



NURSING STUDENTS KNOWLEDGE ON PREVENTION OF CATHETER-ASSOCIATED URINARY TRACT INFECTION

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<p>ARTICLE INFO</p> <p>Keywords Knowledge, Nursing Students, Prevention, Catheter-Associated, Urinary Tract Infection</p> <p>Corresponding Author: Afshan Nazly, Associate Professor Ziauddin University Faculty of Nursing and Midwifery, Email: afshan.nazly@zu.edu.pk</p>	<p>ABSTRACT</p> <p>Catheter-associated urinary tract infections (CAUTIs) are a severe problem in healthcare facilities, leading to increased illness, mortality, and healthcare costs. Nursing students have a crucial role in the prevention of CAUTIs because they frequently assist with insertion and management of urinary catheters.</p> <p>Objective: The purpose of the study was to assess the knowledge of nursing students about CAUTI prevention.</p> <p>Methods: A descriptive cross-sectional study was conducted at the College of Nursing, Jinnah Postgraduate Medical Centre in Karachi, Pakistan, during a two-month period from January to February 2025. With a convenient sampling technique, 80 nursing students were included. Data were gathered via a self-reported questionnaire completed to evaluate their perception of CAUTIs.</p> <p>Results: The results indicated that 25% of the students were found to have low knowledge, 53.75% had moderate knowledge, and 17% showed high knowledge regarding prevention of CAUTI.</p> <p>Conclusion: Most of the nursing students had a moderate level of understanding regarding prevention of CAUTI. These findings indicate the importance of evidence-based targeted educational measures by nursing educators and administrators to fill knowledge gaps and maintain effective practices in the prevention and management of CAUTI.</p>
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INTRODUCTION

Catheter-associated urinary tract infections (CAUTIs) present a prominent challenge in the global healthcare landscape, constituting around 40% of all healthcare-associated infections [1]. Patients who have indwelling urinary catheters are particularly susceptible to the development of CAUTIs, which can lead to severe complications, including sepsis, pyelonephritis, and mortality. Effective prevention of CAUTIs is crucial for enhancing patient outcomes and mitigating healthcare expenditures [2]. Nursing students occupy a pivotal position in the prevention and management of CAUTIs, underscoring the necessity for future healthcare providers to be well-versed in contemporary guidelines and best practices associated with CAUTI prevention [3]. Furthermore, the use of urinary catheters, which facilitate urinary drainage from the bladder through the urethra, has been linked to approximately 75% of urinary tract infections arising in hospital settings. It is noteworthy that 15–25% of patients undergoing hospitalization utilize urinary catheters [4]. Alongside these statistics, various risk factors contribute to the incidence of CAUTIs, including extended catheter usage, female gender, advanced age, diabetes, immunocompromised states, urinary tract abnormalities, urinary retention, inadequate hygiene practices, and contamination at the catheter insertion site. These risk factors underscore the imperative to implement preventative strategies such as stringent hand hygiene, timely removal of urinary catheters, and adherence to sterile techniques during catheter placement. Additionally, the findings accentuate the necessity for the education and training of healthcare providers, including nursing students, to enhance their competencies in the prevention and management of CAUTIs [5]. By systematically identifying and addressing these risk factors, healthcare practitioners can substantially elevate the quality of care provided to patients with indwelling urinary catheters and curtail the prevalence of CAUTIs and their attendant complications [6-9].

UTIs are common in hospitals, with approximately 25% of patients undergoing urinary catheterization during their stay, a major risk factor for CAUTI. CAUTI is the most frequently acquired infection in hospitals, accounting for around 40% of all nosocomial infections. Nurses, as primary healthcare providers, are tasked with the placement and management of urinary catheters to achieve desired outcomes. They must also acquire the necessary knowledge and skills for effective catheter care. The risk of a UTI for patients rises with the duration of catheter use. Furthermore, prolonged catheterization correlates with an increased occurrence of CAUTI. Among those admitted with hip fractures, spinal cord injuries, or existing urinary tract infections, CAUTI is the most common hospital-acquired infection. Patients with chronic conditions may experience incontinence, bladder obstruction, and extended indwelling catheterization. Globally, about 150 million individuals suffer from urinary tract infections, with 80% of hospital-acquired UTIs linked to catheter use. *Escherichia coli* is a leading cause of CAUTI, followed by *Proteus* and *Pseudomonas* species. Other contributing pathogens include *Serratia*, *Candida*, *Enterococci*, and *Klebsiella*, among others. The male gender is more commonly affected by CAUTI, likely due to urinary system structure and hormonal differences in women. Risk factors for developing bacteriuria and UTIs include weakened immunity, co-morbidities like diabetes and hypertension, as well as age groups such as the elderly and pediatric populations.

Nurses and nursing students are rightly identified as the primary healthcare providers in performing urinary catheter insertions and maintenance for desired outcomes [17]. This necessitated the assessment of their knowledge concerning CAUTI.

Methodology

This Descriptive Cross-sectional study was conducted at the College of Nursing Jinnah Postgraduate Medical Centre Karachi, and the participants were recruited through a convenient sampling technique. The study duration was two months after approval of the synopsis from January to February 2025. Moreover, the sample size was calculated through open EPI version-3.0 with a population of N size 100, a confidence interval of 95%, and the obtained sample size is 80. All students of the second semester of post-RN who are enrolled in College of Nursing Jinnah Postgraduate Medical Centre Karachi, have at least six months of working.

This experience was specifically in any reputed hospital for students presently being trained at CON JPMC for less than six months of practical training and who were excluded from the study. The study tool was adopted from referenced study “**Knowledge of Nursing Students on Catheter-Associated Urinary Tract Infection Prevention**” and permission taken from correspondence author for using tool, yielding a reliability coefficient for the questionnaire of 0.79. Moreover, the total number of items in the questionnaire is 20, which consists of 4 demographic questions and 16 related to CAUTI prevention. The scoring of the tool was converted into percentages: low level for those who scored below 50%, moderate 50-70%, and high for those above 70%. The Jinnah Postgraduate Medical Center research committee approved this study. After approval, the study was explained to each participant, and each participant signed a written consent form. The data collected were analyzed using SPSS version 26.0, frequency counts per item were done using descriptive statistics, and their frequencies were presented in tabular form.

Results

The study involved 80 participants altogether. You’ll find the demographic spread summarized in Table 1. Of all the respondents, 33 (41.3%) were men and 47 (58.8%) were women, so there were more female participants. Most of the participants were aged 31 to 40, with 42 (52.5%) aged in that range, 21 (26.3%) between 41 and 50, and 17 (21.3%) aged 20 to 30 years. This means that the sample consisted mostly of professionals with some experience. A total of 53 participants (66.2%) were married, and 27 (33.8%) were single. A summary of the work experience of participants is shown in Table 2. Out of the sample, the largest group (45%) had worked in this role for more than four years, while 32.5% had worked for 2–4 years, and 22.5% had only 1–2 years of experience as an assistant manager. The degree of understanding of CAUTI prevention among the participants is summarized in Table 3. About 43 had moderately good knowledge, 20 had only basic knowledge, and 17 were skilled at handling the questions. Most of those surveyed understood how to reduce CAUTI, but a large number did not know enough, suggesting that training should be improved.

Table 1: Demographic Characteristics of Participants

Characteristics	Frequency (%)
Gender	
Male	33 (41.3)
Female	47 (58.8)
Age	
20-30	17 (21.3)
31-40	42 (52.5)

41-50	21 (26.3)
Marital Status	
Single	27 (33.8)
Married	53 (66.2)

Table 2: Working Experience of the Participants

Working Experience of Participants	
No. of Years	Participants %
1-2yrs	18 (22.5 %)
2-4yrs	26 (32.5 %)
>4yrs	36 (45 %)

Table:3 Participants Level of Knowledge

Level of knowledge	Participants
Low Level of knowledge	20 (25 %)
Moderate Level of knowledge	43 (53.75 %)
High Level of knowledge	17 (21.25 %)

Discussion

Hospitalized patients with urinary catheters often develop Catheter-Associated Urinary Tract Infections (CAUTIs). CAUTIs can cause more health complications for patients, lead to prolonged hospital stays, and increase healthcare costs [18]. Students in nursing care for patients who have catheters and help prevent CAUTIs [6]. The purpose of this study is to evaluate the knowledge of

nursing students regarding the prevention of CAUTIs. It was found that there were more female participants in the present study. Another study discovered the same result: females had a higher (+2) average score compared to males [19]. The settings for some studies might encourage more women to join or be included in the research. The results so far suggest that the main participants are people between 20 and 40 years. A study led by Benny et al. discovered similar results: mostly, the participants were in their twenties and thirties [3]. This is probably because the people in this age group are more often students of nursing or healthcare, who the research is focusing on. According to the findings, 21.23 % did not understand how to prevent CAUTI. According to research carried out in Palestine, nearly 13.2% of participants did not have complete knowledge [20]. To some extent, the findings from another study aligned with the first: 11.2% reported insufficient knowledge [3]. In addition, another report revealed that 15% of the participants were found to have a low understanding of CAUTI prevention [21]. Consequently, results from another study showed that the average knowledge score was only 68.05 [22].

Furthermore, a research study in Iraq has shown that 36% of the people in the study had very little knowledge about preventing CUATI [23]. Consequently, nursing students lack knowledge about the correct way to insert, care for, and take out a catheter. Thus, there is a higher chance that important steps might be missed or that CAUTI risks will increase [24]. Such situations may increase infection among patients, leading to added discomfort, extended stay, and more serious complications [25]. Therefore, nursing students should take part in education and training programs that help prevent CAUTI [26]. Current data indicate that almost two-thirds had a good understanding of avoiding CAUTI. Survey results in Nepal reported that 59.37% of people demonstrated moderate knowledge about preventing CAUTI [27]. The second study found that 70% of respondents have an average understanding [28]. This area was studied further, with a result of 80.85% of nurses having average knowledge about how to prevent CAUTI [3]. At the same time, another research study showed that 82.4% of respondents had a fair amount of knowledge [29]. Furthermore, another survey found that almost one-third possessed medium levels of information [2]. The study found that 16% of participants had a high understanding of how to prevent catheter-associated urinary tract infections. Similar findings were made in a study, showing that 16.7% of healthcare workers understood how to prevent catheter-associated UTIs [29]. Alternative research found that 23% exhibited a high knowledge level [28]. Some findings indicate that 7.231% of the sample demonstrated excellent knowledge [3]. However, research from another shelter indicates that about half of the group had a good understanding of CAUTI prevention [19]. Pakistani research also reveals that both nurses and doctors have a reasonable grasp of how to perform urinary catheterization and infection prevention [30]. In the same way, a study from India has shown that most of the study's participants (85%) have knowledge related to ensuring CAUTI prevention. Another research paper by Palestine has found that nearly all of the surveyed people are well-versed in the topic [21].

Conclusions

The findings of this study indicate that most respondents possess a moderate level of knowledge regarding the prevention of catheter-associated urinary tract infections, while only a few demonstrate a high level of understanding. These results highlight the potential need for additional educational efforts to strengthen nursing students' knowledge of catheter-associated urinary tract infection prevention.

Conflict of Interest

The authors declare no conflict of interest.

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