



ANTIMICROBIAL SUSCEPTIBILITY PATTERN OF *ESCHERICHIA COLI* ISOLATES CAUSING URINARY TRACT INFECTIONS AT TERTIARY CARE HOSPITAL.

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ABSTRACT

Escherichia coli is the most common organism causing both community as well as hospital acquired UTI. The antibiotic resistance has increased over the past many years. Hence we aimed to assess the current antibiotic resistance pattern in the common uropathogen *E.coli* from urine samples from in and out patients at VIMS, Bellary, presenting with UTI. Mid-stream urine samples were processed for routine microscopy and culture and the pathogens isolated were identified by standard methods. Antibiotic susceptibility was done by Kirby Bauer disc diffusion method. A total of 2,024 urine samples collected from patients of suspected UTIs, 812 samples showed growth. *E.coli* was the predominant urinary pathogen (53.2%) followed by *Klebsiella spp*(19%), *Pseudomonas spp*(10.8%). *Escherichia coli* showed high resistance to Amoxicillin (82.4%), Amoxicillin-clavulanic acid (80.78%) and Ciprofloxacin(78%). The present study shows *E.coli* to be the most common isolate. The pathogens are multidrug resistant with only few available options like Amikacin, Nitrofurantoin and PiperacillinTazobactam. Increasing antibiotic resistance trends indicate that it is imperative to rationalize the use of antimicrobials in the community and also use these conservatively.

KEY WORDS: Urinary Tract Infection; Antimicrobial Susceptibility; *Escherichia coli* and Uropathogen.



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INTRODUCTION

Urinary tract infections (UTI) are among the most common infections with an increasing resistance to antimicrobial agents¹. Urinary tract infection (UTI) can be caused by Gram-negative as well as Gram-positive bacteria. *E. coli* is the most common organism causing both community as well as hospital acquired UTI². Nowadays, it represents one of the most common diseases encountered in medical practice affecting people of all ages from the neonate to geriatric age group³. Antibiotic resistant microorganisms have been a source of ever-increasing therapeutic problem. Continued mismanaged selective pressure has contributed towards the emergence of multiple drug resistant (MDR) bacteria⁴. Treatment of UTI cases is often started empirically and therapy is based on information determined from the antimicrobial resistance pattern of the urinary pathogens. In spite of the availability and use of the antimicrobial drugs, UTIs caused by bacteria have been showing increasing trends in recent years⁵. The emergence of antibiotic resistance in the management of UTIs is a serious public health issue, particularly in the developing world where apart from high level of poverty, ignorance and poor hygienic practices, there is also high prevalence of fake and spurious drugs of questionable quality in circulation⁶. The present study was carried out to assess the current antibiotic resistance pattern in the common uropathogen *E. coli* from urine samples from in and out patients at VIMS, Bellary, presenting with UTI. The susceptibility patterns of the bacterial isolates to antimicrobial agents was determined to generate information to guide treatment of UTI.

MATERIALS AND METHODS

The study was done from January 2012 to December 2012 at Vijayanagar Institute of Medical Sciences (VIMS), Bellary, Karnataka, India. Mid-stream urine samples from the suspected UTI patients were collected in a sterilized containers. The name, age, sex and address of the patients was also recorded. The collected urine samples were inoculated on MacConkey and Chocolate Agar plates and were incubated aerobically at 37°C. A growth of $\geq 10^5$ colony forming units/ml was considered as significant bacteriuria⁷. Gram staining was done to differentiate Gram positive from Gram negative organisms. Antimicrobial susceptibility of the confirmed organisms was done by Kirby-Bauer disc diffusion method on Mueller-Hinton Agar and interpretations were carried out according to CLSI guidelines⁸. The antibiotics tested were Amoxycillin, Amoxycillin-Clavulanic acid, Amikacin, Ciprofloxacin, Cotrimoxazole, Gentamycin, Nitrofurantoin, Nalidixic acid, Norfloxacin, Piperacillin-Tazobactam.

RESULTS AND DISCUSSION

A total of 2,024 urine samples were received for culture and sensitivity during the study period. Among these, 812 samples (40.1%) yielded significant bacteriuria and 1,212 samples (59.9%) showed no growth. The various organisms isolated from urine culture are shown in Table.1. *E. coli* was the most frequently isolated urinary pathogen (53.2%)

Table 1
Frequency of Isolation of Various Urinary Pathogens

Bacterial isolates	No. of isolates	Percentage (%)
<i>Escherichia coli</i>	432	53.2
<i>Klebsiella</i> spp	154	19
<i>Pseudomonas</i> spp	88	10.8
<i>Staphylococcus</i> spp	62	7.6
<i>Citrobacter</i> spp	34	4.2
<i>Enterococcus</i> spp	28	3.4
<i>Proteus</i> spp	8	0.9
<i>Candida</i> spp	6	0.7
Total	812	100

Escherichia coli showed high resistance to Amoxycillin (82.4%), Amoxicillin-clavulanic acid (80.78%) followed by Ciprofloxacin(78%), Cotrimoxazole(72%), Gentamycin (63.8%), Nalidixic acid(56.25%) and Norfloxacin(54.16%). Resistance to Amikacin (14.8%), Nitrofurantoin (13%) and Piperacillin-Tazobactam(8.7%) was quite low. (Table.2)

Table 2
Resistance pattern of *E.coli* isolates

Drugs	No. of isolates(n)	Percentage
Amoxycillin	356	82.4%
Amoxicillin-clavulanic acid	349	80.78%
Cotrimoxazole	311	72%
Gentamicin	276	63.8%
Nalidixic acid	243	56.25%
Ciprofloxacin	336	78%
Norfloxacin	234	54.16%
Amikacin	64	14.8%
Nitrofurantoin	56	13%
Piperacillin-Tazobactam	38	8.7%

In the community, bacterial infection of the urinary tract is one of the common causes for seeking medical attention¹. The pathogens causing UTIs are almost always predictable; with *Escherichia coli* being the primary etiological agent among both inpatients and outpatients.⁹ This was seen in other studies by Moges et al¹⁰ and Sibi et al¹¹. In our study *E.coli* was most resistant to Amoxycillin followed by Amoxicillin-clavulanic acid, Ciprofloxacin and Cotrimoxazole. It was most sensitive to Piperacillin-Tazobactam, Nitrofurantoin and Amikacin, which shows that *E.coli* showed resistance to older urinary antimicrobial agents such as Amoxycillin indicates that increased consumption of a particular antibiotic can be a pathway to its resistance. Antimicrobial resistant patterns are constantly evolving, it is a present global health problem, there is the necessity for constant antimicrobial sensitivity surveillance. This will help the clinicians to provide safe and empiric therapies.

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CONCLUSION

The present study shows *E.coli* to be the most common isolate and they are multidrug resistant with only few available options like Amikacin, Nitrofurantoin and Piperacillin-Tazobactam. Increasing antibiotic resistance trends indicate that it is imperative to rationalize the use of antimicrobials in the community. Hence, routine monitoring of drug susceptibility pattern helps to identify the resistance trends to suggest empirical treatment options to the clinicians.

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