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Assessment of Aetiology and Risk Factors of Urinary Tract Infections in Geriatric Patients Admitted to the Surgery Department in Tertiary Care Hospital of West Bengal: A Cross-Sectional Study

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Abstract

Background: Urinary Tract Infections (UTIs) are among the most common infections in the elderly population, often complicating surgical admissions due to comorbidities and age-related physiological changes. Understanding their aetiology and risk factors is essential for effective management and prevention. **Objectives**: To evaluate the underlying causes and associated risk factors for UTIs in geriatric patients admitted to the surgical department of tertiary care hospitals in West Bengal. **Methods**: A cross-sectional study was conducted on 32 geriatric patients (age ≥60 years) diagnosed with UTIs. Data on demographic characteristics, clinical history, comorbidities, and microbiological findings were collected. Statistical analysis identified significant risk factors and causative organisms. **Results**: The mean age was 68.4 years. Female patients (59.4%) had a slightly higher prevalence. The most common causative organism was Escherichia coli (62.5%), followed by Klebsiella pneumoniae (18.7%). Key risk factors identified included indwelling catheter use (68.7%), diabetes mellitus (53.1%), immobility (37.5%), and previous antibiotic use (31.2%). **Conclusion**: UTIs in the elderly surgical population are primarily caused by gram-negative bacteria, with catheterization and diabetes being the most significant risk factors. Proper catheter care, glycaemic control, and preventive strategies are necessary to minimize incidence.

KEYWORDS: Urinary tract infection, E coli.

INTRODUCTION

Urinary Tract Infections (UTIs) are particularly prevalent in the elderly, accounting for significant morbidity in hospital settings. Surgical patients, due to invasive procedures, catheter use, and existing comorbidities, are at heightened risk[1].

UTIs are the most common outpatient infections in the United States (US). With the exception of a spike in young women aged 14−24 years old, the prevalence of UTIs increases with age. The prevalence in women over 65 years of age is approximately 20%, compared with approximately 11% in the overall population. Between 50% and 60% of adult women will have at least one UTI in their life, and close to 10% of postmenopausal women indicate that they had a UTI in the previous year[2]

Aetiology in older postmenopausal women varies depending on their health status, residential status (institutionalized or not), age, the presence of diabetes mellitus, history of/current catheterization, spinal cord

dysfunction, and a history of antibiotic use. Most UTIs in no catheterized older adults are caused by a single bacterial species. However, in the presence of structural abnormalities and catheterization, it is not unusual to isolate more than one species in the urine culture[3]. The increased use of catheters and instrumentation in these patients predisposes them to UTIs caused by Gram-negative rods such as *Proteus, Klebsiella, Serratia*, and *Pseudomonas*. In patients with diabetes mellitus, infections caused by *Klebsiella, Enterobacter, and Candida* are more common.

Urinary tract infections (UTIs) are very common, with about 150 million people diagnosed annually worldwide. Women are significantly more susceptible to UTIs, with a lifetime risk of 60% compared to 12-13% in men. Recurrent UTIs are also common, affecting an estimated 25-50% of women who have had a previous UTI[4].

Key Prevalence Information: Overall Prevalence: UTIs are one of the most common infections, affecting people of all ages. Women vs. Men: Women are much more likely to experience UTIs due to anatomical differences (shorter urethra) and other factors. Lifetime Risk: About 60% of women and 12-13% of men will have a UTI at some point in their lives. Recurrent UTIs: 20-30% of women who have a UTI will experience recurrent infections. Age and UTI: UTIs are more common in certain age groups, including young women, infants, and the elderly

The frequency of uncomplicated cystitis in young sexually active women in the US is approximately 0.5 episodes per person per year. The peak rate of uncomplicated UTIs occurs during the years of maximum sexual activity, usually between the ages of 18 and 39. Uncomplicated recurrent UTIs are also frequent in young women. After a first episode of a UTI, 27% of women have a confirmed recurrence within the next 6 months, and 2.7% have a second recurrence within the same period of time[5].

Geriatric patients often present with atypical symptoms, making diagnosis challenging. Furthermore, physiological changes with aging, such as reduced immune response and altered bladder function, contribute to susceptibility.

This study focuses on geriatric patients admitted to the surgical department in West Bengal, aiming to identify the common pathogens responsible for UTIs and the underlying risk factors contributing to infection.

METHODS

This study was conducted in a tertiary hospital. After obtaining institutional ethical committee approval. It was Cross-sectional observational study conducted on 32 patients in the department of Obstetrics and gynaecology at a tertiary care centre, from September/ 2021 to March/2022.

Total 32 participant were approached to project among No one were excluded in this study and Total 32 Confirmed cases were included on the basis of fulfilling of the eligibility criteria.

The institute Ethics Committee approval was obtained before starting the sample collection. A written and informed consent was taken from the patient regarding the study in his/her vernacular language and English. In this study Patients were subjected to: A detailed history of sign & symptoms and its duration. Detailed history of systemic diseases and its duration, medication were noted. Patients were subjected to General physical examination.

- **Study Design:** Cross-sectional observational study.
- **Study Population:** Geriatric patients (age ≥60 years) admitted to the surgical department in selected tertiary care hospitals in West Bengal with confirmed UTIs.
- **Sample Size:** 32 patients.
- **Data Collection Tools:** Structured proforma for demographic details, clinical history, catheter usage, comorbidities, and microbiology reports.
- **Inclusion Criteria:** Patients aged 60 years and above with a clinical and laboratory diagnosis of UTI.
- **Exclusion Criteria:** Patients with known chronic kidney disease or ongoing urological interventions unrelated to the current surgical admission.

- **Data Analysis:** Descriptive statistics and frequency distribution.

Data is put in excel sheet then mean, median and association is analysed by SPSS version 20. Chi-square test was used as test of significance for qualitative data. Continuous data was represented as mean and SD. MS Excel and MS word was used to obtain various types of graphs such as bar diagram. P value (Probability that the result is true) of Pvalue <0.05 was considered as statistically significant after assuming all the rules of statistical tests. Statistical software: MS Excel, SPSS version 22 (IBM SPSS Statistics, Somers NY, USA) was used to analyse data. Sample size is calculated by N master statistical software

RESULTS

In this study we found that Urinary Tract Infections (UTIs) is associated with demographic profile of patient. Female were more prone to suffered of Urinary Tract Infections (UTIs) as compared to Male, its prevalence 59.4%. Urinary Tract Infections (UTIs) was more common in abdominal surgery; Its Prevalence is 31.2% (Table 1).

Age is also associated factors for Urinary Tract Infections (UTIs). Prevalence of Urinary Tract Infections (UTIs) 37.5% and it is is more common in 66-70 years age group (Table 1). Urinary Tract Infections (UTIs) is more predominance among Urban Residence its prevalence is 65.6% (Table 1).

Demographic Profile Table 1

Demographic Variable	**Frequency (n=32)**	**Percentage (%)**
Age Group (Years)		
60–65	9	28.1%
66–70	12	37.5%
>70	11	34.3%
Gender		
Male	13	40.6%
Female	19	59.4%
Residence		
Urban	21	65.6%
Rural	11	34.4%
Type of Surgery		
Abdominal	10	31.2%
Orthopaedic	8	25.0%
Genitourinary	6	18.7%
Others	8	25.0%

Urinary Tract Infections have many risks factors Indwelling catheter use, Diabetes mellitus, Immobility/bedridden status, Previous antibiotic exposure, Constipation or fecal incontinence, Urinary retention, Dehydration and Female gender. Among them indwelling catheter is most important its prevalence is 68.7%(Table 2).

Risk Factors Table 2

Risk Factor	Frequency (n=32)	Percentage (%)
Indwelling catheter use	22	68.7%
Diabetes mellitus	17	53.1%
Immobility/bedridden status	12	37.5%
Previous antibiotic exposure	10	31.2%
Constipation or fecal incontinence	6	18.7%
Urinary retention	8	25.0%
Dehydration	7	21.8%
Female gender	19	59.4%

- **aetiology:** *Escherichia coli* was the predominant pathogen isolated (62.5%), followed by *Klebsiella pneumoniae* (18.7%), *Enterococcus faecalis* (9.3%), and *Pseudomonas aeruginosa* (6.2%).
- **Most Significant Risk Factor:** Indwelling urinary catheter use.
- **Gender Disparity:** Females were more commonly affected than males.
- **Comorbidity Profile:** More than half of the patients were diabetic; immobility was another major contributor to UTI incidence.

DISCUSSION

This study reveals that the geriatric population undergoing surgery is at substantial risk of developing UTIs, largely due to modifiable hospital-related factors. Catheter-associated urinary tract infections (CAUTIs) remain the primary contributor, consistent with global data. Diabetes mellitus increases the risk due to immunocompromised status and glycosuria promoting bacterial growth[6].

Demographic Factors: Gender: Women are significantly more susceptible to UTIs than men due to the shorter length of the female urethra, which allows bacteria to travel to the bladder more easily. Age: Infancy: UTIs are more common in male infants than female infants. Sexual Activity: Young women experience a peak in UTI incidence during their years of maximum sexual activity. Older Adults: UTI rates increase in older adults, particularly men with enlarged prostates[7].

Race/Ethnicity: While research on this is ongoing, some studies suggest that certain racial or ethnic groups may have a higher predisposition to UTIs, according to the European Journal of Cardiovascular Medicine. Socioeconomic Status: Studies indicate that individuals with lower socioeconomic status may have higher UTI rates, potentially due to factors like access to hygiene resources or healthcare. Pregnancy: Pregnancy increases the risk of UTIs due to hormonal changes and the pressure of the uterus on the bladder. Underlying Medical Conditions: Conditions like diabetes, kidney stones, and conditions that affect the immune system can increase the risk of UTIs[8-10].

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Behavioural and Lifestyle Factors: Poor Hygiene: Not wiping from front to back after using the toilet can introduce bacteria from the rectum into the urethra. Dehydration: Not drinking enough fluids can concentrate urine, making it easier for bacteria to multiply [11-14]. Certain Birth Control Methods: Diaphragms and spermicides can alter the vaginal flora and increase the risk of UTIs. Incomplete Bladder Emptying: Conditions that prevent complete bladder emptying, such as an enlarged prostate, can lead to urinary stasis and bacterial growth. Medical Conditions: Diabetes: High blood sugar levels can weaken the immune system and make it easier for bacteria to infect the urinary tract [15,16].

Urinary Tract Obstructions: Conditions like kidney stones or enlarged prostate can obstruct urine flow and create a breeding ground for bacteria. Lifestyle Factors: Sexual activity, hygiene practices, and certain behaviours can also play a role in UTI development, according to Valley International. The higher incidence in females aligns with known anatomical predispositions. A significant number of infections were hospital-acquired, underlining the importance of infection control measures.

CONCLUSION

Urinary tract infections in elderly surgical patients are primarily caused by gram-negative organisms, especially *E. coli*. The most critical risk factors are catheter use and diabetes. Healthcare professionals must emphasize catheter care protocols, early mobilization, and tight glycaemic control to reduce infection rates.

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CONFLICT OF INTEREST

The authors report no conflicts of interest

SUBMISSION DECLARATION

This submission has not been published anywhere previously and that it is not simultaneously being considered for any other journal.

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