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KNOWLEDGE OF NURSING STUDENTS ON CATHETER-ASSOCIATED URINARY TRACT INFECTION PREVENTION AT LIAQUAT UNIVERSITY HOSPITAL, HYDERABAD

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Abstract

Background: Catheter-associated urinary tract infections (CAUTIs) are common healthcare-associated infections and pose significant patient safety concerns. Nursing students play a critical role in infection prevention, making their knowledge essential.

Objective: To assess the knowledge of nursing students regarding CAUTI prevention and identify knowledge gaps.

Methods: A descriptive cross-sectional study was conducted at Liaquat University Hospital, Hyderabad, including 63 BS Nursing students undergoing clinical training. Participants were selected using simple random sampling. Data were collected using a structured questionnaire covering demographics and knowledge of CAUTI causes, risk factors, catheter care, aseptic insertion, maintenance, and prevention. Knowledge scores were categorized as low (0–7), moderate (8–11), or high (12–15) and analyzed using SPSS version 27.

Results: Among participants, 31.7% demonstrated low knowledge, 55.6% moderate knowledge, and 12.7% high knowledge. The majority were male (68.3%) and aged 20–25 years (68.3%).

Conclusion: The study concluded that most nursing students exhibited moderate knowledge of CAUTI prevention, highlighting the need for targeted educational interventions and enhanced clinical training to improve CAUTI prevention practices and patient care outcomes.

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INTRODUCTION

Urinary tract infections (UTIs) are among the most common bacterial infections globally, affecting individuals of all ages and genders and may involve either the lower or upper urinary tract, classified as simple or complex depending on severity and patient-related factors.[1] Catheter-associated urinary tract infections (CAUTIs) are a frequent type of healthcare-associated infection and account for a substantial proportion of hospital-acquired infections, representing approximately 40% of all nosocomial infections and up to 80% of nosocomial UTIs.[2] CAUTIs occur when an indwelling urethral catheter disrupts the natural urinary defenses and facilitates bacterial colonization on catheter surfaces[3]. Patients with long-term catheterization are particularly at risk for serious complications such as pyelonephritis, sepsis, and increased mortality, and CAUTIs have been linked with increased morbidity, prolonged hospital stays, and higher healthcare costs[4]. Nurses play a central role in CAUTI prevention, as they are primarily responsible for the insertion, maintenance, and timely removal of urinary catheters. However, in many healthcare settings, especially those with limited resources, standard infection prevention protocols are not strictly followed, and inadequate adherence to recommended practices contributes to ongoing infection risk[5, 6]. An estimated 17–69% of CAUTIs may be prevented with appropriate infection control measures, including aseptic insertion and catheter care.[5, 7] Despite preventive strategies, CAUTI rates remain high, accounting for 32% of healthcare-associated infections in the United States, largely due to insufficient knowledge of catheter care among nurses[8]. This study aimed to assess nursing students' knowledge regarding CAUTI prevention at Liaquat University Hospital, Hyderabad. The findings are intended to identify educational gaps, guide the development of context-specific nursing practices, enhance training programs, and support evidence-based guidelines. Furthermore, the study seeks to inform curriculum development by strengthening clinical learning experiences and continuing professional development activities.

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MATERIALS & METHODS

A descriptive cross-sectional study was conducted at Liaquat University Hospital (LUH), Hyderabad, a tertiary care teaching hospital in Sindh, Pakistan, over four months from September to December 2025, following administrative approval from the Global Institute of Medical and Health Sciences (GIMHS), Hyderabad. The study population included BS Nursing students undergoing clinical training at the hospital. Participants were selected using simple random sampling from the list of eligible students. Students in the 2nd, 3rd, and 4th years who had attended clinical postings and consented to participate were included, while first-year students without clinical exposure, those absent during data collection, and those who declined participation were excluded.

The sample size was calculated using the Raosoft calculator with a 95% confidence level and a 5% margin of error, resulting in 63 participants. Data were collected using a structured questionnaire adapted from a previously published study. Written informed consent was obtained from all participants, and questionnaires were distributed during clinical hours with 15–20 minutes to complete. Knowledge scores were calculated using the Helincy method, which assigns weighted values to each correct response to quantify participants' knowledge. Scores were then categorized as low (0–7), moderate (8–11), or high (12–15). Data were analyzed using SPSS version 27, and descriptive statistics, including frequencies and percentages, were used to summarize the results. The study adhered to ethical principles outlined in the Declaration of Helsinki. Participation was voluntary, informed consent was obtained, and confidentiality was maintained throughout the study.

RESULTS

A total of 63 nursing students participated in the study. The majority were male (43, 68.3%), while females accounted for 20 (31.7%). Most participants were aged 20–25 years (43, 68.3%), followed by 18–20 years (17, 27.0%), with only 3 participants (4.8%) aged 25 years or older. Regarding academic year, fourth-year students comprised the largest group (28, 44.4%), followed by second-year (21, 33.3%) and third-year students (14, 22.2%) (Table 1).

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In terms of work experience, more than half of the participants (52.4%) reported less than one year of professional experience, 25.4% had 1–2 years, and 22.2% had three years or more (Figure 1), indicating that most participants had relatively limited clinical exposure.

Assessment of knowledge regarding CAUTI prevention showed that the majority of students (35, 55.6%) had a moderate level of knowledge, 20 participants (31.7%) demonstrated low knowledge, and only 8 participants (12.7%) exhibited high knowledge (Table 2). These results suggest that while most nursing students had a moderate understanding of CAUTI prevention, a significant proportion still had insufficient knowledge, underscoring the need for targeted educational interventions and enhanced clinical training.

Table 1: Demographic Characteristics of Participants (n = 63)

Variable	Category	Frequency (n)	Percent (%)
Gender	Male	43	68.3
	Female	20	31.7
Age (years)	18–20	17	27.0
	20–25	43	68.3
	25 and above	3	4.8
Academic Year	2nd Year	21	33.3
	3rd Year	14	22.2
	4th Year	28	44.4

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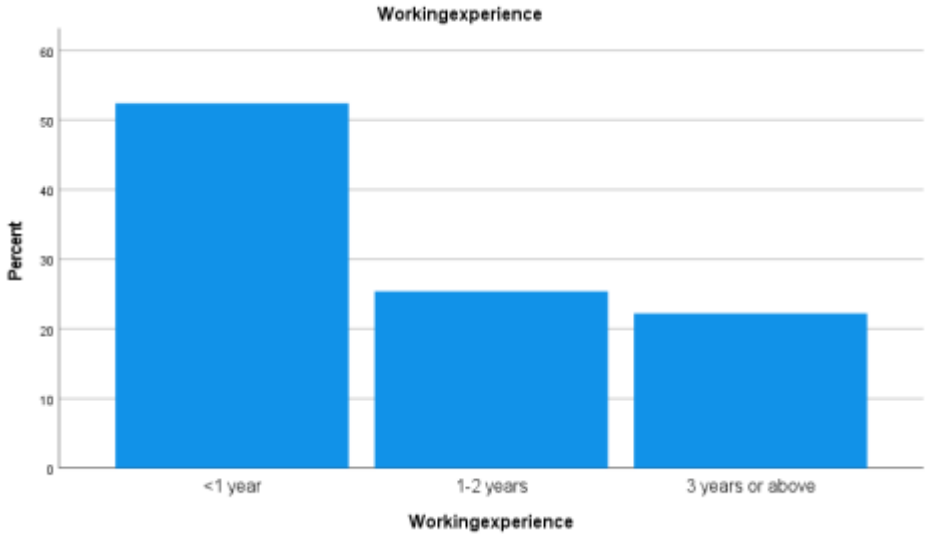

Figure 1: Working Experience of the Participants

Table 2: Levels of Knowledge among Participants (n = 63)

Level of Knowledge	Participants (n)	Percentage (%)
Low level of knowledge	20	31.7
Moderate level of knowledge	35	55.6
High level of knowledge	8	12.7
Total	**63**	**100.0**

DISCUSSION

Catheter-associated urinary tract infections (CAUTIs) are common among hospitalized patients with indwelling urinary catheters and are associated with increased morbidity, prolonged hospital stays, and higher healthcare costs.[8] Nurses and nursing students play a critical role in CAUTI prevention because they are directly involved in catheter insertion and maintenance. [9]

In this study, males comprised 68.3% of participants, consistent with other healthcare trainee and CAUTI-related studies where gender distribution varies by accessibility and willingness to participate.

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Most participants were aged 20–25 years (68.3%), reflecting typical undergraduate nursing and trainee populations.[10, 11]

Regarding knowledge of CAUTI prevention, 31.7% of participants demonstrated low knowledge. This finding aligns with a study of nursing students in Karachi, Pakistan, where approximately 19% had low knowledge, indicating that a substantial minority of students may lack essential understanding of evidence-based catheter care.[9] Such knowledge gaps can compromise effective catheter management and patient safety. The largest proportion of participants (55.6%) had moderate knowledge of CAUTI prevention, consistent with findings from Nepal, where 59.37% of nurses demonstrated moderate knowledge.[12] Moderate knowledge levels suggest that while basic concepts are understood, deeper competency in catheter care and infection prevention may still be lacking. Only 12.7% of participants exhibited high knowledge regarding CAUTI prevention, a proportion comparable to the 16% reported among nursing students in Pakistan, where most demonstrated moderate to low levels of CAUTI prevention knowledge.[13] Similar patterns have been observed internationally; for example, in a study of nurses working in intensive care units in Ethiopia, only 36.9 % demonstrated good knowledge of CAUTI prevention, highlighting persistent gaps in knowledge among critical care staff across settings.[14] Research from teaching hospitals in Nepal also reports wide variation in knowledge levels, with approximately 38.2 % of nurses demonstrating good knowledge of CAUTI prevention and up to 59.37 % showing moderate understanding, indicating that knowledge gaps persist in diverse healthcare environments.[15]

Overall, these findings underscore the need for targeted educational interventions, enhanced clinical training, structured infection control programs, and integration of CAUTI prevention guidelines into nursing curricula. Strengthening nursing students' knowledge and competencies in CAUTI prevention is essential to reduce patient risk, improve clinical outcomes, and enhance overall quality of care.

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CONCLUSION

The majority of respondents had a moderate level of knowledge on catheter-associated urinary tract infection prevention, with only a small percentage exhibiting high knowledge. These findings indicate that nursing students may benefit from further education and training to strengthen their understanding and practices related to CAUTI prevention.

Conflict of Interest

The authors declare **no conflict of interest.**

Funding Disclosure

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