DOI: https://doi.org/10.54393/pjhs.v4i05.756

PAKISTAN JOURNAL OF HEALTH SCIENCES

https://thejas.com.pk/index.php/pjhs

Volume 4, Issue 5 (May 2023)

Original Article

Knowledge of Nursing Students on Catheter-Associated Urinary Tract Infection Prevention

Afsha Bibi[1*], Rasheed Ahmad Khan[1], Usama Bilal[1], Zaigham Abbas[1], Dilshad Ali[1], Kainat Noman[1] and Aafia Aziz[1]

[1]Horizon School of Nursing and Health Sciences, Karachi, Pakistan

ARTICLE INFO

Key Words:

Knowledge, Nursing Students, Prevention, Catheter-Associated, Urinary Tract Infection

How to Cite:

Bibi, A. ., Khan, R. A. ., Bilal, U. ., Abbas, Z. ., Ali, D. ., Noman, K. ., & Aziz, A. . (2023). Knowledge of Nursing Students on Catheter-Associated Urinary Tract Infection Prevention: Catheter-Associated Urinary Tract Infection. Pakistan Journal of Health Sciences, 4(05). https://doi.org/10.54393/pjhs.v4i05.756

***Corresponding Author:**

Afsha Bibi

Horizon School of Nursing and Health Sciences, Karachi, Pakistan

fawad52005@gmail.com

Received Date: 8th May, 2023

Acceptance Date: 25th May, 2023

Published Date: 31st May, 2023

ABSTRACT

Catheter-associated urinary tract infections (CAUTIs) are a significant problem in healthcare settings, leading to increased morbidity, mortality, and healthcare costs. Nursing students are crucial in preventing CAUTIs, as they are often responsible for inserting and maintaining urinary catheters in patients. **Objective:** To assess the nursing students' knowledge regarding the prevention of CAUTIs. **Methods:** This descriptive cross-sectional was conducted at the Horizon School of Nursing and Health Sciences in Karachi, Pakistan, over a period of two months from November to December 2022. A total of 67 nursing students were recruited using a convenient sampling technique. Data were collected using a self-administered questionnaire that assessed the students' knowledge of CAUTIs. **Results:** The results showed that 19% of the nursing students had low knowledge, 65% had moderate knowledge, and 16% had a high level of knowledge regarding the prevention of CAUTIs. **Conclusions:** The findings suggest that most nursing students have moderate knowledge regarding preventing CAUTIs prevention. Educators and administrators can use these findings to develop targeted interventions that address the gaps in knowledge and promote best practices for preventing and managing CAUTIs in nursing students.

INTRODUCTION

Catheter-associated urinary tract infections (CAUTIs) are a significant healthcare problem worldwide, accounting for approximately 40% of all healthcare-associated infections [1]. Patients with indwelling urinary catheters are at a high risk of developing CAUTIs, leading to complications such as sepsis, pyelonephritis, and even death. Preventing CAUTIs improves patient outcomes and reduces healthcare costs [2]. Nursing students play a critical role in preventing and managing CAUTIs. Future healthcare providers must know the current guidelines and best practices for preventing CAUTIs [3]. Moreover, A urinary catheter, used to drain urine from the bladder and put it into the bladder through the urethra, is thought to be the cause of about 75% of UTIs that occur in hospitals. During their stay in the hospital, 15–25% of patients use urinary catheters [4]. Along with this, several risk factors are associated with catheter-associated urinary tract infections (CAUTIs), including prolonged catheterization, female gender, advanced age, diabetes, immunocompromised status, urinary tract abnormalities, urinary retention, poor hygiene, and catheter insertion site contamination. These risk factors highlight the importance of implementing preventative measures, such as proper hand hygiene, early removal of urinary catheters, and use of sterile techniques during catheter insertion. Additionally, the findings emphasize the need for education and training of healthcare providers, including nursing students, to improve their knowledge and skills in preventing and managing CAUTIs [5]. By identifying

DOI: https://doi.org/10.54393/pjhs.v4i05.756

and addressing these risk factors, healthcare providers can improve the quality of care provided to patients with indwelling urinary catheters and reduce the incidence of CAUTIs and associated complications [6-9]. UTI is a condition that is frequently seen in hospitals. During their hospital stay, about 25% of patients undergo urinary catheterization, which is considered to be a substantial risk factor for CAUTI. The most prevalent sickness acquired in hospitals, CAUTI, is responsible for around 40% of all nosocomial infections. As primary healthcare professionals, nurses are responsible for placing and maintaining urinary catheters and obtaining targeted outcomes. Additionally, it is the responsibility of nurses to gain the expertise and information required for catheter care [10]. The patient's risk of developing a UTI increases the longer the catheter is in place [11]. Moreover, Prolonged catheterization is related to a higher incidence of CAUTI [12]. When patients with hip fractures, spinal cord injuries, or urinary tract infections are admitted, CAUTI is the most prevalent and frequent nosocomial infection [13]. In patients with chronic diseases, incontinence, bladder blockage, and prolonged indwelling catheterization are common symptoms [14]. One hundred fifty million patients globally suffer from urinary tract infections, and 80% of nosocomial UTIs are related to catheter use [14]. Escherichia coli is among the pathogens that can cause CAUTI, with Proteus species and Pseudomonas species coming in second and third. The other responsible microorganisms include *Serratia*, *Candida*, *Enterococci*, *Klebsiella*, and others. Due to the structure of the urinary system and the hormonal changes women experience, CAUTI indicates safe male predominance. Impaired immunity, co-morbid illnesses including diabetes and hypertension, and elderly and pediatric age groups are all risk factors for developing bacteriuria and UTI [16]. Nurses and nursing students are considered the primary healthcare providers who are responsible for inserting and maintaining urinary catheters, as well as the production of desired outcomes [17]. Therefore, this was necessary to assess their knowledge regarding CAUTI.

METHODS

This Descriptive Cross-sectional study was conducted at the Horizon School of Nursing and Health Sciences Karachi, and the participants were recruited through a convenient sampling technique. The study duration was two months after approval of the synopsis from November to December 2022. Moreover, the sample size was calculated through open EPI version-3.0 with a population of N size 80, a confidence interval of 95%, and the obtained sample size is 67. All students of the second semester of post-RN who are enrolled in Horizon School of Nursing and Health Sciences have at least six months of working experience in any reputed hospital. Those students currently enrolled in HSNHS and having experience less than six months of experience were excluded from the study. The study tool was made with the help of literature, and after that, it was reviewed by four experts, and the pilot study was conducted reliability of the questionnaire is 0.79. Moreover, the total number of questionnaire items is 20, including 04 questions of demographic data, and 16 items are related to CAUTI prevention. The tool's scoring was converted into percentages. Those who scored were considered low level, 50% to 70% were considered moderate, and those who scored above 70% were considered high level of knowledge. The research committee of Horizon School of Nursing and Health Sciences approved this study. After the approval, all participants were informed about the study, and each participant signed the consent form. The collected data were analyzed using SPSS version 26.0. The frequency of each item was calculated through descriptive statistics. The frequency is mentioned in table form.

RESULTS

Table 1 shows the results of demographic characteristics regarding gender. Of the total sample size of 67 participants, 37.3% were males, and 62.7% were females. This indicates that the study had a slightly higher proportion of female participants. Moreover, among the participants, the majority (58.2%) were aged between 20 and 30 years, 40.3% were between 31 and 40 years, and only 1.5% were aged between 41 and 50. This indicates that the study sample had a relatively young age profile, with most participants in their 20s and 30s. Concerning their marital status, almost half (47.8%) of the participants were single, while slightly more than half (52.2%) were married. This suggests the study had a relatively balanced distribution of single and married participants.

Table 1: Demographic characteristics n= 67

Characteristic	Frequency (%)
Gender	
Male	25(37.3)
Female	42(62.7)
Age	
20-30	39(58.2)
31-40	27(40.3)
41-50	1(1.5)
Marital status	
Single	32(47.8)
Married	35(52.2)

Figure 1 shows the results of the participants' working experience shows that 50% had 1-2 years of experience, 42% had 3-4 years of experience, and above 4 years were 8%.

DOI: https://doi.org/10.54393/pjhs.v4i05.756

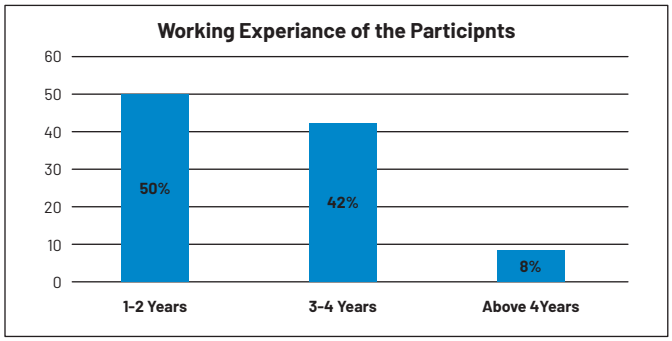

Figure 1: Experience of the Participants

Table 2 shows that 19% have low knowledge, 65% moderate, and 16% have a high level of knowledge regarding the Prevention of Catheter-Associated Urinary Tract Infection.

Table 2: The Levels of Knowledge

Level of knowledge	Participants
Low level of knowledge	19%
Moderate level of knowledge	65%
High level of knowledge	16%

DISCUSSION

Catheter-Associated Urinary Tract Infections (CAUTIs) are a common complication in hospitalized patients with indwelling urinary catheters. CAUTIs can increase patient morbidity, prolong hospitalization, and increase healthcare costs [18]. Nursing students are responsible for caring for patients with indwelling catheters and play a key role in preventing CAUTIs [6]. This study aims to assess the level of knowledge among nursing students regarding the prevention of CAUTIs. Present findings revealed that slightly higher proportion of female participants. Similarly, another study found a similar finding that females were higher than male participants [19]. The studies may have been conducted in settings where more females are available or are more likely to participate in research studies. Current findings show that most participants are between 20 to 30 years. Another study by Benny *et al.*, found the same result: most participants aged between 20-30 years [3]. This could be due to the fact that individuals in this age range are more likely to be nursing students or healthcare professionals, who are the target population for the study. Present findings revealed that 19% had low knowledge regarding the prevention of CAUTI. A study from Palestine found to result in minute differentiation that 13.2% of the respondents had low knowledge [20]. Similarly, another study found results in slight divergence: 11.2% had insufficient knowledge [3]. In addition, another study found that 15% of the participants had low knowledge regarding CAUTI prevention [21]. Similarly, another study found knowledge scores were a determined low mean of 68.05 [22]. In light of this, another study from Iraq shows that 36% of the participants had a low level of knowledge regarding CUATI prevention [23]. As a result, nursing students do not have sufficient knowledge about the proper catheter insertion, care, and removal techniques. In that case, they may be more likely to make mistakes or overlook essential steps that increase the risk of CAUTI [24]. This can lead to increased patient infection rates, which can cause discomfort, extended hospital stays, and even severe complications [25]. Therefore, education and training programs focused on CAUTI prevention are essential for nursing students to provide safe, high-quality patient care [26]. Current findings show that 65% had moderate knowledge regarding CAUTI prevention. A study conducted in Nepal found that 59.37% had moderate knowledge regarding the prevention of CUATI [27]. Another study found slightly different results, showing that 70% of participants have average knowledge [28]. In this regard, a study found results in slight divergence; approximately 80.85% of nurses had average awareness of CAUTI prevention [3]. At the same time, another study found that 82.4% had moderate knowledge [29]. Additionally, another study demonstrated that 35.48% had moderate knowledge [2]. Present findings revealed that 16% had high knowledge regarding the Prevention of Catheter-Associated Urinary Tract Infections. A study found a similar result, showing that 16.7% had a high understanding of preventing catheter-associated UTIs [29]. While another study found a slightly different result that 23% had a high level of knowledge [28]. Another study found a slight variance result showing that 7.231% had excellent knowledge [3]. In contrast, another study shows that 57% of the participants had good knowledge regarding CAUTI prevention [19]. Another study from Pakistan shows that nurses and doctors have a reasonable understanding of urinary catheterization and preventative treatments for catheter-associated urinary tract infections [30]. In addition, a study from India by Gayathry *et al.*, shows that 85% of the participants have good knowledge regarding preventing CAUTI. Furthermore, another study from Plastine shows that 86.8% of the respondents have a high level of knowledge [21].

CONCLUSIONS

Based on the study results, it can be concluded that the majority of the respondents have a moderate level of knowledge on catheter-associated urinary tract infection prevention, with only a small percentage having a high level of knowledge. These findings suggest nursing students may need further education to enhance their knowledge of catheter-associated urinary tract infection prevention.

DOI: https://doi.org/10.54393/pjhs.v4i05.756

Authors Contribution

Conceptualization: AB
Methodology: UB, AZ, KN
Formal analysis: KN
Writing-review and editing: RAK, ZA, DA

All authors have read and agreed to the published version of the manuscript

Conflicts of Interest

The authors declare no conflicts of interest.

Source of Funding

The authors received no financial support for the research, authorship, and/or publication of this article.

DISCUSSION

[1] Khasal QA. Knowledge of Nurses toward Prevention for Catheter-Associated Urinary Tract Infection in Intensive Care Unit at Al Nasiriyah General Hospital. HIV Nursing. 2022 Oct; 22(2): 1516-22.

[2] Mukakamanzi J. Knowledge, attitude and practices of nurses towards the prevention of catheter-associated urinary tract infection in selected Referral Hospitals in Rwanda (Doctoral dissertation, University of Rwanda). 2017. Available at: http://dr.ur.ac.rw/handle/123456789/324.

[3] Benny AM, Idiculla AS, Kunjumon A, George A, Sequera SK. Nurses' knowledge on prevention of catheter-associated urinary tract infection in a selected hospital of mangaluru. Journal of Health and Allied Sciences NU. 2020; 10(03): 128-31. doi: 10.1055/s-0040-1716664.

[4] Singha P, Locklin J, Handa H. A review of the recent advances in antimicrobial coatings for urinary catheters. Acta Biomaterialia. 2017 Mar; 50: 20-40. doi: 10.1016/j.actbio.2016.11.070.

[5] Crentsil J. Educational Program for Decreasing Catheter-Associated Urinary Tract Infections (Doctoral dissertation, Walden University). 2020. Available at: https://www.proquest.com/docview/2403128885?pq-origsite=gscholar&fromopenview=true.

[6] Ahmed N and Usmani S. A study to assess the effectiveness of planned teaching programme on knowledge regarding indwelling catheter care among the gnm 3rd year internship students of selected college of nursing at Moradabad. Hindu. 2022 May; 64: 74-4.

[7] Elkbuli A, Miller A, Boneva D, Puyana S, Bernal E, Hai S, *et al*. Targeting catheter-associated urinary tract infections in a trauma population: a 5-S bundle preventive approach. Journal of Trauma Nursing| JTN. 2018 Nov; 25(6): 366-73. doi: 10.1097/JTN.0000000000000403.

[8] Jacobsen SM, Stickler DJ, Mobley HL, Shirtliff ME. Complicated catheter-associated urinary tract infections due to Escherichia coli and Proteus mirabilis. Clinical Microbiology Reviews. 2008 Jan; 21(1): 26-59. doi: 10.1128/CMR.00019-07.

[9] Cortese YJ, Wagner VE, Tierney M, Devine D, Fogarty A. Review of catheter-associated urinary tract infections and in vitro urinary tract models. Journal of Healthcare Engineering. 2018 Oct; 2018: 1-16. doi: 10.1155/2018/2986742.

[10] Haza'a AA. Knowledge of nurses toward prevention for catheter-associated urinary tract infection in public hospitals at Amran City, Yemen. 2021 Nov; 11: 933-46. doi: 10.4236/ojn.2021.1111076.

[11] Andersen MJ, Fong C, La Bella AA, Molina JJ, Molesan A, Champion MM, *et al*. Inhibiting host-protein deposition on urinary catheters reduces associated urinary tract infections. Elife. 2022 Mar; 11: e75798. doi: 10.7554/eLife.75798.

[12] Hagerty T, Kertesz L, Schmidt JM, Agarwal S, Claassen J, Mayer SA, *et al*. Risk factors for catheter-associated urinary tract infections in critically ill patients with subarachnoid hemorrhage. Journal of Neuroscience Nursing. 2015 Feb; 47(1): 51-4. doi: 10.1097/JNN.0000000000000111.

[13] Kranz J, Schmidt S, Wagenlehner F, Schneidewind L. Catheter-associated urinary tract infections in adult patients: Preventive strategies and treatment options. Deutsches Ärzteblatt International. 2020 Feb; 117(6): 83. doi: 10.3238/arztebl.2020.0083.

[14] Nazarko L. Reducing the risk of catheter-related urinary tract infection. British Journal of Nursing. 2008 Sep; 17(16): 1002-1010.

[15] McLellan LK and Hunstad DA. Urinary tract infection: pathogenesis and outlook. Trends in Molecular Medicine. 2016 Nov; 22(11): 946-57. doi: 10.1016/j.molmed.2016.09.003.

[16] Majumder MM, Ahmed T, Ahmed S, Khan AR. Microbiology of catheter associated urinary tract infection. Microbiology of Urinary Tract Infections-Microbial Agents and Predisposing Factors. 2018 Nov.

[17] Obaid M, Salman A, Abd Rabo A, Khalil AA, Hayek M. Nurses'knowledge and practices toward prevention of catheter-associated urinary tract infection. 2018. Available at: https://repository.najah.edu/server/api/core/bitstreams/c8cce052-d129-4f84-9284-43e1455ec4da/conten.

[18] Fasugba O and Gardner A. Catheter associated urinary tract infections (cautis): a research update. Australian Nursing & Midwifery Journal. 2017 Mar; 24(8): 43-.

DOI: https://doi.org/10.54393/pjhs.v4i05.756

[19] Jain M, Dogra V, Mishra B, Thakur A, Loomba PS. Knowledge and attitude of doctors and nurses regarding indication for catheterization and prevention of catheter-associated urinary tract infection in a tertiary care hospital. Indian journal of critical care medicine: peer-reviewed, official publication of Indian Society of Critical Care Medicine. 2015 Feb; 19(2): 76. doi: 10.4103/0972-5229.151014.

[20] baid M, Salman A, Abd Rabo A, Khalil AA. Nurses' knowledge, practices and attitude toward prevention of catheter-associated urinary tract infection. 2021.

[21] Gayathry L. A study to assess the knowledge regarding 2009 guidelines of catheter associated urinary tract infection among neuronurses in SCTIMST Trivandrum. 2011 Nov. Available at: http://dspace.sctimst.ac.in/jspui/bitstream/123456789/1611/1/485.pdf.

[22] Seyhan Ak E and Özbaş A. The effect of education of nurses on preventing catheter-associated urinary tract infections in patients who undergo hip fracture surgery. Journal of Clinical Nursing. 2018 Mar; 27(5-6): e1078-88. doi: 10.1111/jocn.14160.

[23] Rahman YF, Ahmed MN, Jabal MH. A Study to Evaluate Knowledge of Nursing College Students about the Preventive Measures of Urinary Tract Infection. 2022. Available at: https://cloud.uobasrah.edu.iq/uploads/2022/08/17/8880A%20Study%20to%20Evaluate%20Knowledge%20of%20Nursing%20College%20Students%20about%20the%20Preventive%20Measures%20of%20Urinary%20Tract%20Infection.pdf.

[24] Bagley K and Severud L. Preventing catheter-associated urinary tract infections with incontinence management alternatives: pureWick and condom catheter. Nursing Clinics. 2021 Sep; 56(3): 413-25. doi: 10.1016/j.cnur.2021.05.002.

[25] Magers TL. Using evidence-based practice to reduce catheter-associated urinary tract infections. AJN The American Journal of Nursing. 2013 Jun; 113(6): 34-42. doi: 10.1097/01.NAJ.0000430923.07539.a7.

[26] Oman KS, Makic MB, Fink R, Schraeder N, Hulett T, Keech T, *et al*. Nurse-directed interventions to reduce catheter-associated urinary tract infections. American Journal of Infection Control. 2012 Aug; 40(6): 548-53. doi: 10.1016/j.ajic.2011.07.018.

[27] Rashmi KC and Dhakal B. Knowledge, attitude and practice on prevention of catheter-associated UTI among nurses of a tertiary care hospital. Journal of College of Medical Sciences-Nepal. 2021 Mar; 17(1): 61-8. doi: 10.3126/jcmsn.v17i1.28543.

[28] Singh S, Kumari R, Thakur A, Tomar S. Knowledge Regarding Prevention of Urinary Tract Infection In Patients with Indwelling Catheter among Staff Nurses: An Interventional Study. Indian Journal of Forensic Medicine & Toxicology. 2021 Aug ;15(4): 2649-52.

[29] Cutinho MC and Sheilini M. Knowledge on Practice of Urinary Catheter Care and Compliance to Urinary Catheter Care Guidelines-A Hospital based Study. Indian Journal of Public Health Research & Development. 2018 Nov; 9(11): 218-224. doi: 10.5958/0976-5506.2018.01455.9.

[30] Ghauri SK, Javaeed A, Abbasi T, Khan AS, Mustafa KJ. Knowledge and attitude of health workers regarding catheter-associated urinary tract infection in tertiary care hospitals, Pakistan. JPMA. The Journal of the Pakistan Medical Association. 2019 Dec; 69(12): 1843-7. doi: 10.5455/JPMA.8096.