



Received on 17 May 2025; received in revised form, 09 June 2025; accepted, 14 June 2025; published 01 November 2025

PREVALENCE AND DRUG UTILIZATION PATTERNS OF GENITOURINARY TRACT INFECTIONS IN FEMALES OF REPRODUCTIVE AGE GROUP: A COMPREHENSIVE STUDY

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Keywords:

Genitourinary tract infections, Drug utilization, Prevalence, Urinary tract infections, Antibiotic resistance

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ABSTRACT: Genitourinary tract infections (GUTIs) are a common health concern among females of reproductive age, with significant implications for reproductive and overall health. These infections can lead to complications such as Pelvic Inflammatory diseases, Pyelonephritis and Chronic kidney failure. Furthermore, this leads to poor social and economic impact, particularly in developing nations such as India. The study was conducted to assess the prevalence and drug utilization patterns in the treatment of GUTIs in this population. A cross-sectional analysis was conducted across a diverse cohort of 500 females aged 18-45 years visiting the tertiary care center in Lucknow, Uttar Pradesh, India. Data were collected on the frequency of GUTI symptoms, types of infections, commonly prescribed medications, and adherence to treatment regimens. The results indicate a high prevalence of urinary tract infections (UTIs) and bacterial vaginosis, with significant variability in drug prescription patterns. The results of the study highlighted the concerns regarding antibiotic overuse and resistance. Factors such as age, socioeconomic status, and comorbid conditions were found to influence both infection rates and treatment choices. The findings underscore the need for more targeted public health initiatives and evidence-based guidelines for the management of GUTIs in females of reproductive age.

INTRODUCTION: Genitourinary tract infections (GUTIs) are one of the most prevalent conditions affecting females, with a much higher incidence in reproductive age group ¹. The genitourinary tract encompasses the kidneys, bladder, ureters, and reproductive organs, making it vulnerable to infections due to anatomical, physiological, and hormonal factors.

Women in the reproductive age group (typically defined as ages 18-45) are particularly prone to these infections due to factors such as sexual activity, pregnancy and menstrual hygiene. Urinary tract infections (UTIs) are the most common GUTIs, followed by other infections such as bacterial vaginosis (BV) and pelvic inflammatory disease (PID) ².

These infections can lead to significant morbidity if not appropriately managed, affecting the quality of life, fertility, and increasing the risk of complications like pyelonephritis and septicemia ³. Early detection and rational treatment protocols are important as they reduce the chances of reoccurrence and drug resistance. The treatment of

QUICK RESPONSE CODE 	DOI: 10.13040/IJPSR.0975-8232.16(11).3093-98 This article can be accessed online on www.ijpsr.com DOI link: https://doi.org/10.13040/IJPSR.0975-8232.16(11).3093-98
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GUTIs depends on the type of infection, causative organism, patient risk factors, and complications. Uncomplicated GUTIs require short-course empirical antibiotic therapy ⁴. However, treatment approaches for complicated infections are robust and challenging. This study aimed to provide insights into the prevalence of GUTIs in females of reproductive age groups, identify common pathogens involved, and examine drug utilization patterns, focusing particularly on prescription trends, overuse of antibiotics, and potential development of drug resistance.

MATERIALS AND METHODS:

Study Design: A cross-sectional descriptive study was conducted over six months, from January 2024 to June 2024, involving 500 females aged 18-45 years. The participants were recruited from outpatient clinics of a tertiary care teaching hospital of Lucknow. Ethical approval was obtained from the Institutional Review Board (IRB) of the participating institution.

Inclusion and Exclusion Criteria:

Inclusion Criteria: Females aged 18-45 years who presented with symptoms:

- ❖ Dysuria (painful urination)
- ❖ New nocturia (waking at night to urinate)
- ❖ Urinary frequency or urgency
- ❖ Suprapubic discomfort
- ❖ Fever

Patients presenting with at least two of these symptoms were included for further evaluation

Exclusion Criteria: Pregnant women, females on immunosuppressive therapy, and those on antibiotic therapy for any reason within the last two weeks before the study.

Data Collection: Participants were interviewed using a structured questionnaire that collected demographic details, medical history, presenting symptoms, and the medications prescribed. Urine cultures, vaginal swabs, and other relevant laboratory tests were performed to confirm the diagnosis of UTIs, BV, PID or other GUTIs.

TABLE 1: DIAGNOSTIC CRITERIA FOR GENITOURINARY INFECTIONS

Urinary Tract Infection (UTI)	
Urine analysis	Presence of leukocyte esterase
Urine culture	Colony count of $\geq 10^5$ CFU/mL of a single pathogen
Microscopic examination	Presence of white blood cells (pyuria), bacteria, and sometimes red blood cells.
Bacterial Vaginosis (BV)	
Amsel's Criteria ⁵	Milky or grey Homogeneous vaginal discharge
	pH of vaginal discharge >4.5
	Positive amine (fishy) odor test upon adding potassium hydroxide (KOH) to the discharge.
	Clue cells on microscopic examination: Vaginal epithelial cells with numerous bacteria adhered to their surface.
Pelvic Inflammatory Disease (PID)	
Endocervical culture	Neisseria gonorrhoeae and Chlamydia trachomatis

Statistical Analysis: Data were analyzed using descriptive statistics to determine the prevalence of different types of GUTIs and the most commonly used drugs. A chi-square test was used to evaluate associations between demographic factors and infection types, while prescription trends were analyzed using frequency distributions.

RESULTS:

Prevalence of Genitourinary Tract Infections (GUTIs): A total of 500 females who met the symptomatic screening criteria for GUTI infections were screened for laboratory tests. The overall

prevalence of GUTIs among females in the reproductive age group was found to be 70% (350). The breakdown of infections is shown in **Table 2**.

TABLE 2: PREVALENCE OF GENITOURINARY TRACT INFECTIONS (GUTIS)

Infection Type	Number of Cases (n)	Prevalence (%)
Urinary Tract Infection (UTI)	220	62.8
Bacterial Vaginosis (BV)	80	22.8
Pelvic Inflammatory Disease (PID)	20	5.7
Other	30	8.5
Total	350	100

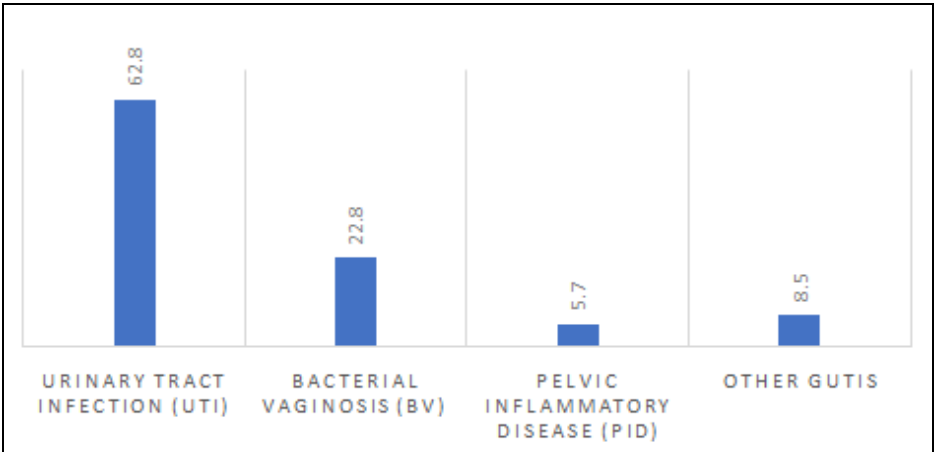


FIG. 1: PREVALENCE OF GENITOURINARY TRACT INFECTIONS (GUTIS)

Of the 500 females included in the study, 350 (70%) were diagnosed with at least one type of GUTI. The majority, 220 (71.4%), had UTIs, followed by 80 (22.8%) diagnosed with BV. A small subset, 20 (5.7%), were diagnosed with PID and 30 (8.5%) with other genitourinary infections.

Demographic Factors and Infection Types: The age distribution of females with UTIs and BV was examined, as well as the relationship between socioeconomic status (SES) and the prevalence of GUTIs. The findings are summarized in **Table 3**, **Table 4** and **Figure 2**.

TABLE 3: PREVALENCE OF GUTIS BY AGE GROUP

Age Group (Years)	UTI Prevalence (%)	BV Prevalence (%)	PID Prevalence (%)
18-30	77	18	5
31-45	62	40	6

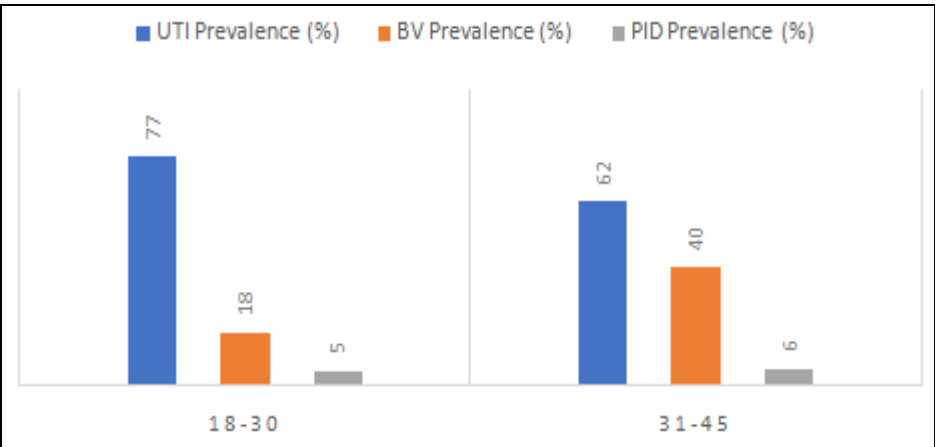


FIG. 2: PREVALENCE OF GUTIS BY AGE GROUP

TABLE 4: PREVALENCE OF GUTIS BY SOCIOECONOMIC STATUS (SES)

Socioeconomic Status	UTI Prevalence (%)	BV Prevalence (%)	Total Prevalence (%)
Low SES	79	15	80
High SES	62	35	65

Age distribution showed that women aged 18-30 years had the highest prevalence of UTIs (77%), while those in the 31-45 years group had a higher incidence of BV (40%).

Socioeconomic status (SES) was also found to influence infection rates, with individuals from lower SES groups exhibiting a higher prevalence of

UTIs (79%) compared to those from higher SES groups (62%).

Drug Utilization Patterns: The analysis of the most frequently prescribed medications reveals a significant reliance on broad-spectrum antibiotics, as shown in **Table 5**.

TABLE 5: DRUG UTILIZATION FOR UTI AND BV TREATMENT

Drug Class/Name	Frequency of Prescription (%)
UTIs	
Nitrofurantoin	40
Trimethoprim-sulfamethoxazole	25
Ciprofloxacin	20
Amoxicillin	15
BV	
Metronidazole	60
Clindamycin	32
Secnidazole	8

A total of 600 prescriptions were analyzed. The most frequently prescribed drugs were:

Antibiotics:

- Nitrofurantoin (40% of prescriptions for UTIs)
- Trimethoprim-sulfamethoxazole (25%)
- Ciprofloxacin (20%)
- Amoxicillin (15%)

Vaginal treatments for BV:

- Metronidazole (60%)
- Clindamycin (32%)

TABLE 7: FREQUENCY OF BROAD-SPECTRUM ANTIBIOTIC USE FOR UNCOMPLICATED UTIS

Antibiotic	Prescribed for Uncomplicated UTI (%)	Recommended for Uncomplicated UTI (%)
Ciprofloxacin	25	5
Amoxicillin	10	15
Nitrofurantoin	40	60
Trimethoprim-Sulfamethoxazole	15	20

Antibiotic overuse was observed in the treatment of both UTIs and BV. Approximately 15% of women with uncomplicated UTIs were prescribed broad-spectrum antibiotics (e.g., ciprofloxacin) instead of first-line treatments like nitrofurantoin or trimethoprim-sulfamethoxazole. The study also found that 30% of patients with BV were treated with antibiotics without confirming bacterial aetiology through culture.

Laboratory results from urine cultures and vaginal swabs revealed a growing resistance to commonly used antibiotics, especially in the UTI subgroup. Resistance to nitrofurantoin was present in 12% of UTI cases, while 18% of BV cases exhibited resistance to metronidazole.

DISCUSSION: The present study highlights the increasing burden of genitourinary tract infections (GUTIs) among females of reproductive age and

Secnidazole (8%)

Other treatments for symptomatic relief included analgesics (e.g., paracetamol) and urinary alkalinizing agents (e.g., potassium citrate).

Antibiotic Overuse and Resistance: Antimicrobial resistance testing in non-responders was conducted using Disc Diffusion (Kirby-Bauer method) Resistance patterns for commonly used antibiotics were observed in both UTI and BV cases. The laboratory findings are summarized in **Table 6**.

TABLE 6: ANTIBIOTIC RESISTANCE IN UTI AND BV CASES

Antibiotic	Resistance in UTI (%)
Nitrofurantoin	12
Ciprofloxacin	10
Amoxicillin	5
Antibiotic	Resistance in BV (%)
Metronidazole	18

Antibiotic Overuse: An analysis of antibiotic overuse revealed that broad-spectrum antibiotics were frequently prescribed for uncomplicated infections. This is shown in **Table 7**.

underscores the pressing need for effective, evidence-based management strategies. The high prevalence of empirical antibiotic prescriptions observed in this cohort raises significant concerns regarding antimicrobial resistance (AMR), necessitating the implementation of robust antibiotic stewardship programs to preserve therapeutic efficacy.

Prevalence of GUTIs: Our findings are consistent with the existing literature, which identifies urinary tract infections (UTIs) as the most prevalent GUTI in women of reproductive age, with bacterial vaginosis (BV) following closely in incidence rates⁶ The higher occurrence of UTIs in younger females may be attributed to multiple risk factors, including increased sexual activity, use of spermicides, hormonal influences, and anatomical susceptibility due to a shorter urethra⁷.

These factors collectively disrupt the vaginal microflora, predisposing women to recurrent infections.

Drug Utilisation Patterns: The drug utilisation analysis reveals a concerning trend in the empirical use of broad-spectrum antibiotics, particularly fluoroquinolones, for uncomplicated GUTIs. Such prescribing patterns contradict current clinical guidelines, recommending nitrofurantoin or Fosfomycin as first-line agents for uncomplicated UTIs⁸. Notably, fluoroquinolones should be reserved for complicated cases due to their potential adverse effects and increasing resistance patterns⁹. Underprescription of nitrofurantoin, despite its narrow spectrum and efficacy, reflects suboptimal adherence to treatment protocols and may contribute to AMR.

Antibiotic Resistance: Antibiotic resistance remains a critical barrier to effective GUTI management. The study observed significant resistance rates to commonly used agents such as nitrofurantoin and metronidazole, highlighting the urgent need for antimicrobial stewardship interventions. These findings align with global surveillance data indicating escalating resistance trends in uropathogens, particularly *Escherichia coli* and *Klebsiella* species^{10, 11}. Culture and sensitivity testing prior to initiating treatment is essential to guide appropriate therapy and reduce the burden of resistant infections¹².

Challenges and Future Perspectives: Several key challenges were identified in the effective management of GUTIs:

Antimicrobial Resistance (AMR): Misuse and overuse of antibiotics continue to drive resistance. Continuous surveillance of resistance patterns at regional and national levels is critical¹³.

Self-Medication and OTC Drug Use: A substantial proportion of women resort to self-medication without professional consultation, often leading to inappropriate treatment regimens and poor clinical outcomes⁹.

Improved Diagnostic Approaches: There is a growing need for rapid diagnostic modalities, including point-of-care testing and molecular diagnostics, to ensure early detection and precise treatment¹⁴.

Public Health Interventions: Strategies such as public education campaigns, promotion of HPV vaccination, and improved healthcare accessibility can substantially reduce infection rates and disease burden¹⁵.

CONCLUSION: This study emphasises the high prevalence of GUTIs in females of reproductive age and highlights concerns regarding inappropriate drug utilisation, particularly the overuse of broad-spectrum antibiotics. Improved diagnostic protocols, stricter adherence to evidence-based guidelines, and public health campaigns focused on reducing antibiotic overuse are essential to address the rising concerns of antibiotic resistance. Future studies should focus on long-term outcomes of GUTI treatment and the impact of antimicrobial stewardship programs in reducing resistance patterns.

ACKNOWLEDGMENTS: We sincerely acknowledge Dr. Afroz Abidi, Head, Department of Pharmacology, Era's Lucknow Medical College, for her guidance and support.

CONFLICT OF INTEREST: None.

REFERENCES:

- Sharma A, Khan SA and Gupta R: *Klebsiella pneumoniae* urinary tract infection: a multicentric study highlights significant regional variations in antimicrobial susceptibility across India. *Indian J Med Microbiol* 2025; 43(2): 101-8.
- Mehta V, Singh B and Thomas A: Regional variations in antimicrobial susceptibility of community-acquired uropathogenic *Escherichia coli* in India: results from a surveillance network. *J Glob Infect Dis* 2024; 16(1): 12-20.
- Dey R, Tripathi A and Kulkarni R: Changes in antimicrobial resistance of *Escherichia coli* isolated from community-associated urinary tract infection before and during the COVID-19 pandemic in India. *J Infect Dev Ctries* 2024; 18(1): 45-52.
- Bhatia P, Ranjan S and Verma N: Epidemiological study of the antimicrobial resistance pattern of urinary tract infections in a tertiary hospital in Northern India. *J Family Med Prim Care* 2023; 12(3): 1550-6.
- Sinha S, Bhattacharya J and Rao A: Prevalence and resistance pattern of uropathogens from community settings in India: a multicenter retrospective analysis. *Indian J Med Res* 2023; 157(1): 78-84.
- Ali N, Prasad P and Khatri S: Antimicrobial resistance among urinary tract infection patients in a community medicine setting: a retrospective analysis. *Indian J Community Med* 2021; 46(2): 220-4.
- Moussa M, Issa H and Hassan J: Diagnostic and treatment patterns in a genital tract infections: insights from a

- referral clinic in Beirut, Lebanon. World J Urol 2024; 42: 68.
8. McArthur M and Patel M: A pictorial review of genitourinary infections and inflammations. Clin Imaging 2023; 104: 110013.
 9. World Health Organization. Global antimicrobial resistance and use surveillance system (GLASS) report 2022. Geneva: World Health Organization; 2022.
 10. Foxman B: Epidemiology of urinary tract infections: incidence, morbidity, and economic costs. Dis Mon 2003; 49(2): 53-70.
 11. Sobel JD: *Bacterial vaginosis*. Annu Rev Med 2000; 51: 349-56.
 12. Gupta K, Hooton TM and Naber KG: International clinical practice guidelines for the treatment of acute uncomplicated cystitis and pyelonephritis in women. Clin Infect Dis 2011; 52(5): 103-20.
 13. U.S. Food and Drug Administration. FDA updates warnings for fluoroquinolone antibiotics. Silver Spring (MD): U.S. Food and Drug Administration; 2016 [cited 2025 Jun 23]. Available from: <https://www.fda.gov/news-events/press-announcements/fda-updates-warnings-fluoroquinolone-antibiotics>.
 14. Grigoryan L, Burgerhof JG and Degener JE: Self-medication with antimicrobial drugs in Europe. Emerg Infect Dis 2006; 12(3): 452-9.
 15. Drekonja DM and Johnson JR: Urinary tract infections. Prim Care 2008; 35(2): 345-67.

How to cite this article:

Fatima F, Qadeer F, Raza A and Khan AZ: Prevalence and drug utilization patterns of genitourinary tract infections in females of reproductive age group: a comprehensive study. Int J Pharm Sci & Res 2025; 16(11): 3093-98. doi: 10.13040/IJPSR.0975-8232.16(11).3093-98.

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