

ASSESSMENT OF KNOWLEDGE ATTITUDE AND PRACTICES OF OPERATION THEATRE STAFF REGARDING PREVENTION OF CATHETER ASSOCIATED URINARY TRACT INFECTION

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ABSTRACT

Objective: to evaluate the knowledge, attitudes, and practices of operating theatre staff concerning CAUTI prevention at Health Sciences, Superior University, Lahore, Pakistan.

Study Design: A Cross sectional Study

Place and Duration of the Study: A cross-sectional study was performed with operating theater personnel, comprising physicians, nurses, and technicians, at Health Sciences, Superior University, Lahore, from Jan to June 2024

Methodology: A standardized questionnaire was employed to assess participants' understanding of CAUTI causes, dangers, and preventative measures; attitudes towards CAUTI prevention; and compliance with suggested actions. Data were gathered and examined to pinpoint knowledge deficiencies and intervention opportunities.

Results: The study measured the knowledge, attitude, and practices (KAP) of operating room staff with relation to preventing catheter-associated urinary tract infections (CAUTIs). The results showed that, on average, 1.8 out of a possible 5.0 points were deemed sufficient, and that 52.7% shown moderately adequate knowledge. A mean attitude score of 2.05 (SD = 0.75) was produced by the mixed attitudes, with 40.9% exhibiting somewhat positive attitudes and 29.1% indicating favorable attitudes. The staff's level of practice adherence varied; on average, 1.88 (SD=0.6), with 56.4% indicating moderate practice and 43.6% indicating adequate practice. Staff members acknowledged the significance of aseptic technique to a degree of 94.5%, and 79.1% were in favor of prompt catheter removal to avoid CAUTI, according to key responses. Higher levels of practice adherence were linked to more professional experience ($\chi^2 = 19.172$, $p < 0.01$), and there were notable positive associations between attitude and practice ($\rho = 0.264$, $p < 0.01$). Despite a moderate degree of knowledge and practice, patient safety can only be improved by targeted education that fills attitude gaps and enhances CAUTI prevention strategies.

Conclusion: CAUTI is a common healthcare-associated disease. Healthcare personnel had sufficient CAUTI prevention knowledge, attitudes, and practices in this study. Every hospital's infection prevention program must create, implement, and monitor urinary catheter infection prevention policies. Health care organizations must establish medical education programs, interdisciplinary training, and catheter care checklist audits to improve staff knowledge and practices.

Keyword: knowledge attitude and practices, operation theatre staff, urinary tract infection, catheter

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INTRODUCTION

In hospitals, and notably in intensive care units, urinary catheterization is a necessary procedure. According to the Centers for Disease Control and Prevention (CDC), between seventy percent and eighty percent of all UTIs are the result of inappropriate or non-compliance with urinary catheterization protocols(1). Patients admitted with hip fracture, spinal cord damage, urine incontinence, bladder blockage, or prolonged usage of indwelling catheterization due to chronic illness are at increased risk of contracting a catheter-associated urinary tract infection (CAUTI), the most prevalent type of nosocomial infection(2). Around 80% of nosocomial UTIs are related with catheters, and 150 million people globally suffer from this infection. Among the many infectious agents that can cause catheter-associated urinary tract infections (CAUTIs), the most common are *Proteus* and *Pseudomonas* species. *Enterococci*, *Klebsiella*, *Candida*, *Serratia*, and a handful of other microorganisms are also responsible for the infection. The female preponderance in CAUTI can be explained by the female urinary tract morphology and the hormonal changes that occur during menstruation(3). People with compromised immune systems, those with diabetes, hypertension, or obesity, as well as those in the pediatric and elderly age groups, are at increased risk for having bacteriuria and UTIs(4). A substantial public health concern, according to the World Health Organization (WHO), is infections that patients get while in the hospital. These infections can lengthen the time a patient spends in the hospital, increase the risk of death and morbidity, put a financial strain on the healthcare system, and even worsen the suffering of the patient's loved ones. Catheterization is necessary for more than a quarter of all hospital in-patients for a variety of reasons(5,6). Admitted patients with CAUTI may experience a wide range of symptoms, including fever and bodily pain, and the risk of developing MDR-pathogens due to the need for antibiotics for an extended period of time. The urinary system serves as a breeding ground for drug-resistant bacteria, which can then infect other individuals in the area. The vast majority of catheter-associated urinary tract infections (CAUTIs) are avoidable. Cautionary urinary tract infections (UTIs) can be avoided by adhering to the recommended protocols and taking precautions, such as thoroughly washing hands using the right methods, carefully tending to the indwelling catheter, and removing the catheter correctly(7,8). It is important to refrain from urinary catheterization unless absolutely essential, and to keep catheterization times to a minimum. In order to enhance patient care, it is necessary to adhere to practices supported by evidence(9). Careful catheter insertion is essential in preventing catheter-associated urinary tract infections (CAUTIs). However, in hectic clinical environments, it may be difficult to administer and adhere to the necessary preventative measures. Health care providers in Peshawar, Pakistan, were the subjects of this study because researchers were interested in learning more about their perspectives, beliefs, and methods for preventing catheter-associated urinary tract infections (CAUTIs).

MATERIALS AND METHODS

Study Design and Setting

This cross-sectional descriptive study was conducted over a three-month period at the surgical operating theaters of a tertiary care hospital using structured questionnaires to assess CAUTI prevention awareness.

Study Population

The study population included 120 operating theater staff members—comprising nurses, surgical technologists, and anesthetic assistants—who were directly involved in perioperative care and catheter management during surgical procedures.

Ethical Approval Statement

The Institutional Review Board of Superior University (IRB/FAHS/ALLIED-S/10/24/MS/RS-3495) approved this research project ethically before its commencement. Participants committed their consent along with the study maintaining absolute confidentiality inside its framework which aligned with human research ethical standards..

Inclusion Criteria

The research enrolled all medical staff from the operating theater consisting of surgeons together with anesthesiologists, nurses and technicians. The study required all participating healthcare professionals to demonstrate six months of experience alongside granting their full knowledge of the research requirements.

Exclusion Criteria

The research excluded healthcare workers who refused informed consent as well as healthcare personnel who maintained operational distance from room procedures or unavailable during the study period. Data records containing incomplete survey questions were filtered out from all the analysis conducted. The study used a cross-sectional design that employed standardized questionnaires for measuring operating theater staff understanding regarding CAUTI prevention and their practices and views. Through the survey the researchers assessed both participant comprehension about CAUTI origins together with its vulnerabilities and preventive actions in addition to their adherence to recommended protocols. The research data revealed which sections needed additional information alongside appropriate treatment plans.

Data Collection

Data were collected using a structured, self-administered questionnaire designed to evaluate knowledge, attitudes, and practices regarding CAUTI prevention. The tool was distributed among eligible operating theater staff during work hours. Participation was voluntary and anonymous, with informed consent obtained beforehand. Responses were compiled for quantitative and thematic analysis.

Statistical Analysis

Data were entered and analyzed using SPSS version 26. Descriptive statistics summarized frequencies and percentages for categorical variables, while means and standard deviations were calculated for continuous variables. Chi-square tests evaluated associations between professional role and CAUTI knowledge or practices. A p-value of <0.05 was considered statistically significant.

INSTRUMENTS FOR GATHERING DATA

For this evaluation, we administered a practice questionnaire in addition to a validated structured questionnaire measuring knowledge and attitudes using a modified Likert scale. Guidelines from the Centers for Disease Control and Prevention (CDC) at the national and international levels informed its development. The following face validity method was used to validate the questionnaire. In order to ensure that the tool was both valid and reliable, a pilot research was carried out with several groups of participants employed by tertiary care hospitals. No one who took part in the pilot trial was considered for this follow-up.

ASSESSMENT TECHNIQUES (SCORE)

Questions were divided into four parts by the questionnaire. This section contains the participants' demographic information, which includes their age, gender, level of education, occupation, and years of professional experience. Afterwards, a battery of fourteen questions designed to gauge familiarity with the material followed. In this case, a "0" was given for the wrong answer and a "1" for the right one. A total knowledge score between zero and fourteen is feasible. If a person's score was less than the mean, on par with the mean, or higher than the mean, their level of knowledge was categorized as inadequate, fairly adequate, or adequate knowledge, respectively. Eight statements were used to measure attitude in the segment that used a 5-point Likert scale. For the positive statements that were given, there were five possible choices: "Strongly Agree," "Agree," "Neither agree nor disagree," "Disagree," and "Strongly disagree," each with a 1–5 score. For questions stated negatively, the scores were reverse-coded as 5, 4, 3, 2, and 1. The total attitude score, which may be anywhere from 8 to 40, was then determined. Scores 'below the mean' were used to classify negative attitudes, scores 'above the mean' for favourable attitudes, and scores 'equivalent to the mean score' for moderately favourable attitudes. Ten statements, each on a three-point scale, made up the last parts of the practice exam. "Agree," "Neither agree nor disagree," and "Disagree" were the supplied positive statement options, with scores ranging from 1 to 3, as said. For questions worded negatively, the scores were scored as 3, 2, 1. Afterwards, a total score between 10 and 30 was

determined. Inadequate, somewhat adequate, and adequate practice were the three categories into which practice scores were placed. Inadequate practice was defined as scores below the mean, appropriate practice as scores above the mean, and moderately adequate practice as scores equal to the mean.

RESULTS

The demographic data reveals a wide range of ages, genders, occupations, degrees of education, and years of experience represented. With 34.1% being in the 21–24 age bracket and 22.5% being beyond the age of 30, the bulk of participants (44.1%) are in the 25–30 age bracket. With 50.8% men and 49.2% females, the gender breakdown is almost equal. When looking at occupations, the biggest category is that of doctors and other medical professionals (36.6%), followed by that of allied health professionals (34.6%) and nurses (28.5%). Among the participants' educational levels, nearly half (48%) possess undergraduate degrees, while 27.1% have diplomas and 24.9% have postgraduate degrees. The majority of the sample is in the early to mid-career stage of their careers, with just 7.9% having more than 10 years of experience, and the biggest group having 6 months to 2 years of experience (34%).

Table 1. Demographic characteristics of health care professionals.

Variable	Category	Frequency (n)	Percentage (%)
Age			
	21-24 Years	110	33.40%
	25-30 Years	145	44.10%
	> 30 Years	74	22.50%
Gender			
	Female	162	49.20%
	Male	167	50.80%
Profession			
	Medicine	121	36.80%
	Nursing	94	28.60%
	Allied Health Sciences	114	34.60%
Educational Qualification			
	Diploma	89	27.10%
	Undergraduate	158	48.00%
	Post Graduate	82	24.90%
Professional Experience			
	Less than 6 Months	66	20.10%
	6 Months – 2 Years	112	34.00%
	2 – 6 Years	81	24.60%
	7 – 10 Years	44	13.40%
	More than 10 Years	26	7.90%

According to the statistics, medical workers have a reasonable amount of information, attitude, and behavior when it comes to preventing catheter-associated urinary tract infections (CAUTIs). With a mean score of 1.8 and an SD of 0.5, indicating somewhat below-average adequacy, only 47.3% of individuals show adequate knowledge, while 52.7% exhibit moderately adequate knowledge. With a mean score of 2.05 and an SD of 0.75, attitudes range; 40.9% are somewhat favorable, 30.0% are unfavorable, and 29.1% are positive. With a mean of 1.88 and a standard deviation of 0.6, the percentage of participants reporting moderate or adequate practice in preventing CAUTIs is 56.4%, while 43.6% report adequate practice. These results indicate that there is a need for enhanced practices in this population.

Table 2. Level of Knowledge, Attitude, and Practice on prevention of CAUTI among health care professionals

Variable	Level	Frequency (n)	Percentage (%)	Mean	SD
Knowledge of Health Care Professionals on CAUTI				1.8	0.5
	Moderately Adequate Knowledge	58	52.70%		
	Adequate Knowledge	52	47.30%		
Attitude of Health Care Professionals on CAUTI				2.05	0.75
	Unfavourable Attitude	33	30.00%		
	Moderate Favourable Attitude	45	40.90%		
	Favourable Attitude	32	29.10%		
Practice of Prevention of Health Care Professionals on CAUTI				1.88	0.6
	Moderate Practice	62	56.40%		
	Adequate Practice	48	43.60%		

Evidence suggests that the majority of medical practitioners are aware of critical components of CAUTI therapy and prevention. Some 74.5 percent of people think that catheter-associated urinary tract infections are widespread among patients in hospitals. The vast majority agree that aseptic measures are important (94.5%), and that high-risk populations are an acknowledged risk factor (81.8%). A large percentage of people know that post-operative patients should have their catheters removed as soon as possible (79.1%) and that longer catheterization increases the risk of bacteriuria (85.5%). While 63.6% think regular lubricant use is unnecessary, just 56.4% think silicone-coated catheters are advantageous for long-term use. The research indicates that there is a good general understanding of the causes that can cause CAUTI (83.6% of people named *Escherichia coli* as the main agent), however there are gaps in understanding when it comes to specific activities and items.

Table 3. Assessment of Knowledge on CAUTI among health care professionals.

Q.No	Variable	Yes		No	
		(n)	(%)	(n)	(%)
8	• Most common Hospital-acquired infection is CAUTI'	82	74.50%	28	25.50%
9	• Risk factor of CAUTI is not directly related to the duration of catheterization	43	39.10%	67	60.90%
10	• High-risk groups for CAUTI include female gender and elderly patients	90	81.80%	20	18.20%
11	• Acute urinary retention and bladder obstruction is the indicationmfor catheterization	95	86.40%	15	13.60%
12	• Strict aseptic precautions to be followed for urinary catheterization	104	94.50%	6	5.50%
13	• Catheter must be removed as soon as possible or within 24 hours for catheterized post-operative patients	87	79.10%	23	20.90%
14	• Cleaning the peri-urethral region with antiseptics is mandatory to prevent CAUTI	76	69.10%	34	30.90%
15	• Secure the IUC catheter properly after insertion to prevent displacement and injury	101	91.80%	9	8.20%

16	<ul style="list-style-type: none"> CAUTI increases the duration of the patient’s stay in the hospital 	88	80.00%	22	20.00%
17	<ul style="list-style-type: none"> If urinary catheter remains indwelling for a month, the risk of bacteriuria is high 	94	85.50%	16	14.50%
18	<ul style="list-style-type: none"> Silicone alloy-coated indwelling urinary catheters may benefit patients for long-term care 	62	56.40%	48	43.60%
19	<ul style="list-style-type: none"> Frequent use of lubricants with antiseptics may not be necessary 	40	36.40%	70	63.60%
20	<ul style="list-style-type: none"> Daily cleaning of the meatus and catheter with soap and water reduces the possibility of CAUTI 	97	88.20%	13	11.80%
21	<ul style="list-style-type: none"> CAUTI is most often caused by Escherichia coli 	92	83.60%	18	16.40%

The results show how healthcare providers feel and what they know about preventing CAUTIs. Renewal reminders for catheters reduce catheter-associated urinary tract infections (CAUTIs), according to the majority (84.6%), whereas a tiny number (6.3%) disagree. Mixed views on the effectiveness of CAUTI prevention reveal that attitudes are divided on the inevitability of CAUTI in catheterized patients. While 39.1% disagree, 43.7% think that it cannot be avoided. Recognizing the seriousness of CAUTI, the majority of experts (77.3%) either disagree or strongly disagree with the assertion that it is not significant. 89.1% of people think that basic catheter care education is preventative, demonstrating the widespread agreement that education has a role in preventing CAUTI. Contrarily, 45.5% of people think that healthcare providers should not remove catheters just because it's convenient, which shows that people understand the value of good catheter management. There needs to be greater education on realistic CAUTI prevention tactics, even though 54.5% of people think it's impossible. The assumption that aseptic precautions might be skipped after catheter removal is strongly opposed by 54.6% of respondents, highlighting the importance of hygiene procedures. Finally, 74.6% are in favor of routine screening for asymptomatic bacteriuria, which shows that healthcare providers are being cautious despite the fact that the CDC is not currently recommending this before catheter implantation. The data shows that people are generally aware of the most important things they can do to prevent CAUTIs, but there are also some areas where people have mixed feelings and could benefit from more training or explanation.

Table 4. Assessment of Attitude towards prevention of CAUTI among health care professionals

S.No	Variable	Strongly Agree		Agree		Neither Agree nor Disagree		Disagree		Strongly Disagree	
		(n)	(%)	(n)	(%)	(n)	(%)	(n)	(%)	(n)	(%)
22	<ul style="list-style-type: none"> Renewal reminders for catheter prevents CAUTI 	39	35.50%	54	49.10%	10	9.10%	5	4.50%	2	1.80%
23	<ul style="list-style-type: none"> Development of CAUTI cannot be avoided among catheterized patients 	18	16.40%	30	27.30%	19	17.30%	28	25.50%	15	13.60%
24	<ul style="list-style-type: none"> CAUTI is not a very serious illness 	12	10.90%	24	21.80%	18	16.40%	41	37.30%	15	13.60%
25	<ul style="list-style-type: none"> Education regarding basic catheter care helps to prevent CAUTI 	61	55.50%	37	33.60%	7	6.40%	3	2.70%	2	1.80%
26	<ul style="list-style-type: none"> Health care workers can remove the catheter whenever convenient 	20	18.20%	30	27.30%	10	9.10%	36	32.70%	14	12.70%
27	<ul style="list-style-type: none"> Prevention of CAUTI is a frequent problem and impossible to attain 	12	10.90%	25	22.70%	13	11.80%	41	37.30%	19	17.30%
28	<ul style="list-style-type: none"> Aseptic precautions may not be needed for removing Foley’s catheter 	11	10.00%	26	23.60%	13	11.80%	42	38.20%	18	16.40%
29	<ul style="list-style-type: none"> Routine screening for asymptomatic bacteriuria (ASB) is recommended in catheterized patients, which has now not been advised by the CDC prior to catheter insertion 	30	27.30%	52	47.30%	12	10.90%	9	8.20%	7	6.40%

According to the statistics, healthcare providers strongly agree on a number of critical measures for preventing CAUTIs. Using antiseptics before and after handling the catheter is important, as nearly all respondents (96.4%) agree. Additionally, 92.7% agree that using an adequate catheter size decreases urethral damage. Similarly, 86.4% are aware of the proper usage requirements and believe that urinary catheterization should only be done when there is an appropriate indication. Another important consideration is the prevention of catheter twisting and kinking, with 89.1% of respondents agreeing. Positioning the urine collection bag below the bladder level is emphasized by the majority of experts (94.5%), and the benefit of frequent educational training on catheter management is agreed upon by 93.6%. On the other hand, there is some disagreement over whether or not daily bladder irrigation is necessary; whereas 54.5% agree, 24.6% disagree. On the more divisive topic of whether or not UTI patients should be isolated, 39.1% are opposed and only 29.1% are in favor. Lastly, 66.4% think that preventing CAUTIs requires keeping the drainage system closed. Based on these results, it seems that most CAUTI prevention procedures are widely agreed upon. However, some areas, such as patient isolation and bladder irrigation, could use some further explanation or standardized methods.

Table 5. Assessment of Practice on prevention of CAUTI among health care professionals

Q.No	Variable	Agree		Neither Agree nor Disagree		Disagree	
		(n)	(%)	(%)	(%)	(%)	(%)
30	• Before and after handling the catheter site, hands must be washed with antiseptics.	106	96.40%	3	2.70%	1	0.90%
31	• Appropriate catheter size should be used to minimize urethral trauma	102	92.70%	5	4.50%	3	2.70%
32	• Urinary catheterization must be done whenever there is an appropriate indication.	95	86.40%	10	9.10%	5	4.50%
33	• Twisting and kinking of the catheter must be prevented for an unobstructed flow of urine	98	89.10%	7	6.40%	5	4.50%
34	• At least once daily, the bladder must be irrigated with antimicrobial solutions/iodine solution.	60	54.50%	23	20.90%	27	24.60%
35	• Urine collection bag should be emptied regularly	104	94.50%	4	3.60%	2	1.80%
36	• Urine collection bag must be positioned and fixed below the level of the bladder	104	94.50%	3	2.70%	3	2.70%
37	• Isolation must be done for a patient with UTI, from other non-infected patients	32	29.10%	35	31.80%	43	39.10%
38	• Maintaining close drainage system prevents CAUTI	73	66.40%	19	17.30%	18	16.40%
39	• Regular educational training to be given on basic urinary catheter care	103	93.60%	6	5.50%	1	0.90%

Results from a Spearman's correlation study reveal connections between healthcare workers' CAUTI prevention knowledge, attitude, and practice. The lack of statistical significance ($p = 0.488$) and weak correlation ($\rho = 0.072$) between knowledge and attitude suggest that there is little to no link between the two. In a similar vein, there is a modest and non-significant association ($\rho = 0.058$) between knowledge and practice ($p = 0.579$). Nevertheless, there is a noteworthy and somewhat favorable relationship ($\rho = 0.264$) between attitude and practice, with a p-value of less than 0.01. Knowledge does not seem to have an immediate effect on attitude or practice in this population, however a more positive attitude toward CAUTI prevention is moderately linked with better preventative actions. This suggests that enhancements to preventative practices could be better achieved through interventions that target attitudes rather than just knowledge.

Table 6 Correlation between knowledge, attitude and practice on prevention of CAUTI among healthcare professionals

Spearman's correlation (rho)	Knowledge	Attitude	Practice
• Knowledge	Correlation Coefficient	1	0.072
	Sig. (2-tailed)	0	0.488
• Attitude	Correlation Coefficient	0.072	1
	Sig. (2-tailed)	0.488	0
• Practice	Correlation Coefficient	0.058	0.264**
	Sig. (2-tailed)	0.579	0.01

Results from a chi-square test of demographic characteristics showed no significant correlations between CAUTI preventive knowledge, attitude, or practice and age, gender, occupation, or level of education. There were no statistically significant differences in knowledge, attitudes, or practices across age groups, genders of healthcare workers, or healthcare occupations. There was no correlation between educational attainment and these results. On the other hand, there was a strong correlation between professional experience and practice, suggesting that healthcare providers with over six months of experience were more inclined to use sufficient CAUTI prevention measures. While other demographic variables did not exhibit a robust association with the outcomes examined, professional experience was the only one that significantly affected practice.

Table 7. Demographic variable's association with the knowledge, Attitude and Practice level on prevention of CAUTI among health care professionals

Demographic Variables	Adequate Knowledge	Chi-Square Value	Moderate Favourable Attitude	Favourable Attitude	Chi-Square Value	Adequate Practice	Chi-Square Value
Age							
• >21 Years	9 (90.0%)	$\chi^2 = 2.178$, df = 2, p = 0.336 (NS)	9 (90.0%)	0 (0%)	$\chi^2 = 5.709$, df = 4, p = 0.222 (NS)	10 (100%)	$\chi^2 = 5.926$, df = 2, p = 0.052 (NS)
• 25 – 30 Years	42 (67.7%)		57 (91.9%)	3 (4.8%)		61 (98.4%)	
• >30 Years	17 (73.9%)		18 (78.3%)	4 (17.4%)		20 (87.0%)	
Gender							
• Male	47 (71.2%)	$\chi^2 = 0.14$, df = 1, p = 0.905 (NS)	59 (89.4%)	3 (4.5%)	$\chi^2 = 4.119$, df = 2, p = 0.128 (NS)	64 (97.0%)	$\chi^2 = 0.747$, df = 1, p = 0.338 (NS)
• Female	21 (72.4%)		25 (86.2%)	4 (13.8%)		27 (93.1%)	
Profession							
• Medicine	29 (61.7%)	$\chi^2 = 4.821$, df = 2, p = 0.090 (NS)	42 (89.4%)	4 (8.5%)	$\chi^2 = 7.079$, df = 4, p = 0.132 (NS)	47 (100%)	$\chi^2 = 4.448$, df = 2, p = 0.108 (NS)
• Nursing	37 (80.4%)		41 (89.1%)	2 (4.3%)		42 (91.3%)	
• Allied Health • Sciences	2 (100%)		1 (50.0%)	1 (50.0%)		2 (100%)	
Educational Qualification							
• Diploma	21 (80.8%)	$\chi^2 = 3.077$, df = 2, p = 0.215 (NS)	23 (88.5%)	1 (3.8%)	$\chi^2 = 4.643$, df = 4, p = 0.326 (NS)	25 (96.2%)	$\chi^2 = 1.169$, df = 2, p = 0.557 (NS)

• Undergraduate	27 (62.8%)		40 (93.0%)	3 (7.0%)		42 (97.7%)	
• Postgraduate	20 (76.9%)		21 (80.8%)	3 (11.5%)		24 (92.3%)	
• Professional Experience							
• Less than 6 Months	26 (76.5%)	$\chi^2 = 3.141, df = 4, p = 0.535$ (NS)	30 (88.2%)	2 (5.9%)	$\chi^2 = 10.228, df = 8, p = 0.249$ (NS)	34 (100%)	$\chi^2 = 19.172, df = 4, p = 0.01^{**}$ (S)
• 6 Months – 2 Years	14 (58.3%)		23 (95.8%)	1 (4.2%)		23 (95.8%)	
• 2 – 6 Years	12 (75.0%)		14 (87.5%)	1 (6.3%)		16 (100%)	
• 7 – 10 Years	7 (70.0%)		9 (90.0%)	0 (0%)		7 (70.0%)	
• More than 10 Years	9 (81.8%)		8 (72.7%)	3 (27.3%)		11 (100%)	

DISCUSSION

In order to avoid indwelling urethral catheterization (IUC) and its consequences, including decubitus ulcers, hospital-acquired infections, and protracted usage, a great deal of research and practice guidelines have been developed over many decades. Health care providers' attitudes and actions about catheter-associated urinary tract infections (CAUTIs), the appropriate use of intravenous urea (IUC), and the safe administration of intravenous urea (IUC9) were the primary targets of these interventions. In order to reduce the prevalence of CAUTI, all hospitals should implement stringent infection control protocols(10).The majority of the healthcare providers (65.3% out of 95 total) were older than 30 years old in our current study. Like the study by Assanga et al., this one also had a large proportion of female participants (69.5%).¹⁰ In our study, we had an equal number of medical professionals (doctors and nurses). While 11.6% had over ten years of experience, 45.3% were undergrads(11).Our results show that 71.6% of participants had a good understanding of CAUTI, whereas 28.4% had a mediocre understanding. This discovery was in line with what Jain et al. found.¹¹ More than three quarters of the participants were aware that catheter-associated urinary tract infections (CAUTIs) are among the most common types of hospital-acquired infections and that the length of time a catheter remains in

Place significantly affects the likelihood of infection development(12,13). All individuals involved in the study were well-informed of the need of adhering to stringent aseptic protocols before inserting a catheter. In accordance with Table 3.1, nearly all of the research participants (94%) were aware that elderly patients and females constituted the highest risk category for developing a urinary tract infection (UTI), and they possessed sufficient knowledge of the reasons for undergoing a urinary catheterization. A whopping 92% of those who took part in the study were aware of how to correctly secure the catheter after insertion and how to clean the peri-urethral area using aseptic solution(14,15). Nearly all of the participants (92.6%) had sufficient understanding of the bacteria that cause CAUTI. Research by Jain et al. and Datta P et al.^{11,12} corroborated these results. Since urinary catheter insertion is one of the most fundamental tasks performed by healthcare providers, it is not unexpected that participants exhibited a high degree of knowledge in this area. One key step in preventing catheter-associated urinary tract infections (CAUTIs) is to recall the instructions for inserting the catheter(16–18).Salha et al. corroborated our findings that 88.4% had a somewhat positive attitude and 7.4% had a positive attitude towards CAUTI.¹³ Approximately 56% of those who took part in the study felt that CAUTIs have been less common since receiving training on proper catheter care. The participants in the study all agreed that it is necessary to remove the urinary

catheter with aseptic precautions. Although the CDC no longer recommends screening for asymptomatic bacteriuria in catheterized patients before the procedure, around 55% of participants have come to the conclusion that this is necessary(19,20). Education and training on prevention of bundle care has helped to minimize the occurrence of CAUTI, according to about 56% of the participants. In Table 4, Many issues arise in terms of physical health, social life, and mental health as a result of CAUTI. Therefore, it is critical that all healthcare providers familiar with patients requiring catheterization be up-to-date on the latest standards(21).While 4.2% of participants in our study need additional training and practice sessions to improve their skills in addressing CAUTI, 95.8% had appropriate practice. According to Table 5, the research group was well-versed in the proper way to wash hands before and after dealing with catheters. Following the instructions for catheterization and removal is done by around 86% of the specialists. By keeping the urine bag below the bladder level, periodically emptying it, keeping the drainage system closed, and isolating patients with UTIs, our study participants effectively prevented catheter-associated urinary tract infections (CAUTIs). Both Meneguetti et al. and Parker et al. found the same thing(22,23).According to spearman's correlation at a 2-tailed significance level of $P < 0.01$, there was a relationship between attitude and practice (A-P).According to recent studies, there is a strong correlation ($p < 0.01$) between job experience and actual practice. Knowledge, practice, and attitude were not significantly related to any of the other demographic variables. Professionals have received training to strictly adhere to protocol, which may explain why their approach to CAUTI has improved over time(24–26).It is crucial to establish regulations and guidelines to aid in the prevention of CAUTI, as shown by our study's results. Staffing levels should be adequate, training sessions should be instructional, and supplies should be readily available. It is essential to keep detailed records of all urinary catheter uses, including the reason for the catheterization, the date of placement and removal, and any other relevant information.

CONCLUSION

CAUTI is among the most prevalent healthcare-associated illnesses. In the present study, healthcare workers shown sufficient knowledge, attitudes, and practices for the prevention of CAUTI. Every hospital's infection prevention program must establish, execute, and oversee policies and procedures to reduce infections linked to urinary catheter utilization. Health care institutions must implement medical education programs, interdisciplinary training initiatives, and conduct audits utilizing checklists on catheter care to enhance the knowledge and practices of health care workers.

CONFLICT OF INTEREST: All Authors declare that is no conflict of interest

ETHICAL APPROVAL: Ethical approval was obtained from Superior University IRB/FAHS/ALLIED-HS/10/24/MS/RS-3495

AUTHOR CONTRIBUTION

MA: Conceptualization, study design, and manuscript preparation.

HJ: Data collection, methodology development, and initial drafting of the manuscript.

AW: Statistical analysis, data interpretation, and critical revision of the manuscript.

FH: Literature review and editing of the manuscript.

MS: Data validation, visualization, and final approval of the manuscript.

MT: Supervision, overall coordination, and final editing of the manuscript.

All authors reviewed and approved the final version of the manuscript.

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