

# Prevalence of Urinary Tract Infections in Elderly Patients Attending A Tertiary Care Hospital

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## ABSTRACT

**Introduction:** Urinary tract infections (UTIs) are more common in geriatrics due to physiological alterations/pathological conditions. The main objective of this study was to analyze the prevalence, causative organisms, types of antimicrobials used, drug interactions and its outcome.

**Material and methods:-** This study was conducted in the department of Microbiology in TSM Medical College. 106 total numbers of cases were involved in this study. Each was belong to elderly group. The duration of study was conducted over a period of six month. Early Morning clean catch mid-stream urine were collected and sent to Microbiology laboratory for culture and sensitivity.

**Results:** In this study, 65.3% of gram positive bacteria, 28.5% of gram negative bacteria and 2.8% fungus were isolated. *E. coli* and *Enterococcus* were most prevalent gram positive bacteria and gram negative bacteria respectively.

**Conclusion:** About one-fourth patients have UTIs and half of them were affected by *E. coli*. Urinary tract infections are mainly caused by Gram negative bacteria mainly *Escherichia coli* followed by Gram positive bacteria. UTI can be minimized by proper use of antimicrobial agents and health hygiene.

**Keywords:** UTI, *E. coli*, *Staphylococcus aureus*, *Enterococcus*

## INTRODUCTION

Urinary tract infections (UTI) are the most significant cause of infectious diseases among the geriatric population in males and females.<sup>1</sup> Females are more susceptible due to their anatomy and reproductive physiology.<sup>2,3</sup> Though, the ratio of UTI varies from geriatrics (50:1) to younger (2:1) population.<sup>4</sup> It is quite difficult to diagnose due to the absence of symptoms and lack of clear clinical history.<sup>5</sup> This lead to difficulty in early diagnosis and lack of treatment.<sup>6</sup>

Researches showed that UTI is often wrongly diagnosed in 40% of hospitalized elderly admissions due to its non-specific symptoms. Several studies reported that the primary cause of UTI was related to urinary incontinence, previous history, urogenital surgery and diabetes mellitus in specific patient populations.<sup>3,4</sup>

The most common causative agents in humans are bacteria and fungi. Hence this cannot be ignored. *Escherichia coli* (80% - 85%) and *Staphylococcus saprophyticus* (10% - 15%), are common infecting agents, along with *Klebsiella pneumoniae*, *Pseudomonas* and *Proteus* species account for the rest of the infections.<sup>7</sup>

Nosocomial UTIs are caused by *Escherichia coli*, *Pseudomonas aeruginosa* and *Proteus sp*, whereas

community acquired are caused by *Escherichia coli*, *Klebsiella pneumonia*, *Proteus mirabilis* and *Staphylococcus saprophyticus*.<sup>8</sup>

Studies found that mortality rate increased due to bacterial infections. Early diagnosis of UTI is vital to reduce morbidity and mortality in older patients with UTI.<sup>9</sup> Though antimicrobials play an important role in the treating of bacterial UTIs<sup>10</sup> but unfortunately, improper usage of antimicrobials leads to antimicrobials resistance, the emergence of multi-drug resistant (MDR) strains (*Clostridium difficile* infection) and adverse drug reactions (ADRs).<sup>11</sup> Now a days, antimicrobial resistance is a global concern that significantly affects the cost of treatment, hospitalization period, morbidity and mortality of patients in healthcare.<sup>12</sup> Therefore, the excessive use of antimicrobials should be minimized and a more appropriate approach to therapy can be devised.

The study was conducted among hospitalized elderly patients with the objectives to know the treatment pattern of UTI patients, the incidence of UTI and the antimicrobial susceptibility pattern.

## MATERIAL AND METHODS

This study was conducted in the Department of Microbiology in TSM Medical College, U.P., Lucknow after ethical clearance and written informed consent. 106 total numbers of cases were involved in this study. The duration of study was six month.

### Sample Collection

Patient case records were studied, reviewed and data collected on demographics (age, sex), medical history, diagnosis, comorbidities, Microbiological reports (The antimicrobial susceptibility pattern), drug treatment chart, and duration of

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hospitalization. Early Morning clean catch mid-stream urine sample were collected and sent to Microbiology laboratory for Culture and Sensitivity.

#### Inclusion Criteria

Patients 60 years and above  
Cognitive Impairment  
Catheterized Patients  
Delerium

#### Exclusion Criteria

Those have taken prophylactic antibiotic

Gender	No. of cases	Percentage
Male	56	52.8%
Female	50	47.2%
Total	106	100%

**Table-1:** Distribution of cases according to gender

Age	No. of cases	Percentage
60-70	80	75.4%
71-80	23	21.6%
81-90	2	1.8%
>90	1	0.9%
Total	106	100%

**Table-2:** Distribution of cases according to age (Years)

Isolates	No. of organisms	Percentage
Gram positive bacteria	32	65.3%
Gram negative bacteria	14	28.5%
Fungus	3	2.8%
Total	49	100%

**Table-3** Number of isolates in all cases

Isolated organisms	Isolated organism	No. of organisms	Percentage
Gram negative bacteria	E. coli	24	75%
	K. pneumonia	5	15.6%
	P. aeruginosa	2	9.3%
	Citrobacter spp.	1	3.1%
Gram positive bacteria	Enterococcus spp.	8	57.1%
	S. aureus	6	42.8%
Fungus	Candida spp.	3	100%

**Table-4:** Isolated organisms among all cases

Antibiotics	Sensitive		Resistance	
	No. of cases	Percentage	No. of cases	Percentage
Netilmicin	16	34.7%	30	65.2%
Amikacin	29	63.0%	17	36.9%
Imipenem	25	54.3%	21	45.6%
Piperacillin-Tazobactam	18	39.1%	28	60.8%
Gentamicin	26	56.5%	20	43.4%
Cotrimoxazole	8	17.3%	38	82.6%
Norfloxacin	8	17.3%	18	39.1%
Nitrofurantoin	25	54.3%	21	45.6%
Aztreonam	16	34.7%	30	65.2%
Cefepime	18	39.1%	28	60.8%
Cefazolin	26	56.5%	20	43.4%

**Table-5:** Antibiotic sensitivity pattern of gram positive and gram negative bacteria

Patients below age 60 years

#### STATISTICAL ANALYSIS

Data were analyzed descriptively by using microsoft excel.

#### RESULTS

In the present study, 56 were male and 50 were female among the 106 patients (Table-1). Maximum cases were involved from 60-70 years (75.6%) age group followed by other group (Table-2). In this study, 65.3% gram positive bacteria, 28.5% gram negative bacteria and 2.8% fungus were isolated (Table-3). E. coli and Enterococcus are most prevalent Gram Negative and Gram Positive Bacteria respectively (Table- 4) Amikacin is the most sensitive antibiotic among all cases. Netilmicin and Aztreonam are the most resistant antibiotic among the Gram positive as well as in Gram negative bacteria (Table-5).

#### DISCUSSION

Due to physiological variations, urinary tract infections are one of the most common infections in geriatrics. The chances of an UTI are higher in the presence of chronic diseases like diabetes, HTN, cognitive impairments etc. it can even sometimes lead to mortality.<sup>6</sup>

The results of the present study showed that UTI was more dominant among males (52.8%) than females (47.2%) [Table:1]. Similar results were found in the studies conducted by Faryabi et al.,<sup>13</sup> Mahesh et al.<sup>14</sup> and Arul Prakasam et al.<sup>15</sup> The results of these studies found that UTI was more prevalent in male (85.7%). In contrast, the study conducted by Prakash and Saxena found that UTI is more common among females (73.57%) rather than males (35.14%).<sup>16</sup> UTI were more commonly seen in the age group of 60-65 years of males and females suffering with cognitive impairments

etc.<sup>17</sup>

UTI was more common among females.<sup>18</sup> The reason behind these differences might be because the present study was conducted in Geriatric populations having comorbidities such as cognitive impairments, age related prostate which lead to increased incidence.

In this study, out of all UTI cases, 64.1% of cases have a history of diabetes mellitus while a study conducted by Pargavi et al. in diabetic patients revealed an incidence of 37% of UTI,<sup>18</sup> Marques et al. study<sup>19</sup> observed 23.52% had DM-UTI and in Mahesh et al. study,<sup>14</sup> around 42.6% of the cases have a history of diabetes mellitus. These results showed that diabetes mellitus is one of the major significant risk factors for the incidence of UTI.<sup>20</sup>

The average length of hospitalization in our study was 11.65 ± 8.94 days, that is closer to Faryabi et al. (10.72 ± 5.2 days) study. Most of the patients (52.4%) was prescribed with single antibiotic in the present study, whereas in Faryabi et al. study dual drug (antimicrobial agent) regimens were high (38%) but more or less same for a single drug regimen (31.3%).<sup>13</sup>

Cephalosporin was the most commonly prescribed antibiotics [Table:5] in this study which is similar to studies conducted by Faryabi et al., Ramanath and Shafiya.<sup>21</sup> In Faryabi et al. study penicillin in combination with β-lactamase inhibitors was routinely prescribed.<sup>14</sup> Although aminoglycosides were the least prescribed antibiotics, yet highly sensitive to commonly isolate organisms in UTI patients. The reason is due to the renal toxicity of drugs as well as age related renal impairment among the patients which is considered to be significant.

It has been confirmed by Faryabi et al.,<sup>13</sup> Arslan et al.,<sup>22</sup> Peterson et al.<sup>23</sup> and Marques et al.<sup>19</sup> studies that gram negative organisms such as *E. coli* (24; 48%) were the frequent cause of UTI. Among gram positive organisms that accounts for 28% of isolates, it mainly constituted *Enterococcus* sps<sup>8</sup> and *Staphylococcus* sps (MRSA; 3, *Staphylococcus aureus*; 2 and MSSA; 1). In this study, 65.3% gram positive bacteria, 28.5% gram negative bacteria and 2.8% fungus were isolated. *E. coli* and *Enterococcus* are most prevalent organisms were found among gram negative bacteria and gram positive bacteria respectively.

## CONCLUSION

This study concludes that educational interventions regarding strict control and monitoring of the chronic disease condition use of appropriate antimicrobial therapy, promotion of health hygiene also helps in avoiding recurrence of UTIs in elderly patients.

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