ORIGINAL ARTICLE

RETROSPECTIVE STUDY OF CULTURAL SENSITIVITY PATTERN OF URINE FOR PAST ONE YEAR IN IMRAN IDREES TEACHING HOSPITAL LAB

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Submission complete: March, 2025
Review began: April, 2025
Review ended; May, 2025
Acceptance: May, 2025
Published: June, 2026

Author contribution:
1-2; Designed the research Pattern and drafted the manuscript.
3; Draft the manuscript
4-8; Data Collection
9: Approval

ABSTRACT

Objectives: To assess the Cultural sensitivity pattern of urine for the year of 2024 in IITH lab.

Methods: A retrospective study was carried out on registered patients presented in IITH during the year 01-01-2024 to 31-12-2024.

Results: Out of 181 samples (83 males, 98 females), 60 (33%) were culture positive. The most common isolates were E. coli (43%) and Klebsiella (40%), followed by Pseudomonas, Proteus, and a few others in low frequency. Antibiotic sensitivity patterns showed high effectiveness of Meropenem (91.2%) and Imipenem (90%), followed by Amikacin (74.5%) and Gentamycin (73.3%). In contrast, high resistance was noted against fluoroquinolones (Ciprofloxacin, Levofloxacin, Norfloxacin) and Co-trimoxazole, making them less reliable treatment options.

Conclusion: This highlights the predominance of E. coli and Klebsiella in infections and the rising concern of multidrug resistance, with carbapenems remaining the most effective agents.

Keywords: E.Coli, Klebsiella, Pseudomonas, Proteus, Meropenem, Imipenem, Amikacin

Cite this Article as: *Kaleem M et al.,; Retrospective Study of Cultural Sensitivity Pattern of Urine for Past One Year in Imran Idrees Teaching Hospital Lab. SIAL J Med. Sci. June-26 Volume-4, (Issue-4, Overall Issue-16); 32-37*

Introduction

Urinary tract infections (UTIs) remain among the most frequently encountered bacterial infections in both community and healthcare settings. They affect individuals across all age groups, with higher prevalence in females, elderly populations, and patients with underlying medical conditions. Accurate diagnosis and effective treatment of UTIs rely heavily on the laboratory's ability to isolate causative organisms and determine their antimicrobial susceptibility patterns. Over recent decades, the emergence of multidrug-resistant uropathogens has comp-licated therapeutic decision-making, under-scoring the need for continuous local surve-illance of resistance trends.[1]

Culture and sensitivity testing of urine speci-mens provides crucial data for guiding the empirical therapy and monitoring the effect-tiveness of infection control strategies. The pattern of antimicrobial susceptibility is not static; it evolves in response to antibiotic prescribing habits, patient demographics, and regional epidemiology. Hence, periodic review of laboratory records serves not only as a quality assurance measure but also as an early warning system for emerging resistance.[2]

The IITH lab, serving a diverse patient population, routinely processes the urine samples for bacterial culture and antimicrobial sensitivity. By reviewing results from the past one year, valuable insights can be gained into the prevailing uropathogens, their resistance patterns, and potential shifts in susceptibility profiles. Such data hold practical significance for the clinicians in selecting appropriate empiric therapy, as well as for the public health stakeholders in formulating the antibiotic stewardship interventions.[3]

This study focuses on analysing the cultural sensitivity patterns of the urine samples processed in the IITH laboratory over the last twelve months. Through systematic evaluation of archived laboratory data, the research aims to identify predominant bacterial isolates, assess their resistance trends, and compare findings with established guidelines. In doing so, it contributes to evidence-based management of UTIs within the institution and broader healthcare context.

In urine culture and sensitivity analysis, “TYPES” may refer to several key aspects observed during laboratory processing. These include the types of organisms isolated from urine samples, such as Escherichia coli, Klebsiella species, Proteus species, Enterococcus species, and other less common uropathogens. Each organism type carries distinct clinical significance and may demonstrate different susceptibility or resistance patterns to antimicrobial agents.

Additionally, types can also reflect patterns of the sensitivity and resistance recorded against various antibiotic groups, such as beta-lactams, fluoroquinolones, aminoglycosides, and nitrofurantoin. Recognising the distribution of both organism types and their corresponding sensitivity profiles is essential for understanding the local epidemiology of urinary tract infections.

By categorising these types from the past year’s IITH laboratory data, this research aims to highlight which pathogens are most prevalent and which antimicrobial classes remain effective, thereby providing practical insights for empirical therapy selection and resistance prevention strategies.[4,5]

Objectives

To assess the Cultural sensitivity pattern of urine for past one year in IITH lab.

Methodology

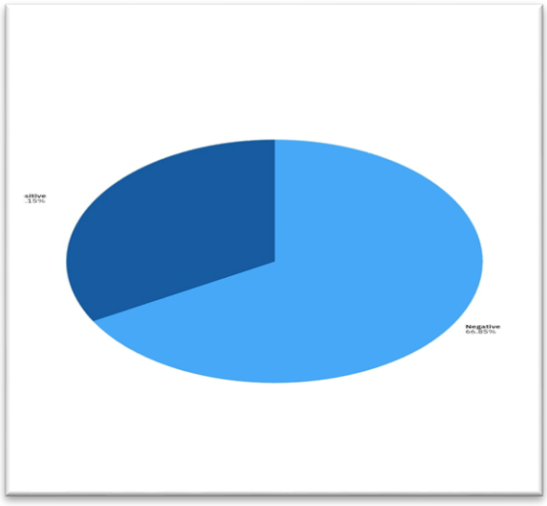
This is a retrospective descriptive study conducted at the IITH laboratory, focusing on the analysis of urine culture and antimicrobial sensitivity results from the past twelve months of .all the urine samples submitted for culture and sensitivity testing between 01-01-2024 to 31-12-2024 were included in the initial dataset. Duplicate samples from the same patient within a short interval, yielding the same organism and sensitivity pattern, were excluded to avoid bias.

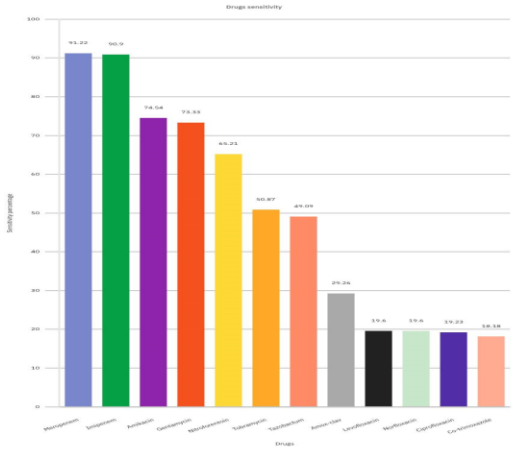
Ethical Considerations;

Patient confidentiality was maintained by anonymising all records before analysis. No direct patient contact or intervention was involved in this study. So there was no need to get permission from Ethic Review Board.

Results

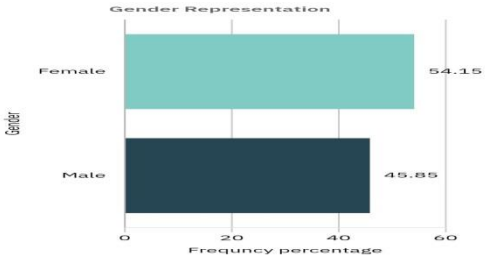
Total Samples = 181
Positive = 60
Negative = 121





Gender:
Male = 45.85%
Female = 54.15%

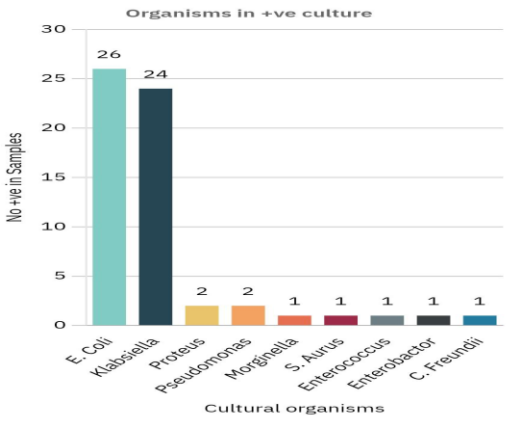
Total patients	+ve patients	-ve patients	+ve Percentage
181	60	121	33.15%



Gender:

Gender	No. of patients	percentage
Male	83	45.85%
Female	98	54.14%

Graphic Representation of organisms positive in cultural samples



Drugs Sensitivity Graphic Representation

Organisms in +ve samples:

Organisms	**No in +vs samples**	**Percentage**
E. Coli	26	43%
Klebsiella	24	40%
Pseudomonas	03	5.0%
Proteus	02	3.3%
C. Freundii	01	1.6%
Enterobactor	01	1.6%
Enterococcus	01	1.6%
S. Aurus	01	1.6%
Morginella	01	1.6%

Drugs Sensitivity and Resistance:

	Drugs	Sensitive	Resistant
1	Meropenem	52	05
2	Imipanem	50	05
3	Amikacin	41	14
4	Gentamycin	33	12
5	Nitroforantoin	30	16
6	Tobramycin	29	28
7	Tazobactum	27	28
8	Amox-clav	12	29
9	Ciprofloxacin	10	42
9	Levofloxacin	10	41
9	Norfloxacin	10	41
9	Co-trimoxazole	10	45

Discussion

During the one-year study at IITH lab, 181 urine samples were processed, of which 60 (33%) showed positive growth. Females had a slightly higher positivity, in line with the known higher risk of urinary tract infections. The most frequent isolates were E. coli (43%) and Klebsiella (40%), followed by less common organisms such as Pseudomonas, Proteus, Citrobacter, Enterobacter, Enterococcus, S. aureus, and Morganella. Antibiotic sensitivity patterns indicated that carbapenems (Meropenem, Imipenem) and aminoglycosides (Amikacin, Gentamycin) remain the most effective therapeutic options. In contrast, the high resistance was observed against fluoroquinolones and Co-trimoxazole, limiting their empirical use.

This study highlights the predominance of E. coli and Klebsiella as uropathogens and underlines the growing challenge of antimicrobial resistance. Continuous survey-llance of the sensitivity patterns and the strict implementation of antibiotic stewardship are essential to guide the empirical therapy and prevent further resistance escalation[6].

UTIs are among the most common bacterial infections worldwide. The higher prevalence was found in females due to the anatomic and the hormonal factors. Complicated UTIs are more frequent in the males, elderly, diabetics, and catheterized patients. Urine culture with antimicrobial sensitivity testing remains the gold standard for diagnosis[7, 8].

Escherichia coli (E. coli) → Most prevalent pathogen globally and regionally. Klebsiella pneumoniae → Second most frequent, often linked to hospital-acquired infections. Non-fermenters (Pseudomonas, Acinetobacter) → Associated with prolonged hospitalization and prior to the use of antibiotics. Proteus & Morganella→ Linked with stone disease due to urease activity. Enterococcus species→ Common in the complicated and device-associated infections. Staphylococcus saprophyticus → Seen in community-acquired UTIs in the young females[9].

High resistance reported against; Fluoroquinolones (ciprofloxacin, levofloxacin, norfloxacin). Co-trimoxazole. ESBL-producing E. coli and Klebsiella → Resistant to third-generation cephalosporins, often multidrug-resistant. Carbapenems (Meropenem, Imipenem)→ Remain highly effective but the resistance is emerging (CRE threat). Nitrofurantoin → Retains good activity for uncomplicated UTIs, especially against E. coli. Aminoglycosides (Amikacin, Gentamicin) → Show good sensitivity for complicated UTIs.[9]

Empirical treatment should be based on local antibiograms. De-escalation to narrow-spectrum antibiotics is critical once culture results are available. Fluoroquinolones should be avoided in high-resistance areas.
Carbapenems should be preserved for severe infections to prevent resistance spread. Preventive measures like catheter stewardship and infection control are equally important.[10]
The predominance of E. coli and Klebsiella matches global and regional reports. High resistance to the fluoroquinolones and the co-trimoxazole aligns with the South Asian surveillance data[10].
Carbapenems and amino-glycosides remain effective, supporting their role in therapy. Annual or biannual local anti-biogram up-dates are necessary to guide the empirical therapy and the stewardship practices.
We discussed different international studies and found our findings in agreement with the figures.

Conclusion

This highlights the predominance of E. coli and Klebsiella in infections and the rising concerns of multidrug resistance, with the carbapenems remaining the most effective agents.

LIMITATIONS:

Main limitation is low number of cases in the hospital. We did not have enough time for our study as far as it is concerned. Un-availability of resources was another limitation which cannot be underestimated.
Little experience in the use of electronic media and difficulty in making the soft copy of research papers We faced shortage of resources and time due to academic commitments and other multiple respon-sibilities such as lectures, clinical rotations, weekly evaluations and other extra-cur-ricular activities. To be more specific, complete age and gender related data was unavailable in the hospital records.

Disclaimer: None
Conflict of Interest: None
Source of Funding: None

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