

Original Research Article

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## Microbiological Profile of Urinary Tract Infections at a Tertiary Care Hospital

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### ABSTRACT

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Urinary tract infection (UTI) is one of the more common medical problems. It is an inflammatory response of the urothelium to bacterial invasion that is usually associated with bacteriuria and pyuria. Common disorder is accounting for 1-3% of consultations in general medical practice. A total of 3835 urine samples collected from clinically suspected urinary tract infection were subjected to microbiological investigations. Out of 3835 urine samples processed, 1756 (45.8%) samples showed significant growth. *Escherichia coli* (48.9%) was the most common organism isolated followed by *Klebsiella* (32.6%). Our study showed that majority (61.2%) of the positive samples belonged to 21-40 years. Sensitivity to nitrofurantoin and amikacin was good in our study when compared to other drugs. This study shows the isolation rate of various uropathogens and their sensitivity to commonly used drugs for the treatment of UTI.

### Introduction

Urinary tract infection (UTI) is a term that is applied to a variety of clinical conditions ranging from asymptomatic presence of bacteria in the urine to severe infection of the kidney with resultant sepsis.<sup>1</sup> Urinary tract infections may involve just the lower tract or both the lower and upper tracts.<sup>2</sup> They are a common cause of morbidity and can lead to significant mortality. They account for 1-2% of all office visits by women and 0.6% of all office visits by men.<sup>3</sup> The uropathogens

causing UTI vary by clinical syndrome but are usually enteric gram negative rods that have migrated to the urinary tract.<sup>4</sup> Most common organisms in community include *Escherichia coli*, *Proteus species*, *Pseudomonas species*, *Streptococci* and *Staphylococcus epidermidis*.<sup>5</sup> In hospital acquired UTIs a wider variety of causative organisms are found though *Escherichia coli* still predominates. The incidence of bacteriuria also increases with institutionalization or hospitalization and concurrent disease. Most UTIs are caused by

a single bacterial species. Choosing judiciously whether to initiate antibiotic therapy and then selecting the most urinary focused agent for the shortest appropriate duration are important factors in global efforts to stem the rise of antimicrobial resistant organisms.

The available data demonstrates a worldwide increase in the resistance to antibiotics commonly used to treat UTI.

Hence this study was undertaken to identify various etiological agents causing urinary tract infection, to evaluate antimicrobial susceptibility pattern of those isolates, to study the effect of age and sex in the causation of UTI.

### **Materials and Methods**

This is an observational study conducted in the Department of Microbiology, ASRAM, Eluru. Urine samples of both inpatients and outpatients of clinically suspected urinary tract infections received in the department for aerobic culture and sensitivity during January 2018 and December 2018, of both sexes and of all age groups were included in the study. Mid stream urine collected in a sterile wide mouthed container was processed.

After preliminary screening by Gram staining, isolation of urinary pathogens was done on MacConkey and blood agar by surface streak procedures using calibrated loops for semi-quantitative method.<sup>6, 7</sup> Confirmation of the isolated organism was done by Gram staining, hanging drop method of motility testing, catalase, oxidase and other biochemical reactions.

### **Antibiotic sensitivity testing**

Was performed according to CLSI guidelines on Muller-Hinton agar by Kirby-Bauer disc

diffusion method. Commercially available antibiotic discs of Himedia were used.

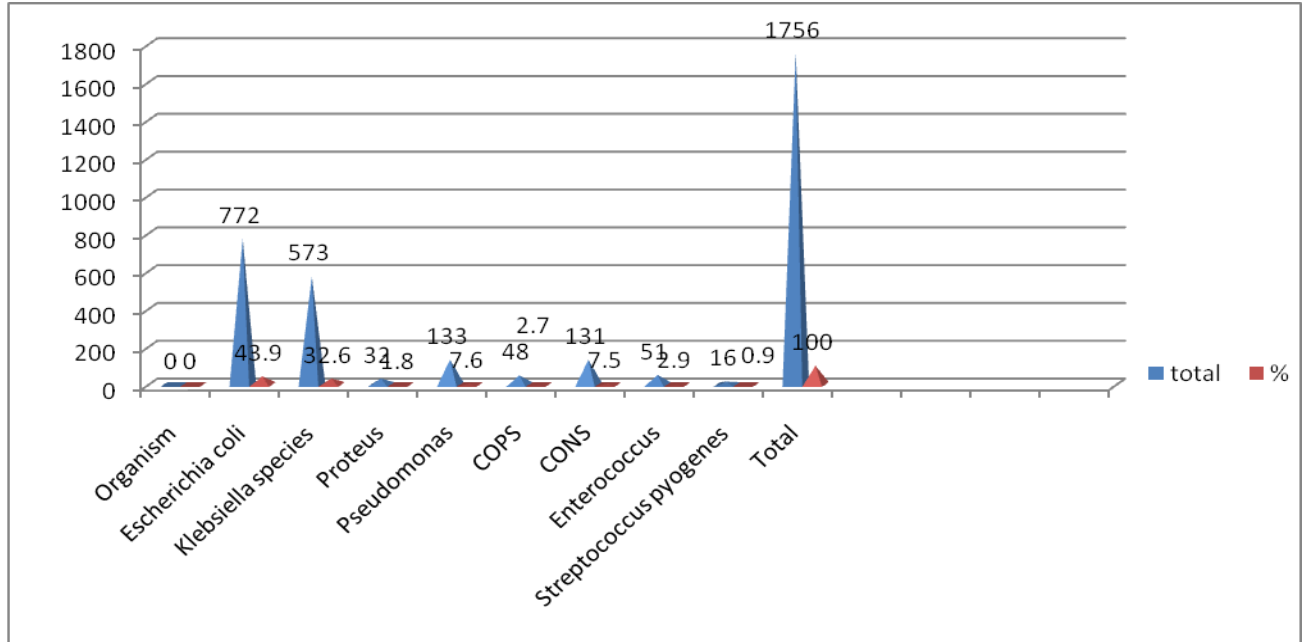
### **Results and Discussion**

A total of 3835 urine samples were considered for the study, of them 2560 were from outpatients and 1275 from inpatients. Of the total samples significant growth was seen in 1756 samples (45.8%). Of the positive samples 502 (28.6%) were males and 1254 (71.4%) were females. Sex wise distribution of the positive samples is shown in the table 1. Gram negative organisms 1510 (85.9%) predominated in our study in comparison to the gram positive organisms 246 (14%). 1377 (91.2%) of 1510 samples belonged to enterobacteriaceae family. Various uropathogens isolated is shown in the chart 1. Our study showed that majority 1075 (61.2%) of the positive samples belonged to 21-40 years. Age wise distribution of the positive samples is shown in the chart 2. Sensitivity to nitrofurantoin 90.5% and amikacin 87% was good in our study, followed by ciprofloxacin 87%. Sensitivity to ceftriaxone and ceftazidime was moderate in our study. Whereas sensitivity to amoxycylav was only 32.4%. All the Gram positive organisms showed low resistance to linezolid. UTIs are the result of interactions between the uropathogens and the host. 45.8% of samples showed growth of various pathogens in our study which is similar to Ruchi Mishra *et al.*, 43.6%.<sup>9</sup> Positivity of females in our study was 71.4% which is similar to the study conducted by Latika Jshch *et al.*, 77.40%.<sup>10</sup> 61.2% of positive samples in our study were of the age group 21-40 years, similar to Shamataj Kattalagere Razak *et al.*,<sup>11</sup> Gram negative organisms predominated in our study in comparison to gram positive organisms, which is similar to other studies. *Escherichia coli* 43.9% is the predominant uropathogen in our study which is similar to Salwa H. Alkhyat *et al.*, 45.2%.<sup>12</sup>

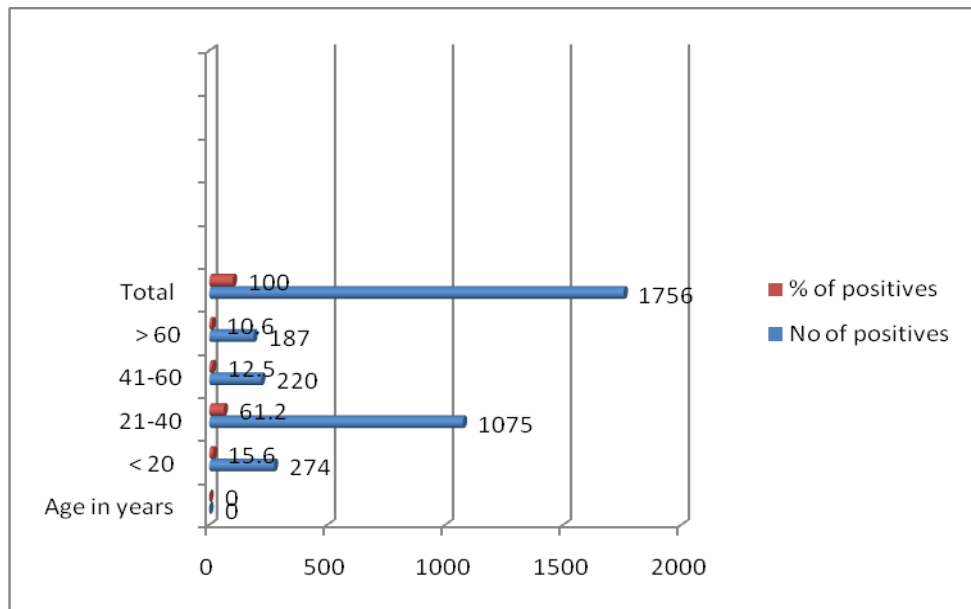
**Table.1** Sex wise distribution of positive samples

Sex	No of positives	% of positives
Males	502	28.6
Females	1254	71.4
<b>Total</b>	<b>1756</b>	<b>100</b>

**Chart.1** Various uropathogens isolated



**Chart.2** Age wise distribution of positive samples



The present study also showed 32.6% of the isolates were *Klebsiella*, similar to Akhilesh kumar *et al.*, 32.8%.<sup>13</sup> Our study showed that there is increasing rate of isolation of klebsiella as uropathogen. Proteus species constituted only 1% of isolates in our study which is almost similar to Bhatt CP *et al.*,<sup>14</sup> 7.6% of the isolates in our study belonged to pseudomonas aeruginosa, while Iregbu *et al.*, reported 8.4%.<sup>15</sup> Isolation of Coagulase Positive Staphylococci as uropathogen in our study was 2.7% while Preethishree *et al.*, reported 3.97%. The present study showed that sensitivity to nitrofurantoin and amikacin was good, similar to the study conducted by Vasuki Balasubramanyam.<sup>17</sup>

In conclusion, treatment of UTI accounts for a major proportion of antimicrobial use in ambulatory care, inpatient care and long term care settings. Responsible use of antibiotics for this common infection has broad implications for preserving antibiotic effectiveness into future.

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