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Prevalence And Antibiotic Resistance Patterns Of Bacterial Isolates From Urine Samples : A Retrospective Analysis At Zonal Hospital Dharamshala District Kangra (H.P.)

Sharma Komal Devi [1]**: Dr RPGMC Kangra at Tanda,**

Sharma Shruti [2]**: Dr RPGMC Kangra at Tanda,**

Assudaney Ashirwad [c]**: Dr RPGMC Kangra at Tanda,**

Introduction

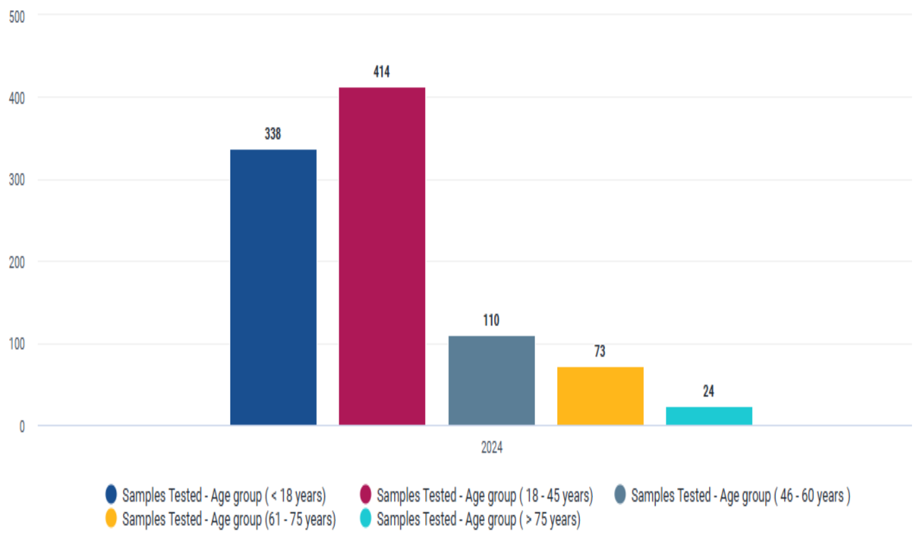
Urinary tract infections (UTIs) are among the most common bacterial infections affecting individuals across all age groups, with a significantly higher prevalence in females due to anatomical and physiological differences (1). UTIs can affect various parts of the urinary system, including the urethra, bladder, ureters, and kidneys, with cystitis (bladder infection) and pyelonephritis (kidney infection) being the most frequently diagnosed forms (2). The majority of uncomplicated UTIs are caused by *Escherichia coli*, a commensal bacterium of the gastrointestinal tract that ascends the urinary tract to initiate infection (3). Several risk factors predispose individuals to UTIs, such as sexual activity, catheterization, diabetes and urinary tract abnormalities. In recent years, the emergence of multidrug-resistant uro-pathogens has complicated treatment regimens and increased the risk of recurrence and complications (4). Accurate diagnosis and appropriate antimicrobial therapy are essential to managing UTIs and preventing their progression to more severe conditions like urosepsis. Due to the growing concern about antibiotic resistance, there is an increasing need for continued surveillance of uropathogens and updated guidelines for empirical treatment. Understanding the etiology, risk factors, and resistance patterns of UTIs is crucial for clinicians to provide effective patient care and to guide public health strategies aimed at reducing the burden of these infections.

Material and methods:

It was a retrospective study conducted at Zonal hospital Dharamshala From January to December 2024. The study aimed to identify the prevalence of bacterial isolates in UTI patients and to determine the pattern of antibiotic sensitivity. Isolation and identification of bacterial pathogens were carried out using standard microbiological techniques [5]. Antimicrobial susceptibility testing was performed using the Kirby-Bauer disk diffusion method as per Clinical and Laboratory Standards Institute (CLSI) guidelines [5]

[Results]

A total of 959 urine samples from January to December 2024 were tested. The Age Group (18 - 45 years) had the highest number of samples tested, a total of 414 over the year. The lowest number of samples were tested for the age group more than 75 years. Female gender consistently had a higher number of samples tested each month, with a total of 648 samples over the year.



Isolates from Urine samples and their susceptibility patterns: The Enterobacteriaceae group had the highest number of organisms isolated, total 231 out of 243 for the year, with a peak of 48 in July. Among enterobacterales *Escherichia coli* was the most common isolates (86%). *Klebsiella pneumoniae was isolated in 30* urine samples, making up 13% of the total. Only one isolates was identified as *Enterobacter* spp. representing 0.5% of the total.

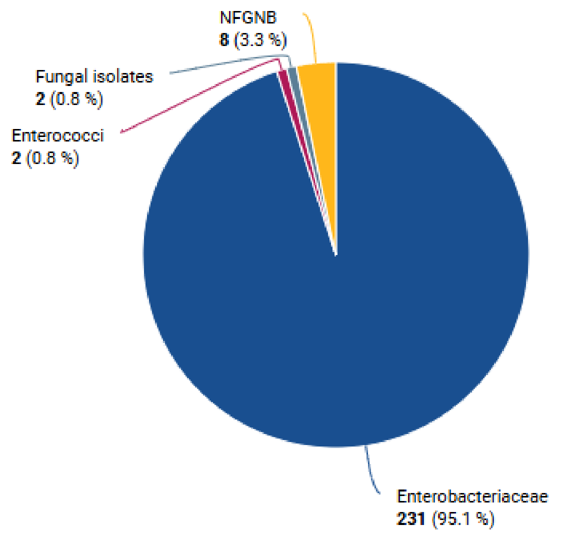


Figure 1: Distribution of Isolates from urine samples

Name of organism	Urine specimen (n)	Urine specimen (%)
Escherichia coli	199	86%
Klebsiella pneumoniae	30	13%
Enterobacter spp.	1	0.5%

Table: Distribution of isolates from Enterobacterales

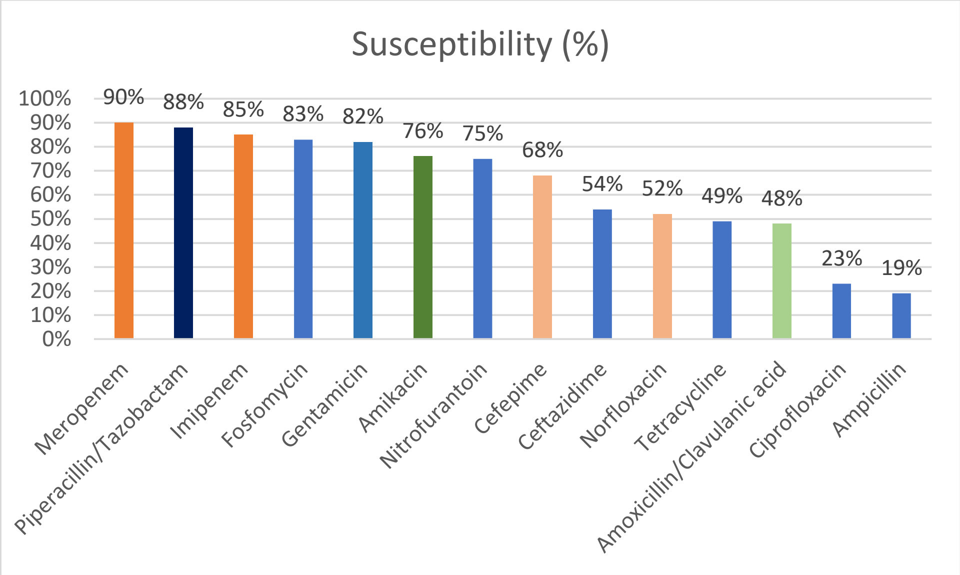


Figure2: AST Pattern of most common isolates.

Discussion

This study highlights the alarming prevalence of antimicrobial resistance among both Gram-negative and Gram-positive pathogens in a tertiary care hospital setting. *E. coli* and *K. pneumoniae* dominated the pathogen landscape. High resistance was noticed for Ampicillin(19%) followed by ciprofloxacin(23%). Maximum susceptibility was seen to Piperacillin -tazobactam 88% followed by meropenem90%.Nitrofurantoin and Fosfomycin also showed high susceptibility pattern 75% and 83% respectively. Their high resistance to fluoroquinolones and beta-lactams is consistent with global trends and poses a challenge for empirical therapy. The high sensitivity of *E. coli* and *Klebsiella* to Fosfomycin and nitrofurantoin suggests these remain reliable treatment options, particularly for urinary tract infections.

Conclusion

The study showed a concerning picture of high antibiotic resistance across commonly isolated pathogens. Continued surveillance, rational antibiotic prescribing, and strict adherence to infection control practices are essential to combat this growing threat. Empirical therapy should be regularly updated based on local antibiogram data.

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