567-1-1.
3. Popovicova M. (2019). Competence of sestjor in the field of rehabilitation in Slovakia. In I naukovo-praktychna konferentsiia z mizhnarodnoiu uchastiu, prysviachena 20-y richnytsi z dnia zasnuvannia fakultetu zdorovia ta fizychnoho vykhovannia. 17-18.10.2019 Uzhhorod, Ukraine. – Zdorovja nacii. 2019; ISSN 2077-6594. 55(2): 141-144.
4. Kose, Y., Leblebici, Y., Akdere, S.S., Cakmakci, H., & Otunctemur, S., Egici, M.T., Bektemür, G. (2016). Level of knowledge of the nurses work in a public hospital about the prevention of catheter-associated urinary tract infections. The Medical Bulletin of Sisli Etfal Hospital, 50(1), 70-79.
5. Gould, C.V., Umscheid, C.A., Agarwal, R.K., Kuntz, G., Pegues, D. A. Healthcare Infection Control Practices Advisory Committee. (2017). Guideline for prevention of catheter-associated urinary tract infections 2009. Infection Control and Hospital Epidemiology, 31(4), 319-26.
6. Opina, M.L.F., & Oducado, R.M.F. (2014). Infection control in the use of urethral catheters. Knowledge and practices of nurses in a private hospital in Iloilo cit y, Asia Pacific Journal of Education, Arts and Sciences, 1(5), 93–100.
7. Babecka, J., Gulasova I. (2020). Specifics of therapy of stress urinary incontinence and care of a woman in the context of nursing. In: Nursing and midwifery. Journal of the Slovak Chamber of Nurses and Midwives (06) 2020, p. 31-36, ISSN: 1339-5920.

Дата надходження рукопису до редакції: 25.04.2022 р.

Aim of this study was to assess nurses knowledge and practices toward prevention of catheter-associated urinary tract infection.

Methods. A cross-section, correlational study was conducted with a convenience sample of 67 nurses recruited from medical and intensive care in Slovakia. Knowledge and Practices Questionnaire was completed by participants. It included one part: Level of Knowledge and Extent of Practices Questionnaire. Data collection was carried out from September 2021 to January 2022. Data were analyzed using the SPSS version 22.

Results. The majority of nurses (91.2%) attended an educational or training program on urinary catheter procedures while only 8.8% had never attended. 32.1% of nurses attended an educational or training program on urinary catheter procedures more than two times. More than half of nurses (77.76%) had low a level of knowledge. While about one-third (35.40%) of nurses had average level of knowledge, and only 0.72% of nurses had high level of knowledge. Regarding the levels of nurses' practices toward catheter-associated urinary tract infection prevention, it was noted that the majority of nurses (89.90%) had a poor level of practices. While 11.10% of nurses had a good level of practices.

Conclusions. There were no statistical, significant relationbetween nurses' knowledge and practices toward catheter-associated urinary tract infection. Also, there was no significant relation between sociodemographic variables and knowledge or practices mean scores.While there was a significant relation between nurses' knowledge and age and there was a significant relation between nurses'practices and current unit.

Key words: urinary incontinence, nursing, prevention of catheter-associated, urinary tract infection.

Метою цього дослідження було оцінити знання та практичні навички медсестер щодо профілактики катетер-асоційованих інфекцій сечових шляхів.

Методи. Було проведено перехресне кореляційне дослідження із вибіркою з 67 медсестер, прийнятих на роботу з медичної практики та інтенсивної терапії у Словаччині. Учасники заповнили Анкету знань та практик. Він включав одну частину: Анкета рівня знань та обсягу практик. Збір даних проводився з вересня 2021 року по січень 2022 року. Дані аналізували за допомогою SPSS версії 22.

Результати. Більшість медичних сестер (91,2%) відвідували освітню або навчальну програму щодо процедури роботи з сечовим катетером, тоді як лише 8,8% ніколи не відвідували. 32,1% медичних сестер відвідували освітню або навчальну програму щодо процедури роботи з сечовим катетером більше двох разів. Більше половини медичних сестер (77,76%) мали низький рівень знань. При цьому близько третини (35,40%) медичних сестер мали середній рівень знань, і лише 0,72% медсестер мали високий рівень знань. Щодо рівня практики медсестер щодо профілактики катетер-асоційованих інфекцій сечовивідних шляхів, було відзначено, що більшість медсестер (89,90%) мали низький рівень практики. Тоді як 11,10% медсестер мали хороший рівень практики.

Висновки. Не було статистичного значущого зв'язку між знаннями та практикою медсестер щодо катетер-асоційованої інфекції сечовивідних шляхів. Крім того, не було суттєвого зв'язку між соціально-демографічними змінними та середніми балами знань чи практики. Хоча існував значний зв'язок між знаннями медсестер та віком, а також існував значний зв'язок між практикою медсестер та поточним підрозділом.

Ключові слова: нетримання сечі, догляд, профілактика катетер-асоційованих, інфекція сечовивідних шляхів.

Conflicts of interest: absent.
Конфлікт інтересів: відсутній.

Відомості про авторів

PhDr. **Babečka Jozef**, PhD.
Catholic university, Faculthy of Health
Námestie A. Hlinku 48
034 01 Ružomberok
Slovak Republic
jozef.babecka@ku.sk.

prof. PhDr. **Gulasova Ivica**, PhD., MHA
Trnava university, Faculty of Health Sciences and Social Work
Univerzitné námestie 600,
917 01 Trnava
Slovak Republic
ivica.gulasova4@gmail.com.