e-ISSN: 0975-9506, p-ISSN: 2961-6093

Available online on www.ijpqa.com

International Journal of Pharmaceutical Quality Assurance 2026; 17(4); 124-130

Original Research Article

A Retrospective Assessment of Urinary Tract Infections in Patients Attending the Urology Department

Ravi Kant Singh[1], Mamta Kumari[2]

[1]Assistant Professor, Department of Urology, Netaji Subhas Medical College and Hospital, Bihta, Patna, Bihar, India

[2]Senior Consultant, Matcare Maternity and Child Hospital, Patna, Bihar, India

Received: 10-02-2026 / Revised: 16-03-2026 / Accepted: 22-04-2026

Corresponding Author: Dr. Mamta Kumari

Conflict of interest: Nil

Abstract:

Background: Urinary tract infections (UTIs) are among the most common bacterial infections in clinical practice, with rising antimicrobial resistance complicating their management, particularly in urology settings.

Aim: To retrospectively assess the demographic profile, clinical presentation, microbiological spectrum, and risk factors associated with UTIs in patients attending the urology department.

Methodology: This retrospective observational study was conducted in the Department of Urology at Netaji Subhas Medical College and Hospital, Bihta, Patna over 12 months. A total of 80 adult patients with confirmed UTIs were included. Data were collected from medical records, and urine samples were analyzed using standard microbiological methods. Statistical analysis was performed using descriptive and inferential tools.

Results: The majority of patients were aged ≥60 years (27.50%) with male predominance (57.50%). Dysuria (72.50%) and urinary frequency (65.00%) were the most common symptoms. Escherichia coli (47.50%) was the predominant pathogen, followed by Klebsiella spp. (20.00%). Major risk factors included previous UTI (40.00%), recent antibiotic use (37.50%), and catheterization (35.00%).

Conclusion: UTIs are more prevalent among elderly patients with identifiable risk factors. Early diagnosis, targeted therapy, and antimicrobial stewardship are essential to improve outcomes and limit resistance.

Keywords: Urinary tract infection, Uropathogens, Antimicrobial resistance, Risk factors, Retrospective study.

DOI: 10.25258/ijpqa.17.4.21

Introduction

Urinary tract infection (UTI) stands as the second most prevalent bacterial infection which doctors encounter in both community settings and hospital environments, following respiratory tract infections (RTIs) according to [1]. The condition produces a worldwide healthcare burden because it occurs frequently and people experience repeated outbreaks together with its resulting medical complications. UTIs can develop in people from every age group but their prevalence occurs at higher rates among female patients and elderly individuals plus those who have multiple health conditions. Urological departments treat a major portion of patients who present with urinary tract infections because these infections lead to worsened urological conditions which need detailed assessment and treatment.

The management of UTIs faces increased challenges because antimicrobial resistance (AMR) has emerged and spread throughout the world during the past few years. AMR has been recognized as a major global public health crisis which threatens to disrupt all methods used for treating infectious diseases [2].

The World Health Organization (WHO) defines AMR as a condition where microorganisms including bacteria and viruses and fungi and parasites develop resistance to antimicrobial drugs which results in ongoing infections that spread to others and cause severe health issues and death. The effects of AMR extend beyond hospitals because they result in extended hospital stays and higher healthcare expenses and increased rates of death and illness. The problem of AMR has expanded beyond its previous limits because it now affects both healthcare facilities and community spaces, which results in its impact on infections that originate from the community as well as those that occur within hospitals [3].

The worldwide impact of AMR causes about 700,000 deaths each year and experts predict that without proper treatment methods this death toll will reach 10 million by the year 2050. The rising number of deaths from this disease demonstrates that society needs to establish systems which

3track antibiotic usage while also promoting responsible distribution practices. The rising number of

drug-resistant uropathogens has resulted in scientists grouping bacteria according to their specific resistance characteristics which identify three types of organisms that include multidrug-resistant (MDR) and extensively drug-resistant (XDR) and pan drug-resistant (PDR) organisms [4]. The definition of MDR organisms requires them to show resistance against at least one antimicrobial from three different drug categories while XDR organisms demonstrate resistance against all but one or two drug categories and PDR organisms show resistance against all available antimicrobial substances. The resistance patterns which medical professionals observe through these categories create major difficulties for them when they try to find suitable treatment methods.

Multiple risk elements exist which lead to the progression of UTIs that result from multidrug-resistant organisms (MDROs) [5]. The factors which influence this phenomenon can be divided into two main groups which include demographic factors and clinical factors. The two demographic characteristics that lead to increased UTI risk include advanced age and female sex. The clinical elements which increase UTI risk include all previous cases of UTIs and existing medical conditions which include diabetes mellitus (DM) and dementia and prostate diseases [6]. Certain predisposing factors which lead to resistant infections create a significant increase in infection risk. The risk factors include extended urinary catheterization and hospital admission and nursing home residency and previous antibiotic treatment. The department of urology needs to pay special attention to these factors because its staff performs standard procedures which involve tools and equipment.

The effective clinical management of urinary tract infections requires knowledge about antimicrobial resistance patterns which are found in these infections. The evaluation of resistance rates for hospital-acquired infections and community-acquired infections serves an important purpose because both types of infections display different epidemiological characteristics and resistance patterns. The healthcare system deals with a significant number of resistant infections which affect its operations yet most people in society use antibiotics and this practice leads to increased resistance development [7]. The assessment of these patterns will assist doctors in choosing the correct empirical treatment which will result in better patient outcomes.

Multiple studies have examined the antimicrobial resistance profiles of uropathogens but only a few studies have focused on differentiating between community-acquired and hospital-acquired urinary tract infections. This distinction is clinically relevant because it determines which antibiotics will be used and how long treatment will last and what overall treatment approach will be implemented. The initiation of empirical antibiotic therapy requires local epidemiological data and resistance patterns as critical resources that will guide treatment decisions until culture results become available. The retrospective studies of this field provide essential information about UTI occurrence and its causing pathogens and the resistance patterns that exist in particular medical facilities.

The study needs to the retrospective examination of urinary tract infections which affect patients who visit the urology department at their hospital. The studies help establish clinical treatment standards which lead to better patient care and promote proper use of antibiotics and help create effective methods for infection control. The health system requires ongoing data monitoring and retrospective information assessment to achieve its goals of reducing treatment failures and controlling resistant bacteria while enhancing patient care results.

Methodology

Study Design: The present study was conducted as a retrospective, observational, record-based study. It involved the systematic review and analysis of previously recorded clinical and laboratory data of patients diagnosed with urinary tract infections (UTIs) in the urology department. This design was selected to evaluate the pattern, clinical profile, and microbiological characteristics of UTIs without any direct intervention.

Study Area: The study was carried out in the Department of Urology, Netaji Subhas Medical College and Hospital, Bihta, Patna, Bihar, India from January 2025 to December 2025.

Study Duration: The study was conducted over a period of 12 months from January 2025 to December 2025.

Study Participants

Inclusion Criteria

- Patients diagnosed with urinary tract infection based on clinical and laboratory findings
- Patients of both genders (male and female)
- Patients aged 18 years and above
- Patients with complete medical and laboratory records
- Patients attending or admitted to the urology department during the study period

Exclusion Criteria

- Patients with incomplete or missing medical records
- Patients below 18 years of age
- Patients with suspected but unconfirmed UTI diagnosis
- Patients with duplicate or repeated records (only one record per patient considered)

- Patients with severe comorbid conditions where UTI was not the primary diagnosis

Sample Size: A total of 80 patients were included in the study. The sample size was determined based on the availability of complete and eligible medical records within the defined study duration.

Procedure: Data were collected retrospectively from hospital medical records and laboratory registers maintained in the Department of Urology and Microbiology. Relevant patient information such as demographic details (age, gender), clinical presentation (symptoms like dysuria, frequency, hematuria, fever), past history of UTI, comorbidities, and history of catheterization or urological procedures were recorded. Laboratory data including urine routine examination and urine culture reports were also reviewed. Urinary tract infection was defined clinically based on symptoms such as burning micturition, increased frequency, urgency, lower abdominal pain, and fever, along with laboratory confirmation. Microbiological diagnosis was confirmed through urine culture showing significant bacteriuria ($\geq 10^5$ colony-forming units per milliliter of urine). Clean-catch midstream urine samples and catheterized urine samples were considered for analysis.

All urine samples were processed in the microbiology laboratory using standard procedures. Samples were cultured on appropriate media such as Blood agar and MacConkey agar and incubated under suitable conditions. Identification of organisms was done using standard microbiological techniques including Gram staining and biochemical tests. Antibiotic susceptibility testing was performed using the disc diffusion method following Clinical and Laboratory Standards Institute (CLSI) guidelines. For patients with multiple urine culture reports, only the most recent report with complete data was included in the study to avoid duplication. Data confidentiality was strictly maintained throughout the study.

Statistical Analysis: The collected data were entered into Microsoft Excel and analyzed using IBM SPSS software version 27.0. Descriptive statistics were used to summarize the data. Categorical variables were expressed as frequencies and percentages, while continuous variables were presented as mean and standard deviation. Appropriate statistical tests such as the Chi-square test were applied to assess associations between variables. A p-value of less than 0.05 was considered statistically significant.

Result

Table 1 shows the age-wise distribution of patients included in the study (n = 80). The majority of patients belonged to the ≥60 years age group, accounting for 22 cases (27.50%), indicating that the highest proportion of cases was observed among the elderly population. This was followed by the 50–59 years age group with 18 patients (22.50%), and the 40–49 years group with 16 patients (20.00%), reflecting a gradual increase in patient frequency with advancing age. The 30–39 years age group contributed 14 cases (17.50%), while the lowest number of patients was recorded in the 18–29 years group with 10 cases (12.50%). Overall, the distribution demonstrates a clear trend of increasing prevalence with age, suggesting that the condition under study is more common in older individuals.

Table 1: Age-wise Distribution of Patients (n = 80)

Age Group (years)	Number of Patients	Percentage (%)
18–29	10	12.50%
30–39	14	17.50%
40–49	16	20.00%
50–59	18	22.50%
≥60	22	27.50%
Total	**80**	**100%**

Table 2 shows the gender distribution of patients included in the study (n = 80). The majority of patients were male, accounting for 46 cases (57.50%), while female patients constituted 34 cases (42.50%). This indicates a higher prevalence of the condition among males compared to females in the studied population. The difference in distribution suggests that gender may play a role in the occurrence or reporting of the condition, with males being more commonly affected. However, a substantial proportion of female patients was also observed, highlighting that the condition is prevalent in both genders. Overall, the findings demonstrate a moderate male predominance in the study sample.

Table 2: Gender Distribution of Patients

Gender	Number of Patients	Percentage (%)
Male	46	57.50%
Female	34	42.50%
Total	**80**	**100%**

Table 3 shows the clinical presentation of UTI patients, highlighting that dysuria was the most common symptom, reported in 58 patients (72.50%), indicating it as a major presenting complaint among cases. This was followed by increased frequency of urination in 52 patients (65.00%), suggesting significant lower urinary tract irritation. Lower abdominal pain was observed in 40 patients (50.00%), reflecting associated discomfort and inflammation. Fever was present in 36 patients (45.00%), indicating that a considerable proportion of patients had systemic involvement. Hematuria was the least common symptom, reported in 18 patients (22.50%), suggesting that visible blood in urine occurred in a smaller subset of cases. Overall, irritative urinary symptoms were more predominant than systemic or severe manifestations.

Table 3: Clinical Presentation of UTI Patients

Symptoms	Number of Patients	Percentage (%)
Dysuria	58	72.50%
Frequency of urination	52	65.00%
Fever	36	45.00%
Hematuria	18	22.50%
Lower abdominal pain	40	50.00%

Table 4 shows the distribution of microorganisms isolated in urine culture among the study population (n = 80). The most predominant organism identified was Escherichia coli, accounting for 38 isolates (47.50%), indicating its major role as the leading causative agent of urinary tract infections. This was followed by Klebsiella spp. with 16 isolates (20.00%), representing the second most common pathogen. Pseudomonas aeruginosa contributed to 10 cases (12.50%), suggesting a notable presence, particularly in complicated or hospital-acquired infections. Additionally, Gram-positive organisms such as Staphylococcus aureus and Enterococcus spp. were isolated in 8 cases each (10.00%), reflecting their comparatively lower but significant contribution. Overall, the findings highlight a predominance of Gram-negative bacteria, especially E. coli, in urinary tract infections within the study group.

Table 4: Microorganisms Isolated in Urine Culture

Organism	Number of Isolates	Percentage (%)
Escherichia coli	38	47.50%
Klebsiella spp.	16	20.00%
Pseudomonas aeruginosa	10	12.50%
Staphylococcus aureus	8	10.00%
Enterococcus spp.	8	10.00%
Total	**80**	**100%**

Table 5 shows the distribution of risk factors associated with urinary tract infection (UTI) among the study participants. The most common risk factor observed was a history of previous UTI within the last one year, reported in 32 patients (40.00%), indicating a strong tendency for recurrence. This was followed by recent antibiotic use in 30 patients (37.50%), which may contribute to antimicrobial resistance and predispose individuals to infection. A history of catheterization was noted in 28 patients (35.00%), highlighting its significant role in increasing UTI risk due to possible introduction of pathogens. Diabetes mellitus was present in 26 patients (32.50%), suggesting its contribution through impaired immunity and glycosuria. Structural urinary abnormalities were the least common risk factor, observed in 14 patients (17.50%), yet still important as they can facilitate urinary stasis and infection. Overall, the findings indicate that both clinical history and underlying conditions play a crucial role in the occurrence of UTIs.

Table 5: Risk Factors Associated with UTI

Risk Factor	Number of Patients	Percentage (%)
History of catheterization	28	35.00%
Previous UTI (last 1 year)	32	40.00%
Diabetes mellitus	26	32.50%
Recent antibiotic use	30	37.50%
Structural urinary abnormalities	14	17.50%

Discussion

The study results were analyzed through existing research to find common aspects and different aspects

which show how urinary tract infections (UTIs) spread and how they affect patients. Our research demonstrated that UTI occurrence gets determined by aging because 27.50% of our elderly patient group aged 60 years and older. The research conducted by Khawcharoenporn et al. (2013) [8] showed that older adults developed infections at higher rates because they had more medical conditions and spent more time in hospitals. The research by Adam et al. (2013) [9] showed that elderly patients developed UTIs at higher rates and displayed more resistance to antimicrobial drugs. The two similar things demonstrate that older people develop urinary tract infections because their bodies weaken and they' experience urine retention and they need to visit hospitals frequently.

The current study found 'that males were more common than females because 57.50% of the participants identified as male, which creates a pattern that contradicts established epidemiological patterns that show women as the primary affected group. The research conducted by Ma and Wang (2013) [10] demonstrated similar results when they found that male patients outnumbered female patients who suffered from urological disorders that included benign prostatic hyperplasia and obstructive uropathy. The research conducted by Akram et al. (2007) [11] demonstrated that female patients experienced higher rates of the condition because the study location had a major impact on how researchers identified male and female participants. The results obtained from our research match the findings of hospital-based urology studies while they show different outcomes when we compare them to community-based disease research.

The most frequently observed symptoms in our study occurred through dysuria which affected 72.50% of participants and through increased urination frequency which affected 65.00% of participants. Foxman (2010) [12] found that dysuria and urinary frequency serve as the main symptoms which occur in more than 70% of UTI cases. Gupta et al. (2014) [13] found that approximately 68% of patients experienced dysuria while 60% of patients had urinary frequency, which closely matched our findings. Our research showed that fever occurred in 45.00% of cases and lower abdominal pain happened in 50.00% of cases, which showed that patients experienced both lower and upper urinary tract problems together with the findings from Kengne et al. (2017) [14]. The symptom profile in our study shows strong similarity to previous studies which establish UTI clinical features as established medical knowledge.

Escherichia coli was the main pathogen in our research because it accounted for 47.50% of cases while Klebsiella spp. and Pseudomonas aeruginosa followed with respective rates of' 20.00% and 12.50%. The 'results align with the findings from several earlier research investigations. Kengne et al. (2017) found that E. coli appeared in 53.3% of their cases while Akram et al. (2007) reported E. coli presence in 50–60% of their analyzed samples. The research conducted by Khawcharoenporn et al. (2012) [15] found that Klebsiella spp. represented approximately 21% of their isolates which matches our research results. Tessema et al. (2007) [16] reported that Staphylococcus species constituted the second most common isolate which conflicts with our findings. The geographical context and the patient group and the methods used for diagnosis created these differences in research results. The studies show that E. coli which belongs to the Gram-negative bacteria group continues to be the main pathogen found in infections.

The study identified three main risk factors which included past UTI history at 40.00%, current antibiotic consumption at 37.50%, and catheterization at 35.00% as the most critical risk factors. The results from this study confirmed previous research findings. Khawcharoenporn et al. (2013) showed that prior antibiotic use together with recurrent UTI conditions served as the two most important predictors for both infection development and antimicrobial resistance. The diabetes mellitus rate in our research study stands at 32.50%, which matches the findings of Gupta et al. (2014) who discovered that diabetes existed in roughly 30% of' their total cases, which resulted in increased vulnerability because of 'reduced immune function and glycosuria.

The study found structural urinary abnormalities in 17.50% of participants which shows lower rates compared to certain studies that reported higher rates according to Nicoletti et al. (2010) [17] who found obstructive uropathy as a main cause. The two groups show different results because they used different methods to choose their patients and diagnose their conditions. The study found that catheterization played a role in 35.00% of cases which matched the findings from Ikram et al. (2015) [18] because they showed that invasive procedures create a greater possibility of infection by facilitating biofilm development and direct microbial contact with patients.

The comparison between our research results and earlier studies shows that our results show high consistency with age distribution patterns and clinical presentation characteristics and microbiological profiles. The study results show different patterns because of three factors which include geographical location and institutional settings and research techniques. The study results demonstrate strong links between modifiable risk factors which include antibiotic use and catheterization with the need for better infection control methods and improved antimicrobial stewardship practices. The study shows that existing evidence from our research together with

our regional study results establishes the UTI burden and its risk factors among urology patients.

Conclusion

The present retrospective study highlights that urinary tract infections are more prevalent among elderly patients, with a moderate male predominance in a urology-based setting. Dysuria and increased urinary frequency were the most common clinical features, reflecting typical lower urinary tract involvement. Microbiological analysis confirmed Escherichia coli as the predominant pathogen, followed by other Gram-negative organisms, emphasizing their major role in UTIs. Key risk factors such as previous UTI, recent antibiotic use, catheterization, and diabetes mellitus significantly contributed to infection occurrence. These findings underline the importance of early diagnosis, identification of risk factors, and appropriate antimicrobial selection. Continuous surveillance and rational antibiotic use are essential to reduce recurrence, prevent complications, and combat the growing challenge of antimicrobial resistance in urological practice.

References

1. Seifu WD, Gebissa AD. Prevalence and antibiotic susceptibility of Uropathogens from cases of urinary tract infections (UTI) in Shashemene referral hospital, Ethiopia. BMC infectious diseases. 2018 Jan 10;18(1):30.
2. Bloom DE, Cadarette D. Infectious disease threats in the twenty-first century: strengthening the global response. Frontiers in immunology. 2019 Mar 28;10:549.
3. Horcajada JP, Shaw E, Padilla B, Pintado V, Calbo E, Benito N, Gamallo R, Gozalo M, Rodríguez-Baño J. Healthcare-associated, community-acquired and hospital-acquired bacteraemic urinary tract infections in hospitalized patients: a prospective multicentre cohort study in the era of antimicrobial resistance. Clinical microbiology and infection. 2013 Oct 1;19(10):962-8.
4. Bajpai T, Bhatambare G, Pandey M, Varma M. Prevalence of multi, extensively and pan drug resistant uropathogens among the women patients visiting a tertiary care hospital in central India. International Journal of Health System and Disaster Management. 2014 Jan 1;2(1):38-.
5. Mahony M, McMullan B, Brown J, Kennedy SE. Multidrug-resistant organisms in urinary tract infections in children. Pediatric Nephrology. 2020 Sep;35(9):1563-73.
6. Nabi T. Clinical profile and risk factors of recurrent urinary tract infection in patients with type 2 diabetes. International Journal of Academic Medicine. 2020 Oct 1;6(4):301-8.
7. Serwecińska L. Antimicrobials and antibiotic-resistant bacteria: a risk to the environment and to public health. Water. 2020 Nov 25;12(12):3313.
8. Khawcharoenporn, T., Vasoo, S., & Singh, K. (2013). Urinary tract infections due to multi-drug-resistant Enterobacteriaceae: prevalence and risk factors.
9. Adam HJ, Baxter MR, Davidson RJ, Rubinstein E, Fanella S, Karlowsky JA, Lagace-Wiens PR, Hoban DJ, Zhanel GG, Canadian Antimicrobial Resistance Alliance (CARA), Zhanel GG. Comparison of pathogens and their antimicrobial resistance patterns in paediatric, adult and elderly patients in Canadian hospitals. Journal of Antimicrobial Chemotherapy. 2013 May 1;68(suppl_1):i31-7.
10. Ma KL, Wang CX. Analysis of the spectrum and antibiotic resistance of uropathogens in vitro: Results based on a retrospective study from a tertiary hospital. American journal of infection control. 2013 Jul 1;41(7):601-6.
11. Akram M, Shahid M, Khan AU. Etiology and antibiotic resistance patterns of community-acquired urinary tract infections in JNMC Hospital Aligarh, India. Annals of clinical microbiology and antimicrobials. 2007 Jan;6(1):4.
12. Foxman B. Epidemiology of urinary tract infections: incidence, morbidity, and economic costs. The American journal of medicine. 2002 Jul 8;113(1):5-13.
13. Gupta S, Kapur S, Padmavathi DV. Comparative prevalence of antimicrobial resistance in community-acquired urinary tract infection cases from representative States of northern and southern India. Journal of clinical and diagnostic research: JCDR. 2014 Sep 20;8(9):DC09.
14. Kengne M, Dounia AT, Nwobegahay JM. Bacteriological profile and antimicrobial susceptibility patterns of urine culture isolates from patients in Ndjamena, Chad. The Pan African medical journal. 2017 Nov 23;28:258.
15. Khawcharoenporn T, Vasoo S, Ward E, Singh K. High rates of quinolone resistance among urinary tract infections in the ED. The American journal of emergency medicine. 2012 Jan 1;30(1):68-74.
16. Tessema B, Kassu A, Mulu A, Yismaw G. Pridominant isolates of urinary tract pathogens and their antimicrobial susceptiblity patterns in Gondar University Teaching Hospital, nothwest Ethiopia. Ethiopian medical journal. 2007 Jan 1;45(1):61-7.
17. Nicoletti J, Kuster S, Sulser T, Ledergerber B. Risk factors for urinary tract infections due to ciprofloxacin-resistant Escherichia coli in a tertiary care urology department in Switzerland. Swiss medical weekly. 2010 Jul 5;140(2728):w13059-.
18. Ikram R, Psutka R, Carter A, Priest P. An outbreak of multi-drug resistant Escherichia coli urinary tract infection in an elderly population:

a case-control study of risk factors. BMC infectious diseases. 2015 Jun 9;15(1):224.