

Antibiotic Resistance Patterns In Urinary Tract Infection Isolates In A Tertiary Care Hospital, Thrissur, Kerala

Dr. Sooryagathri Eranezhuth Shaibu

Abstract

Background: Urinary tract infections (UTIs) are among the most common bacterial infections encountered in clinical practice. Increasing antibiotic resistance among uropathogens poses a major therapeutic challenge, especially in developing countries where empirical therapy is widely practiced.

Objectives: This study aimed to determine the bacterial profile of UTIs and assess the antibiotic resistance patterns of the isolates obtained from patients attending a tertiary care hospital in Thrissur, Kerala.

Methods: A cross-sectional study was conducted over six months (May–October 2025) in the Department of Microbiology, Tertiary Care Hospital, Thrissur. A total of 250 midstream urine samples from clinically suspected UTI cases were processed using standard microbiological procedures. Isolates were identified by conventional biochemical tests, and antibiotic susceptibility was tested using the Kirby–Bauer disk diffusion method in accordance with CLSI guidelines.

Results: Out of 250 urine samples, 180 (72%) yielded significant bacterial growth. *Escherichia coli* was the predominant isolate (56.7%), followed by *Klebsiella pneumoniae* (18.9%), *Pseudomonas aeruginosa* (8.9%), *Proteus mirabilis* (6.1%), and *Enterococcus faecalis* (5.6%). High resistance rates were observed to ampicillin (78.2%), ciprofloxacin (65.8%), and ceftriaxone (60.3%), while lower resistance was noted to gentamicin (32.4%) and nitrofurantoin (20.5%). Carbapenems showed the highest sensitivity (93.3%).

Conclusion: *E. coli* remains the leading cause of UTI in this region. The high resistance to commonly used antibiotics underscores the need for regular surveillance of antimicrobial susceptibility and prudent antibiotic use.

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I. Introduction

Urinary tract infections (UTIs) constitute one of the most prevalent bacterial infections encountered in both community and hospital settings. They contribute significantly to morbidity and healthcare costs worldwide. The causative organisms are predominantly Gram-negative bacteria, with *Escherichia coli* being the most frequent isolate. The increasing emergence of antibiotic-resistant uropathogens is a growing concern. Empirical treatment, inappropriate use of antibiotics, and incomplete therapy courses contribute to the selection and propagation of resistant strains. In India, the burden is exacerbated by over-the-counter antibiotic availability and lack of local antimicrobial stewardship programs. Regional data on antimicrobial susceptibility are vital to guide clinicians in selecting effective empirical therapy. However, in Kerala, such data remain limited. Therefore, the present study aims to determine the bacterial profile of UTIs and analyze antibiotic resistance patterns among isolates obtained from patients at a tertiary care hospital in Thrissur.

II. Results

Table 1. Distribution of bacterial isolates (n = 180)

Bacterial Species	Number of Isolates	Percentage
<i>Escherichia coli</i>	102	56.7
<i>Klebsiella pneumoniae</i>	34	18.9
<i>Pseudomonas aeruginosa</i>	16	8.9
<i>Proteus mirabilis</i>	11	6.1
<i>Enterococcus faecalis</i>	10	5.6
<i>Staphylococcus saprophyticus</i>	7	3.8

Table 2. Antibiotic resistance (%) among major uropathogens

Antibiotic	<i>E.coli</i>	<i>Klebsiella</i>	<i>Pseudomonas</i>	<i>Proteus</i>	<i>Enterococcus</i>
Ampicillin	81.3	76.5	68.7	72.7	58
Amox Clavulanate	60.7	65.2	54.1	48.1	42
Ceftriaxone	63.7	59.4	70.1	55.2	-
Ciprofloxacin	67.6	61.8	75	58.8	45

Gentamicin	29.4	35.3	37.5	30	20
Nitrofurantoin	18.6	22.5	-	-	12
Co-trimoxazole	52.9	50	46.8	40	-
Imipenem	5.9	8.8	12.5	10	-

III. Discussion

The present study highlights the predominance of *Escherichia coli* as the principal uropathogen in patients with UTIs. The significant resistance to ampicillin and fluoroquinolones observed aligns with previous reports indicating extensive misuse of these agents for empirical therapy. The observed ESBL production among *E. coli* and *Klebsiella* isolates is concerning, as it limits third-generation cephalosporin use. Nitrofurantoin and aminoglycosides retained good activity against most isolates. Carbapenems showed the highest efficacy but should be reserved for resistant infections.

IV. Conclusion

E. coli remains the most common cause of urinary tract infections in this tertiary care hospital in Thrissur. High resistance to commonly used antibiotics highlights the urgent need for rational antibiotic use and regular local surveillance.