

# Urinary Tract Infections: Epidemiology, Sex Incidence & Correlation with Pyuria at a Tertiary Care Laboratory in New Delhi

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**Abstract:** Urinary tract infections (UTIs) are one of the most causes of morbidity and co morbidities in patients with underlying conditions, and it accounts for the majority of the reasons for hospital visit globally. This study was designed to figure out the prevalence of UTI, Sex incidence & correlation with Pyuria by isolating and characterizing the varied bacterial etiological agents. During this study, an entire of 1995, clean catch midstream urine (MSU) samples were collected aseptically and analyzed using standard microbiology methods. Antibiotic sensitivity was done on PHOENIX (BD) (MIC TECHNIQUE) AND URINE R/M ON BIORAD SYSTEM. The study revealed 558 /1995 (27.9%) UTI prevalence among patients attending laboratory in Green Park, New Delhi. *Escherichia coli* was the foremost prevalent bacterial uropathogen with 303/1995 (15.18%) followed by *Klebsiella Pneumoniae* 114/1995 (5.71%), *E Faecalis* 36/1995 (1.80%), *Pseudomonas* 33/1995 (1.65%), Others 72/1995 (3.60%). This study has demonstrated that age > 65 is more prevalent to bacterial infection with 216 / 1995 (10.82%). Screening for UTI in Laboratory patients, female patients with 372 / 1995 (18.64%) ratio is more prevalent than males 156 / 1995 (7.81%). **Conclusion:** *Escherichia coli* is that the foremost prevalent uropathogen followed by *K.pneumoniae*, *E. faecalis* & *Pseudomonas*. The susceptibility of infection increases with age-10.82% in age > 65 years (Elderly); 8.27 % in middle age (45-64); 6.16 in young age(15-45 yrs) & 1.05 you tired of Children. 4.9% Urinary tract infection was highest in females with 1404 / 1995 (70.4%) as compared to 591 / 1995 (29.6%) in men. 2.1% samples showed significant growth with low pus cells (associated with loop overheating or obstruction in urinary tract); 1.5 % samples showed no growth with high pus cells (Sterile Pyuria); 2.1% samples with Mix growth with low pus cells (Scenario 1); 1.5% samples showed mix growth with high pus cells (Scenario 2) 0.6 % samples in Scenario 1 showed growth in replating while 1.05 you tired of Scenario 2. Urinary tract infections are more prevalent among Elderly population and Females. Incidence of sterile pyuria is 1.5%; Auric bacteriuria is 2.1%, while samples with mix growth account for 3.6 % of samples out of which 1.7 % yield significant growth on Replating. INT

**Keywords:** Urinary Tract Infection, Sterile Pyuria, *Escherichia Coli*, Antibiotic Sensitivity, Prevalence

## 1. Introduction

The inflammatory conditions of the tract brought on by microorganisms growing of abnormally are known as tract infections (UTIs): [1, 2]. Lower urinary tract infections (LUTIs) are known to result in kidney damage that is irreversible and may cause fever, dysuria, & lower abdominal pain (LAP). [3, 4]. Companion-acquired or nosocomial illnesses are rather common. Uninfections of the urogenital tract that occur in a community context or within 48 hours of hospital admission are referred to as community-acquired tract infections (CA-UTIs). In a community environment, community-acquired UTIs are the second most frequent microbiological infection. [5]. Nosocomial tract infections, or N-UTIs, are tract infections that occur 48 hours after a patient is admitted to the hospital and do not occur within three days after the patient's discharge. [6].

Tract infections may even be asymptomatic, complex either abruptly or persistently, or simple.. As a result, the clinical presentation of UTIs varies depending on the involved tract portion, and the etiologic organisms, the infection's severity, and the patient's capacity to mount an immune system

response. Public health care is seriously threatened by both symptomatic and asymptomatic UTIs, which lowers quality of life & increases absence from work. [7]. Numerous variables, including age, gender, and the time of sample collection, contribute to the formation of UTIs. *E. Coli* is the most often isolated pathogenic organism associated with UTIs, followed by *k. pneumoniae*, *E. faecalis*, *Pseudomonas*, and other pathogens. Every year, some 150 million individuals worldwide have UTIs, costing more than \$6 billion in direct medical expenses. It was stated that urine culture samples were collected from all patients in Delhi at Neptune Hospital, Lifeline Lab, and independent clinics. In all age groups, women develop UTIs at a larger rate than males do. The documented incidence of urinary tract infection (UTI) ranges from 0.5 to 0.7 cases per person-year in sexually active young women. In contrast, the rate is 0.01 per person-year in young males aged 18 to 24. UTI incidence increases in elderly persons but reduces over life. [3, 4]. More than 10% of women aged 65 and older reported experiencing a urinary tract infection (UTI) in the last 6 months. The percentage rises to about 30% for women aged 85 years and older [2]. Urinary tract infections (UTIs) affected 0.07 persons per year among postmenopausal

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women living in communities, according to a large prospective cohorts research. The incidence of urinary tract infections was greater in older women with diabetes, at 0.12 per person-year. [4]. The anticipated incidence of urinary tract infection (UTI) for males between the ages of 65 and 74 is projected to rise to 0.05 per person-year [2]. Older adults (85 years and above) in both genders see a significant increase in the incidence for urinary tract infections (UTIs). UTI rates in this age group were an observational study conducted in this region found that men and women earn 0.08 and 0.13 per person-year, respectively. [5].

## 2. Materials and Methods

**Study Area:** This study was conducted in conducted at lifeline laboratory Green Park, New Delhi; a tertiary care diagnostic pathology laboratory. Sample Size Determination Samples received at Lifeline laboratory from at center premises, Neptune hospital & standalone clinics attached to hospital were taken into account for study. An entire of 1995 samples collected over a period from January 2022 to June Page 1 of two 2022 were analyzed for study data.

**Study Design:** January through June of 2022 saw the completion of an a cross-sectional health point survey. The retrospective investigation included outpatients as well as in patients who presented with or were very suspected of developing UTIs. With consent from the chosen patients, midstream urine (MSU) samples were collected. Collecting Urine Samples for Study Midstream urine samples were obtained from each patient and collected within sterile, clean, leak-proof containers, ensuring a "clean catch" sample. All volunteers had to wash their urethral areas with soap before handling the specimen to prevent contamination. [3] Also, prior to sample collection, female participants had to spread their labia apart widely. Subsequently, the MSU was gathered into a sterile urine container that was clean and uncontaminated. For those with urinary catheters, urine specimens were taken with a syringe from recently placed catheters and then to sterile specimen tubes. Determine the Uropathogens and Their Isolation The Lifeline Laboratory at Green Park was used to isolate and identify the bacterial uropathogens. Every single MSU sample that was evenly mixed and not centrifuged. BD Phoenix Automated Identification and Sensitivity Instrument was used to run the samples.

## 3. Results

3.1. Features of the Patients After receiving permission and meeting the selection criteria, a single nineteen nine five (1995) individuals who presented with or were highly suspected of developing UTIs were included in the trial. The patients ranged in age 8 months to 95 years.

3.2. [15], and thus the mean of the study participants was  $45.09 \pm 23.731$  years. The study participants were majorly females 1404/1995 (70.4%).

Prevalence of UTIs One nine nine five (1995) morning clean catch midstream urine samples were collected from patients attending the laboratory Green Park. Significant bacteriuria was observed in 558/1995 (27.9%). According to Table 1,

the age group over 65 had the greatest prevalence of bacterial UTIs with 216/1995 (10.82%), whereas the teenage age group of 0-14 years had the lowest incidence with 21/1995 (1.05%). tract infection was higher in women than in men, with 372/1995 (18.64%) vs. 156/1995 (7.81%). With 303/1995 (15.18%), After Klebsiella pneumoniae, Escherichia coli was the most common bacterial uropathogen, with 114/1995 cases. (5.71%), E Faecalis 36/1995 (1.80%), Pseudomonas 33/1995 (1.65%), Others 72/1995 (3.60%). (Table 2).

**CORELATION WITH PYURIA** Low pus cell with growth (AuricBacteriuria) 2.1% samples showed sig- nificant growth with low pus cells (associated with loop overheating or obstruction in urinary tract); High pus cell with no growth (Sterile Pyuria) 1.5% samples showed no growth with high pus cells(Sterile Pyuria). Mix growth with low/high pus cell (More than 3 kinds of Organism on Plating) -2.1% samples with Mix growth with low pus cells (Scenario 1.5% samples showed mix growth with high pus cells (Scenario 2) 0.6 % samples in Scenario 1 showed growth in replating while1.05 you tired of Scenario 2. 4.

## 4. Discussion and Conclusion

The purpose of this research was to examine gender prevalence, age distribution, and correlations for pyuria in patients who were receiving care at Lifeline Laboratories in Green parks, New Delhi. 18.64% and 7.81%, respectively, were more common in women, and as a result, more common in men. According to the research, the incidence of UTIs among patients visiting the testing facility in Green Park, the capital of India, was 558/1995, or 27.9%. At 303/1995 (15.18%), Klebsiella pneumoniae was the second most frequent bacterial uropathogen, behind Escherichia coli, which was present at 114/1995 (5.71%) and E. faecalis at 36/1995 (1.80%), Pseudomonas 33/1995 (1.65%), Others 72/1995 (3.60%). Elderly population is affected quite younger population thanks to decreased mobility in such age group [1]. Low pus cell with growth (Auric Bacteriuria) 2.1 % samples showed significant growth with low pus cells (associated with loop overheating or obstruction in urinary tract); This picture could even be seen when there's some obstruction in tract stone etc. this might even be seen if period of your time is long between plating and receipt of urine culture. (Table 3) High pus cell with no growth (Sterile Pyuria) [5] 1.5 % samples showed no growth with high pus cells (Sterile Pyuria). this might be seen when patient is on antibiotic therapy. Sexually transmitted infections, tuberculosis also can present with a uniform picture. Sample with high pus cells yield significant growth on repeat plating. (Table 3) Mix growth with low / high pus cell- (More than 3 kinds of organism on Plating) 2.1% samples with Mix growth with low pus cells (Scenario 1.5% samples showed mix growth with high pus cells (Scenario 2) 0.6 % samples in Scenario 1 showed growth in replating while1.05 you tired of Scenario 2. A repeat sample request is given when a mix growth is seen in urine culture.

- 1) Sample with mix growth with low pus cells yield no growth on repeat sample processing.
- 2) After repeat sample processing, a mix growth sample with a high pus cell count yields significant growth. (Table 3) Interest Conflicts Regarding the

acknowledgments for the publishing of this work, each author states that there are no conflicts of interest. The opportunity to gather the samples at Lifeline Laboratory, Neptune Hospital, and Standalone Clinics is much appreciated by the authors, who also express their gratitude to the laboratory hospital management for their cooperation. They also acknowledge the direction and assistance provided by the doctors, lab technicians, and nurses at the same facilities, which made this study project possible.

**Statistics:** Incidence Rate- Existing Case/ Population at risk.

Urine culture samples at laboratory/ South Delhi population  
 $3900/2731929 = 0.0001427$

**Prevalence Rate- New Case/ Population at Risk**

Positive urine culture samples at laboratory/ South Delhi population.  
 $1116 / 2731929 = 0.000408$

**Urinary Tract Infections:** Epidemiology, Sex Incidence & Correlation with Pyuria; Retrospective study at a laboratory in North India

## References

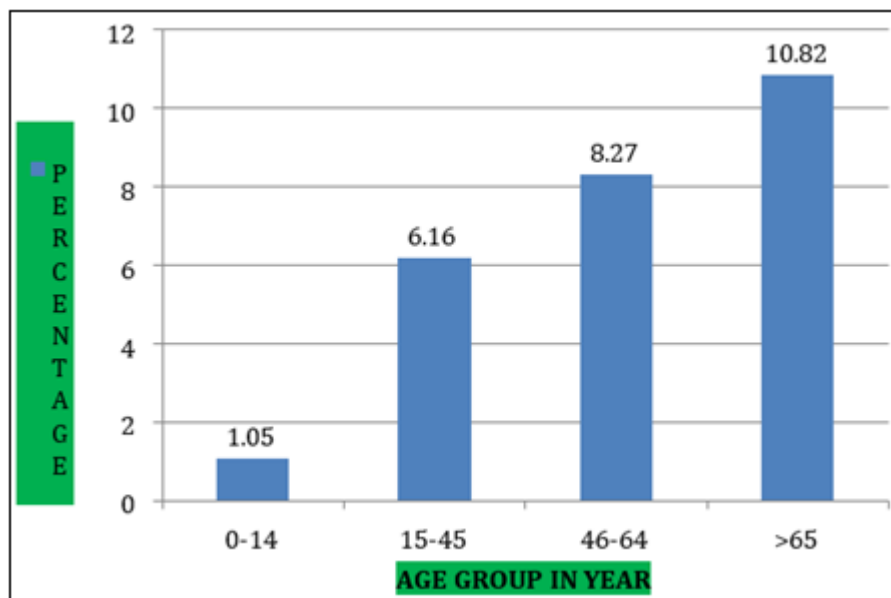
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## Figures and Tables

- 1) Figure 1 Age Distribution Of Urinary Tract Infections
- 2) Figure 2 Percent Wise Organism Incidence of Urinary Tract Infection
- 3) Figure 3 CORELATION OF CFU (Quantitative with Pyuriain Culture Plate



**Figure 4:** Age Distribution of Urinary Tract Infections

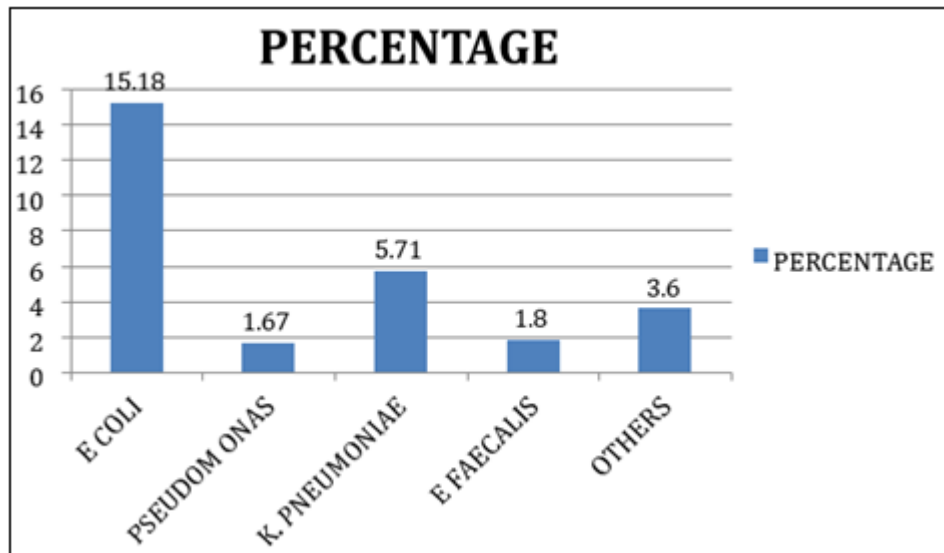


Figure 5: Percent Wise Organism Incidence of Urinary Tract Infections

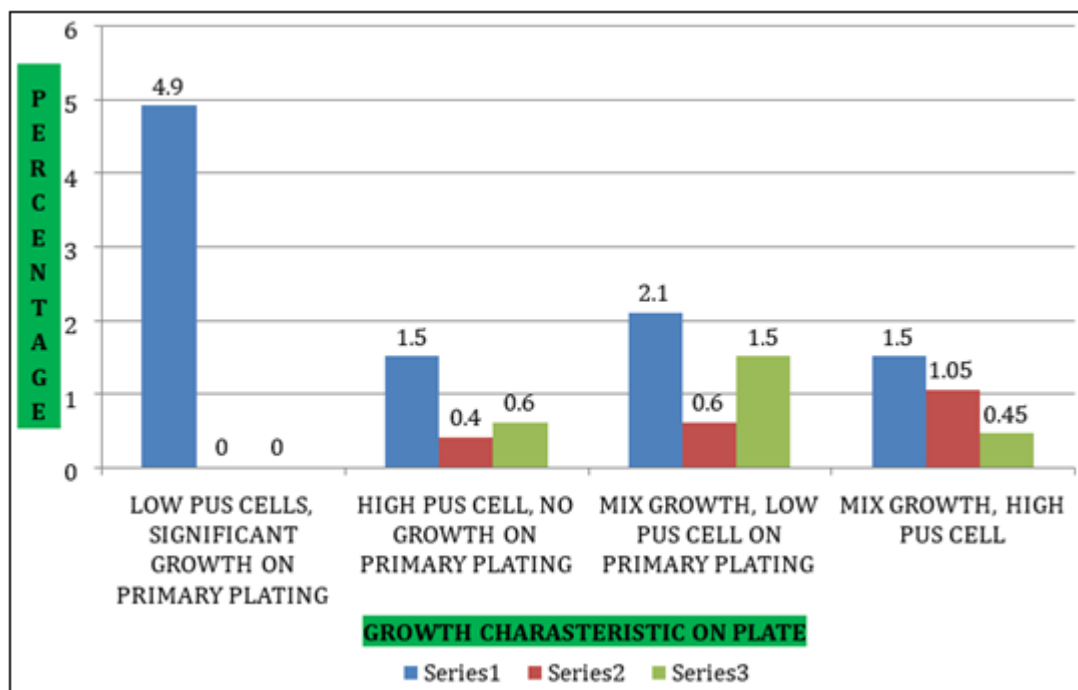


Figure 6: Correlation of CFU (Quantitative) with Pyuria in Culture Plate

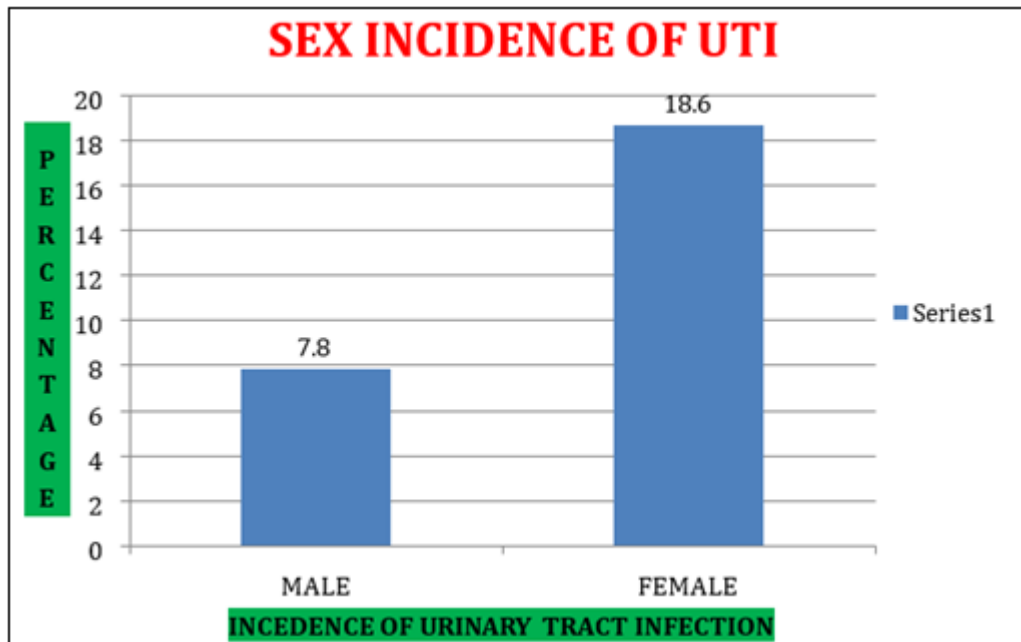


Figure 4: Sex Incidence of UTI