

FREQUENCY OF URINARY TRACT INFECTION IN PATIENTS WITH LONG STANDING INDWELLING FOLEY CATHETERS

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ABSTRACT

Background:

Catheter-associated urinary tract infection (CA-UTI) remains one of the most prevalent hospital-acquired infections, particularly in patients with long-term indwelling urinary catheters. The risk of infection increases significantly when catheters remain in situ for more than 30 days.

Objective:

To determine the frequency of urinary tract infection in patients with indwelling Foley catheters for more than 30 days.

Methodology:

This cross-sectional study was carried out in the Department of Urology at Lady Reading Hospital, Peshawar, over six months from **12 December 2024 to 12 June 2025**. A total of **100** patients aged **15–70 years**, with supra-pubic or urethral Foley catheters in place for **>30 days**, were enrolled. Patients with diabetes, immunosuppression, or recent antibiotic use were excluded. Under aseptic conditions, catheter tips were collected and sent for culture and sensitivity. Data were analyzed using SPSS v22.

Results:

Among **100** patients, the frequency of catheter-associated urinary tract infection was found to be **23%**. The majority of infections were caused by Gram-negative organisms. The incidence was higher in elderly patients and in those with prolonged catheterization, although stratification by gender and age did not reveal statistically significant associations ($p > 0.05$).

Conclusion:

CA-UTI is a significant complication in patients with long-standing indwelling Foley catheters. The infection rate of 23% observed in this study is consistent with recent local and international findings.

INTRODUCTION:

Uti, or urinary tract infections, are among the most prevalent bacterial illnesses, affecting around 150 million people globally each year¹. Urinary catheterization is an important

aspect of medical care. Urinary catheters are standard medical gadget used for urinary retention and incontinence, worldwide the most remarkable indwelling catheter related complication is nosocomial urinary tract

infections². Because they operate as a medium for bacterial adhesion and mucosal irritation, urethral catheters can infect the bladder and lead to colonization, which can result in urinary tract infections³. Indwelling urinary catheters are generally considered to be short term if they are in situ for less than 30 days and chronic or long term when in situ for 30 days or more⁴. The term catheter associated urinary tract infection (CA-UTI) is used to refer to individuals with symptomatic infection. Catheter-associated bacteremia accounts for 15% of nosocomial bloodstream infections and is associated with 10% mortality⁵. Infectious problems that are typically found in patients who have a persistent indwelling catheter include prostate gland abscesses, bladder urolithiasis, blockage of the urinary catheter, purulent urethritis, and prostatitis in men. Urinary catheter-related non-infectious consequences include urethral strictures, nonbacterial urethral inflammation, mechanical damage, and decreased mobility⁶. Individuals who are chronically or permanently catheterized are unable to urinate on their own because of bladder outlet blockage or underactive detrusor muscle. Chronic catheterization may also be necessary for those with bedridden patients, neuropathic bladder dysfunction brought on by spinal cord injuries, or severe incontinence in order to enhance their quality of life. Furthermore, the development of catheter associated urinary tract infection (CA-UTI) is independently risked by this long-term catheterization⁷. The prevalence of urinary tract infections among hospitalized patients with indwelling catheters is approximately 15%⁸.

The gold standard for the diagnosis of a urinary tract infection is the detection of the pathogen identified by midstream urine culture⁹. Guidelines for diagnosis of catheter associated urinary tract infection (CA-UTI) include the presence of clinical signs and symptoms, in addition to a positive urine

culture. The Infectious Diseases Society of America (IDSA) defines catheter associated urinary tract infection (CA-UTI) as a positive urine culture ($\geq 1 \times 10^3$ CFU/ml of ≥ 1 bacterial species) combined with signs or symptoms compatible with urinary tract infection (UTI; fever, rigors, altered mental status, malaise or lethargy with no other identified cause, flank pain, costo-vertebral tenderness, acute hematuria, or pelvic discomfort) in the absence of an alternate source of infection. Asymptomatic catheter-associated bacteriuria is defined as a culture containing $> 1 \times 10^5$ CFU/ml of ≥ 1 bacterial species¹⁰.

Although catheter-associated urinary tract infections (CA-UTIs) are garnering increasing attention among healthcare institutions as a health challenge, it can be noted that there is a dearth of evidence pointing specifically to the very-long-term use of indwelling catheters, especially beyond 30 days, in local tertiary care setups in Pakistan. There has been enough evidence obtained globally and regionally regarding short-term catheterization and ICU patients, but there is insufficient

research on the wider range of non-critical patients with chronic catheterization, who might not always be seen by research instruments. Furthermore, much of the available literature is not stratified by age and sex and lacks consistent data regarding CA-UTI prevalence in inpatient wards not outside of intensive care. This would be a great gap in terms of guiding preventive strategies in long-term catheter users. The present study goes to that gap by studying CA-UTI in those with Foley catheters held for over 30 days, adding region-specific evidence to inform clinical decision-making and infection control protocols.

By carrying out this study we can determine the scope of the most prevalent hospital-acquired illness in Pakistan -catheter-associated urinary

tract infection-. This will allow us to focus on routinely replacing indwelling Foley catheters and using external catheters for patients without occlusion of the bladder outlet.

MATERIAL AND METHODS

Study Design:

A Descriptive cross-sectional study design was used in this study

Study Setting:

Urology Department, lady reading hospital MTI Peshawar

Duration Of Study:

6 months

Sample Size:By using WHO sample size calculator

Probability = 15 %⁸

Confidence level = 95 %

Absolute precision required = 7 %

Sample size = 100

Sampling Technique: Non-probability consecutive sampling

Ethical Approval:

This study is conducted after approval by institutional review board LRH/MTI under Ref:No.224/LRH/MTI

INCLUSION CRITERIA:

- Patients aged ≥ 15 years of both genders.
- Patients with supra-pubic or urethral Foley catheter in situ for ≥ 30 days.
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EXCLUSION CRITERIA:

- Patients aged < 15 years.
- Patients with known Diabetes Mellitus (which will be confirmed by blood sugar levels) or any other known Immune-compromised state.
- Patients with supra-pubic or urethral Foley catheter in situ for < 30 days.

SAMPLE COLLECTION

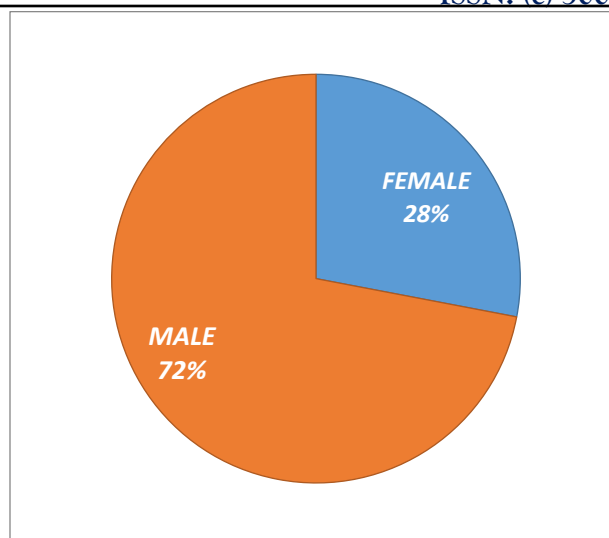
Total 100 patients were selected for the study. After taking informed consent from the patient, the indwelling Foley catheter were changed under aseptic measures and the cut tip end of the Foley catheter removed were secured in a sterilized container. This container were sent for culture and sensitivity. Diabetes Mellitus was ruled out on the basis of previous history and blood sugar levels.

STATISTICAL ANALYSIS

All the data was analyzed using the SPSS v-22. Mean and standard deviation were calculated for all quantitative variables like age. Frequency and percentage were calculated by all qualitative variables like gender and urinary tract infection. Effect modifiers like age and gender were controlled by stratification. Post-stratification chi-square test was applied. P-value < 0.05 was taken as significant

RESULTS

Total 100 patients were enrolled in our study, Mean age was 52.28 years. 72% (n=72) of patients were male and 28% (n=28) were females as shown in figure:1 below.



In our study 27% (n=27) were aged below 50 years whereas 73% (n=73) were aged above 50 years. Mean age was 52.28 years as shown in figure 2 below

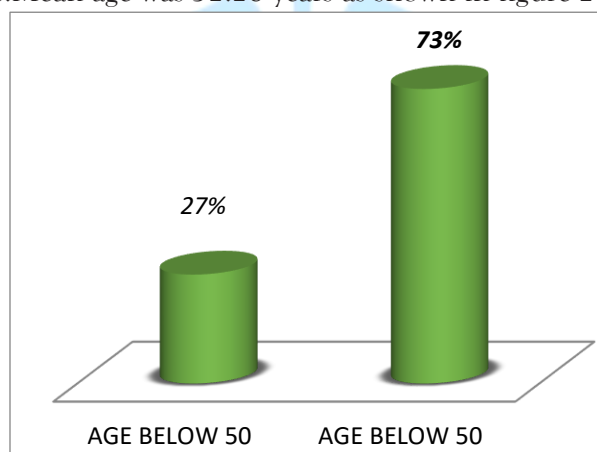
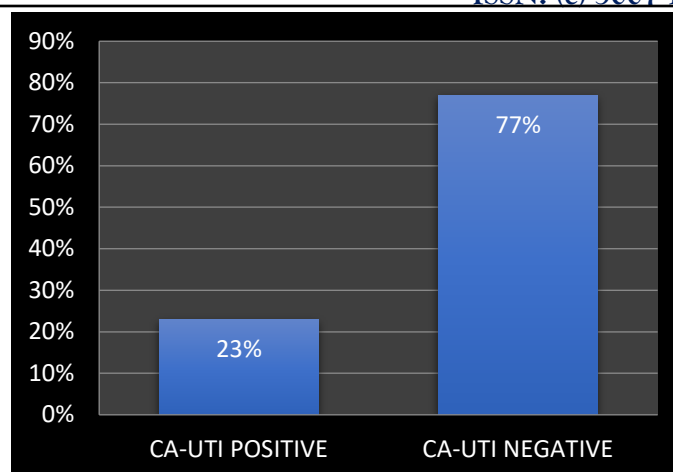


Figure-2. Distribution Of Patients According To Age

In our study 23% of patients having CAUTI In
In our study 23% of patients having CAUTI have
UTI while 77% patients were sterile. Majority of

the patients having CAUTI were aged greater
than 50 years contributing to 94% of the cases.
Majority of the sterile patients were having age
more than 50 years as shown in figure-3 below.



The patients with positive culture, among them 6% were having age >50 and 17% were having

Age >50 years, however the P-value = 0.149 which is statistically non-significant as shown in Table:1

AGE	CA-UTI	P-VALUE
Below 50 years	6%	0.149
Above 50 years	17%	

Table -1

The patients with positive cultures, among them 18% were male and 5% were female.

And, the difference in infection rates between genders was not statistically significant ($p = 0.711$) as shown in Table:2.

GENDER	CA-UTI	P-VALUE
MALE	18%	0.711
FEMALE	5%	

Table-2

DISCUSSION

In our study we witnessed it firsthand, catheterized patients for more than 30 days, some barely able to move, and others dealing with aging and chronic illnesses. The evidence showed that out of 100 such cases, CA-UTI in patients with indwelling Foley catheters for >30 days occurs in 23%. That's nearly 1 in 4. The findings are also suggestive of the emerging trends in regional studies. For instance, a 2024

study from a tertiary hospital in Karachi revealed that among hospitalized patients with long-term catheters, despite having infection control protocols in place, the CA-UTI rate was 27%¹¹. Similarly, CA-UTI frequency of 21.6% have been reported in the Peshawar studies owing to variations in patient comorbidities and hospital wards¹². Similarly another study from

Pakistan by Saifullah et al. (2020) reported that patients with catheterization for more than 20 days had nearly four times the probability of developing UTIs when compared to those having fewer days¹⁸.

CA-UTIs rank among the top hospital-acquired infections throughout the world; an ICU-surveillance study performed in Poland reported an incidence density for CA-UTI cases at 7.1 per 1,000 catheter-days, with *Klebsiella pneumoniae* and *Escherichia coli* as the most frequently identified pathogens¹³. The findings of a 2023 cohort study carried out in China demonstrated that increased risk factors for CA-UTI are long-term catheterization, self-care ability impairment, malnutrition, and advanced age¹⁴. With an odds ratio (OR) of 6.35 for infection among patients with a catheter duration of ≥ 10 days, our finding reinforces the relevance of the 30-day duration discussed in our study. From a wide view in Asia, the INICC study covered 235 ICUs over eight countries, like Pakistan. They saw a common event of catheter-associated urinary tract infection (CAUTI) to be 3.08 for every 1,000 days a tube was used. It matters to note that the risk went up each day the tube was in place (4% more for each new day). Public hospitals and brain care ICU spots were very much at risk. This shows what we see—big public hospitals with many cases and not much room to check again and again, where each extra day with a tube brings more cost. Real work from staff matters too.

In a hospital in Multan, they found good follow-up with CDC rules to stop CAUTI (82% did well), but the rate of CAUTI still hit 60 per 1,000 days with a catheter, much more than what is okay¹⁹. This odd fact shows that even if the rules are clear, problems like not enough staff, not enough time, or not enough stuff can cut down their power—things we know well here too.

Recent systematic reviews have reiterated that majority of catheters undergo colonization

within the period of two or three weeks, especially if maintained for an extended duration without regular replacement and without due regard for hygienic protocols¹⁶. Antimicrobial stewardship is vital not only to avoid unnecessary antibiotics in asymptomatic cases, which may encourage resistance and increase the burden on health services¹⁷.

Recent systematic reviews have also reaffirmed that most catheters become colonized within two to three weeks, particularly when left in situ without regular replacement or proper hygiene protocols¹⁷. Antimicrobial stewardship is crucial, as unnecessary antibiotic use in asymptomatic patients can promote resistance and increase healthcare costs¹⁷.

Overall, our study confirms what has been demonstrated in multiple recent publications: prolonged indwelling catheter use is a major and modifiable risk factor for urinary tract infection^{11, 14}. While male gender and older age showed high frequency of CA-UTI, but neither of both factor showed a statistically significant association, which highlight multifactorial nature of CA-UTI and need for larger stratified studies to explore their potential risks more clearly.

CONCLUSION

The present investigation brings to light a 23% prevalence of CA-UTI in long-term catheters. Thus, these results were consistent with the national and international scientific literature stating that catheterization for more than 30 days increases the risk for infection significantly. The study concludes with

emphasis on clinical symptom-based diagnosis as per current guidelines. With the right preventive strategies, CAUTI burden can be tremendously reduced in tertiary care settings.

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