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# EVALUATION OF ANTIBIOGRAM IN URINARY TRACT INFECTION PATIENTS OF CATHETERISED PATIENTS AT A TERTIARY CARE CENTRE, UTTAR PRADESH

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## ABSTRACT

**BACKGROUND** : Most hospital visits globally are caused by urinary tract infections, which are also a major cause of morbidity and comorbidity in patients with underlying medical conditions. UTIs and the development of antibiotic resistance in uropathogenic bacteria continue to be serious public health issues. It is necessary to regularly assess the microbiological organisms producing UTIs and their antimicrobial resistance in order to implement tailored empirical antibiotic therapy.

**AIM AND OBJECTIVE:** To study the antibiogram in urinary tract infection patients of catheterised patients.

**MATERIAL & METHODS:** This was a hospital based prospective cross sectional study carried out in the Department of Microbiology. A total of 1000 urine freshly voided mid- stream urine sample were collected in a sterile wide mouth container from the individuals preliminary routine urine tests positive for pus cells and albumin. All the urine samples (fever > 38ºC, urgency, frequency dysuria or suprapubic tenderness) were included in this study were processed within one hour after the collection for aerobic bacterial culture. If delayed, samples

were refrigerated and processed within 4 - 6 hrs. The identification , biochemicals and the AST pattern was done according to the CLSI guidelines 2023.

**RESULTS:** In the present study total of 1000 urine samples were received in which 400 (40%) urine samples were showing significant growth for UTI. The ratio of females 254 (63.5%) were more as compared to that of the males 146 (36.5%) with the maximum age of 31-40 (43%) years of age followed by 21-30 (24.5%) being affected the most. In the age group of 0-10 years and above 71 years was the least affected with the infection. It was observed that the maximum number of isolates were from the *E.coli* 150 (37%) followed by *Klebsiella pneumonia* 100 (25%), *Pseudomonas aeruginosa* 55 (13.7%), *Acinetobacter baumanii* 26 (6.5%) , and *Staphylococcus aureus* 30 (7.5%) for gram positive followed by *Proteus* 23 (5.75%) least for *Enterococcus* with 4%.
The days of catheterization were observed to be the maximum in 4-7 followed by 8-12 days.

It was clear that out of the total samples the comorbidity with diabetes was found to be low (13.5%). It was also observed that patients with hypertension and the kidney disease were observed to be low as compared to the healthy individuals. The maximum number of days with fever was observed to be maximum in 4-7 days, least for 8-12 days . In the present study the resistant rate for Ampicillin was observed to be 92% and Imipenem and Nitrofurantoin were sensitive with (93%). It was noted that the maximum number of isolates were from the gram negative isolates as compared to the gram positive isolates.

**CONCLUSION:** Regular check-ups and strict adherence to antibiotic stewardship protocols can lower the cost of UTI prophylaxis. By performing these regular examinations, the expense of UTI prevention can be decreased.

**KEYWORDS:** UTI, Bacteriological profiling , Prevalence, Antibiotic sensitivity testing, Associated factors, CLSI Dysuria, Chills

## INTRODUCTION

Urinary tract infections (UTIs) are the most common infections occurring in people. In critically ill patients, catheter-associated (CA) UTIs can lead to bacteremia, and they are the leading cause of morbidity and mortality in approximately 10% of hospitalized patients [1]. Healthcare-associated infections are an important cause of prolonged hospital stay, around the globe. Urinary tract infections (UTIs) are considered as one of the most common healthcare-associated infections (HCAIs) with an estimated prevalence of 1–10%, accounting for 30–40% of all HCAIs reported by hospital settings. Majority of infections of urinary tract are directly linked to the widespread use of indwelling catheters in these settings [2].

The Center for Disease Control and Prevention (CDC) provides a definition for CAUTI, which pertains to patients who have a catheter inserted and left in place for 48 hours or longer [3]. Catheter-associated urinary tract infection has been a significant factor contributing to illness and death among hospitalized patients [4,5].

CA-UTI accounts for over 80% of infections in catheterized patients admitted in intensive care units (ICUs) during their hospital stay [2]. The important predisposing factors commonly associated with CAUTIs are conditions such as diabetes, immunosuppression, renal insufficiency, and urinary incontinence commonly among neurologic and orthopedic patients.[5] Other factors for CAUTI could be patients staying on catheter for a prolonged duration of time, female and elderly patients, patients with severe illness, catheterization performed under nonsterile conditions, and catheter insertion by undertrained professionals [6]. The source of infection is either endogenous, i.e., via meatal, rectal, and vaginal colonization, or exogenous, i.e., via the contaminated equipment or hands of the healthcare personnel. The route of infection can be intraluminal (from the catheter drainage tube junction) or extraluminal (contaminated collection bag) [7-9].

Females are more susceptible to UTI as compared to males due to the short length of urethra, absence of prostatic secretion, pregnancy and easy contamination of the tract with faecal flora. The risk factors include female gender, extremes of age, diabetes mellitus, and prolonged catheterization duration [10]. The duration of catheterization is the most important factor in the development of bacteriuria, as its daily usage increases the risk of infection by 3–7% [11].

An indwelling catheter interrupts the normal mechanical wash-out effect of the urinary stream, making patients more susceptible to symptomatic infections. This, in turn, can result in the infection ascending from the bladder to the ureter and kidney, ultimately requiring the use of antimicrobial medications [12].

Urinary tract is a vast reservoir of resistant microorganisms with threat of cross infection [13]. *Escherichia coli*, *Klebsiella* species, *Proteus* species, *Pseudomonas aeruginosa*, *Staphylococcus aureus*, Coagulase-negative *Staphylococcus*, and *Enterococcus* species are the important culprits. It can cause genitourinary complications, septicemia, skeletal involvement, and over the years, bladder cancer that causes distress to the patient, prolonged hospital stay, economic loss, and mortality.It can be prevented by maintaining closed urinary drainage system and early removal of catheter. Surveillance, proper training of healthcare personnel, and implementation of bundle care approach aids in reduction of cases in ICU settings.

Currently UTI is mostly managed empirically without urine culture or susceptibility testing this may lead to the frequent misuse of antibiotics. The antimicrobial susceptibility data of UTI-causing microorganisms is variable it changes from time to time and from place to place. Most commonly UTIs are treated empirically; in that case the criteria for the selection of antimicrobial agents should be determined on the basis of the most likely pathogen and its expected resistance pattern in that geographic area [14]. Hence, the periodic monitoring of etiologic agents of UTI and their resistance pattern in the community is very essential. Therefore, the present study was undertaken to evaluate the Antibiogram in Urinary tract infection patients of catheterised patients.

## MATERIAL AND METHODS

This was a Cross sectional study carried out in the Department of Microbiology for a period of 12 months i.e, between April 2023 to April 2024. A total of 1000 freshly voided midstream urine samples from the people whose initial routine urine tests were positive for pus cells and

albumin were collected in a sterile wide mouth container. Within an hour of being collected, all urine samples were processed for aerobic bacterial culture. If samples were delayed, they were refrigerated and processed in 4 to 6 hours.

Our study recruited people who appeared to be in good condition and were open to taking part. Patients with any other diseases and those who had not provided their consent for the trial were also excluded from it.

The study contained information on the demographic characteristics of the patients, including age, gender, tribe, place of residence, degree of education, and history of medical issues.

**Microscopic Study**

One of the diagnosis criteria of UTI was based on microscopic findings of more than 10 pus cells/ high power field (40×) in urine were included in the study.

**Collection and process of urine samples**

Midstream urine samples were collected in a sterile container and processed within two hours of collection. Urine samples were also centrifuged, and the resulting sediment was examined under a microscope for red blood cells (RBCs), leukocytes, epithelial cells, casts, crystals, and parasites. In normal urine sediment, a few RBCs, pus cells (0-5/high power field), and epithelial cells may be present. The number of epithelial cells was reported as "few," "moderate," or "many" per low-power field.

**Isolation and Identification of Uropathogens**

Using a calibrated (1 L) loop, a urine sample was inoculated onto a standard culture media called Cystine-Lactose- Electrolyte-Deficient (CLED) agar.

For 18 hours, culture plates were incubated in an ambient air incubator at 35–37°C. The culture plates were examined for the presence of bacterial colonies after the allotted time was over. Using the colony count method, their growth was classified as significant or not. By growing isolated colonies on various media, such as MacConkeys agar and blood agar, they were further described based on cultural traits

In cases where culture (growth) was unsuccessful, the plates were incubated at 37°C for an additional 24 and 48 hours. The identification, biochemicals, and AST pattern were completed in accordance with CLSI guidelines for 2023 [15]. All chemicals and reagents required for culture media were purchased from HiMedia Laboratories Pvt Ltd., Mumbai.

Urine culture using the calibrated loop/surface streak method.

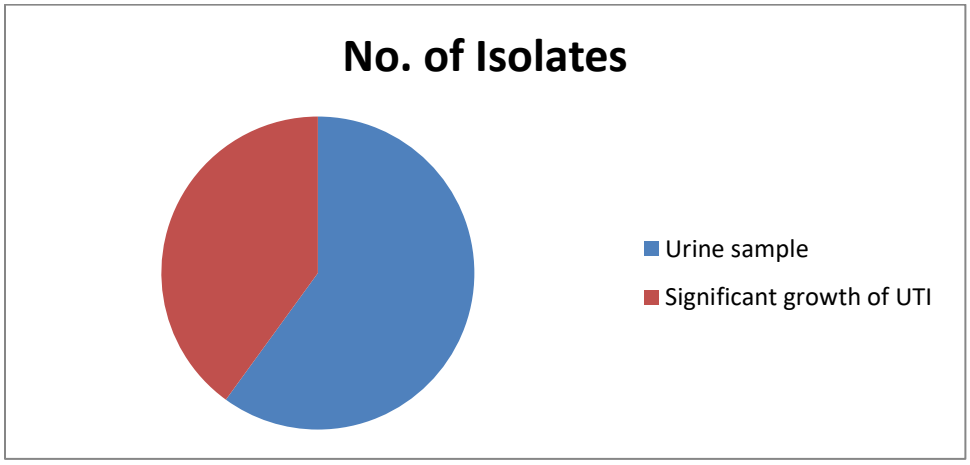
**Figure 1: Biochemicals test for (a.) *S.aureus* ; (B.*) Klebsiella pneumonia* ; (c ) *Pseudomonas aeruginosa***

## RESULTS

In the present study out of 1000 urine samples received in the Microbiology Laboratory 400 urine samples shows significant growth for UTI. Therefore, the prevalence rate of UTI was found to be 40%.

| S.No. | Type of Isolates | Total No. of samples (n=1000) | Percentage |
|---|---|---|---|
| 1. | UTI | 400 | 40% |
| 2. | Other Isolates | 600 | 60% |

**Table No. 1 : Samplewise distribution of the clinical isolates**

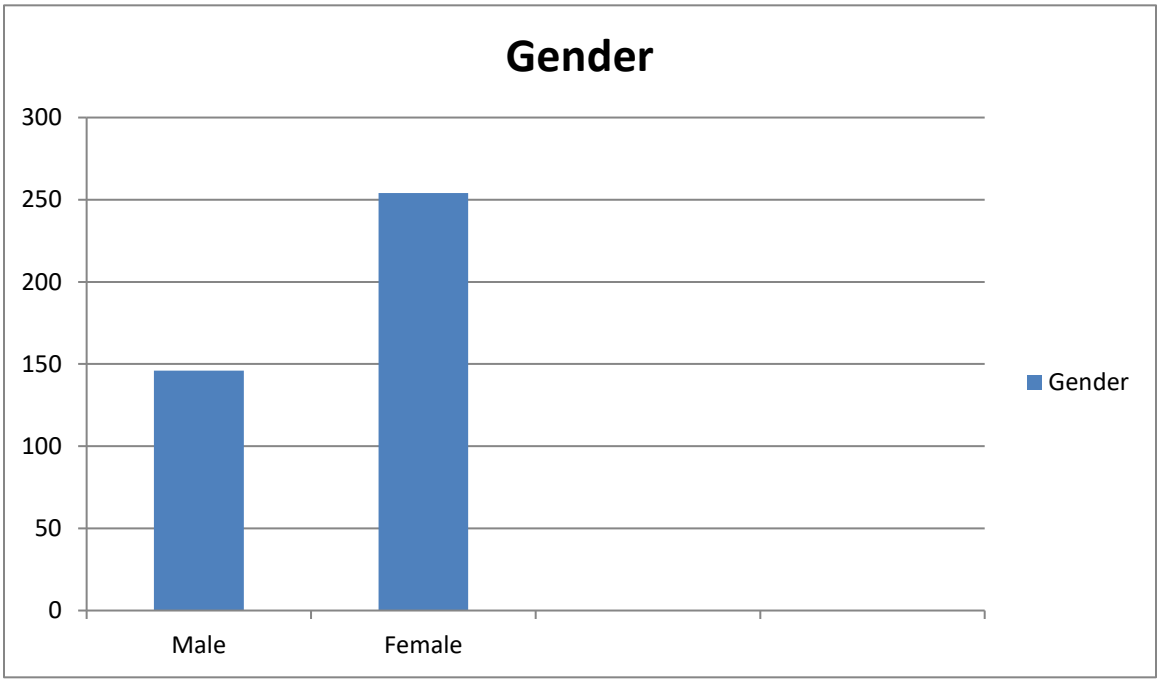



**Graph No. 1: Graphical Representation of Samplewise distribution of the clinical isolates**

| S.NO. | GENDER | TOTAL NO. OF ISOLATES (N=400) | PERCENTAGE |
|---|---|---|---|
| 1. | Male | 146 | 36.5% |
| 2. | Female | 254 | 63.5% |

**Table No. 2: Genderwise distribution of the Isolates**

The ratio of females 254 (63.5%) were more as compared to that of the males 146 (36.5%) [Table no. 2] .




**Graph No. 2: Graphical Representation of the Genderwise distribution**

| S.NO. | Age | No. of Isolates (n=400) | Percentage | |
|---|---|---|---|---|
| 1. | 0-10 | 3 | 0.75% | |
| 2. | 11-20 | 12 | 3% | |
| 3. | **21-30** | **98** | **24.5%** | |
| 4. | **31-40** | **172** | **43%** | |
| 5. | 41-50 | 61 | 15.2% | |
| 6. | 51-60 | 25 | 6.25% | |
| 7. | 61-70 | 16 | 4% | |
| 8. | ≤ 71 | 13 | 3.25 % | |

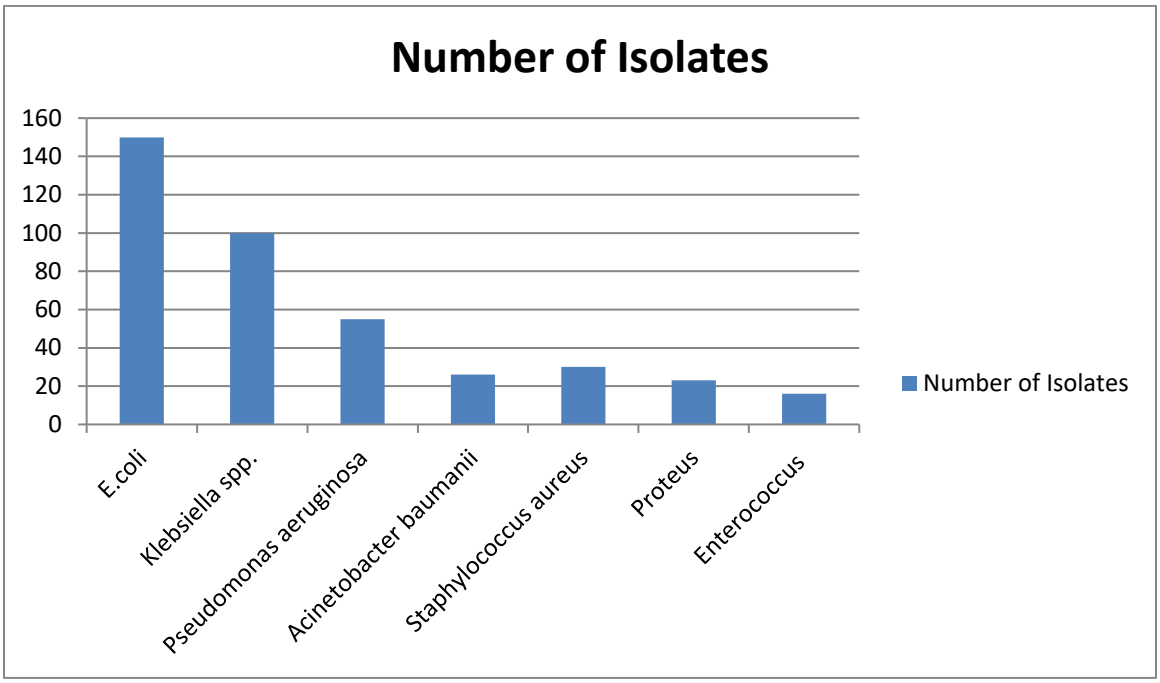
**Table No. 3: Agewise distribution of the Isolates**

From the present study it was also noted that the age group of 31-40 (43%) years of age followed by 21-30 (24.5%) was affected the most. In the age group of 0-10 years and above 71 years was the least affected with the infection.

**To study the different Phenotypic Tests For the detection and Identification of:**. identified by studying colony characteristics, production of pyocyanin pigments, grapelike odour, growth at 42$^{o}$C, motility test, Gram staining, and biochemicals was performed according to the CLSI guidelines [15].

| Type | No. of Isolates | Percentage |
|---|---|---|
| *E.coli* | 150 | 37% |
| *Klebsiella spp.* | 100 | 25% |
| *Pseudomonas aeruginosa* | 55 | 13.7% |
| *Acinetobacter baumanii* | 26 | 6.5% |
| *Staphylococcus aureus* | 30 | 7.5% |
| *Proteus* | 23 | 5.75% |
| *Enterococcus* | 16 | 4% |
| Total | 400 | |

**Table 4 : Types and Number of isolation of patients studied**




**Graph No. 3: Graphical Representation of the Types and Number of isolates of patients studied**

From the Table No. 4 it was observed that the maximum number of isolates were from the *E.coli* 150 (37%) followed by *Klebsiella pneumonia* 100 (25%), *Pseudomonas aeruginosa* 55 (13.7%), *Acinetobacter baumanii* 26 (6.5%) , and *Staphylococcus aureus* 30 (7.5%) for gram positive followed by *Proteus* 23 (5.75%) least for *Enterococcus* with 4%.

**Figure No.2: Microscopic examination of *E.coli***

| Days of catheterization | Gender | | Total |
|---|---|---|---|
| | Female | Male | |
| 1-3 | 15 (5.9%) | 5 (3.4%) | 20( 5%) |
| **4-7** | **155 (61%)** | **72(49.3%)** | **227 (56.7%)** |
| **8-12** | **81(31.8%)** | **65 (43.8%)** | **146 (36.5%)** |
| 13-14 | 3 (1.1%) | 4 (2.7%) | 7(1.75%) |
| Total | 254 | 146 | 400(100%) |

**Table No. 5 : Days of catheterization- Frequency distribution of patients studied**

The days of catheterization were observed to be the maximum in 4-7 followed by 8-12 days [Table No. 5].

| Variables | Gender | | Total |
|---|---|---|---|
| | Female | Male | |
| DIABETICS | | | |
| • No | 225 (88.5%) | 121 (82.8%) | 346(86.5%) |
| • Yes | 29 (11%) | 25 (17.1%) | 54 (13.5%) |
| HYPERTENSION | | | |
| • No | 195 (76.7%) | 90 (61%) | 285 (71.25%) |
| • Yes | 59(23.2%) | 56 (38%) | 115 (28%) |
| KIDNEY DISEASE | | | |
| • No | 200 (78.7%) | 118 (80.8%) | 318 (79.5%) |
| • Yes | 54 (21.2%) | 28 (19.1%) | 82 (20.5%) |
| Total | 254(100%) | 146(100%) | 400 (100%) |

**Table No. 6 :COMORBID CONDITIONS- Frequency distribution of patients studied**

From the Table 6 it was clear that out of the total samples the comorbidity with diabetes was found to be low (13.5%). It was also observed that patients with hypertension and the kidney disease were observed to be low as compared to the healthy individuals.

| Days since Fever | Gender | | Total |
|---|---|---|---|
| | Female | Male | |
| 1-3 | 108(42.3) | 59 (40%) | 167( 41%) |
| 4-7 | 140(55%) | 81(55%) | 221( 44%) |
| 8-12 | 6 (2.36%) | 6(4%) | 12 (3%) |
| Total | 254 (100%) | 146(100%) | 400(100%) |

**Table No. 7: Days since Fever (DAYS)- Frequency distribution of patients studied**

The maximum number of days with fever was observed to be maximum in 4-7 days, least for 8-12 days [Table No. 7].

| Variables | Gender | | Total |
|---|---|---|---|
| | Female | Male | |
| DYSURIA | | | |
| • No | 54(21%) | 19 (13%) | 73 (18.5%) |
| • Yes | 200(78%) | 127 (86.9%) | 327 (81.75%) |
| ABDOMINAL PAINS | | | |
| • No | 66 (25%) | 35 (23%) | 101 ( 25%) |
| • Yes | 188 (74%) | 111 (76%) | 299(74%) |
| CHILLS | | | |
| • No | 74 (29%) | 22 (15%) | 96 (24%) |
| • Yes | 180 (70.8%) | 124 (84.9%) | 304 (76%) |
| Total | 254 (100%) | 146(100%) | 400(100%) |

**Table No. 8 :SIGNS AND SYMPTOMS**

From the Table 8 it was observed that dysuria observed in female was 200 (78%) in male 127 (86.9%) , the abdominal pain in female 188 (74%) followed by the chills with the same ratio of female 180 (70.8%).

**The Identification of Drug Resistance Pattern :** Antibiotic susceptibility testing was performed by Kirby bauer Disk diffusion method as per the CLSI guidelines [15].

**Antibiotic susceptibility testing:** The antibiotic disks (HiMedia) used were ampicillin (10 µg), piperacillin/tazobactam (100/10 µg), ceftriaxone (30 µg), cefotaxime (30 µg), ciprofloxacin (5 µg), norfloxacin (10 µg), amikacin (30 µg), gentamicin (10 µg), cotrimoxazole (1.25/23.75 µg), cefoperazone + sulbactam (75/30 µg), imipenem (10 µg), meropenem (MRP; 10 µg) and

Nitrofuratoin(30 μg) . Antibiotic susceptibility will be determined by using standard Kirby–Bauer disk diffusion method in accordance with Clinical and Laboratory Standards Institute guidelines 2023 [15]

| Antibiotic | RESISTANCE N=400 | SENSITIVITY N=400 |
|---|---|---|
| AMP | 371 (92%) | 29 (7.25%) |
| PTZ | 170 (42%) | 240 (60%) |
| CTR | 350 (87%) | 50(12%) |
| CTX | 350 (87%) | 50(12%) |
| CIP | 371 (92%) | 29 (7.25%) |
| NOR | 348 (87%) | 52 (13%) |
| AMK | 90 (22%) | 310 (77.5%) |
| GEN | 340 (85%) | 60 (15%) |
| COT | 348 (87%) | 52 (13%) |
| CFS | 60 (15%) | 340 (85%) |
| IMP | 30 (7%) | 370 (93%) |
| MERO | 75 (18%) | 325 (81.5%) |
| NIT | 30 (7%) | 370 (93%) |
| Total | 400(100%) | 400 (100%) |

**Table 9: Antibiotic resistance/Sensitivity pattern of patients studied**

In the present study the resistant rate for Ampicillin was observed to be 92% and Imipenem and Nitrofurantoin were sensitive with (93%).

It was noted that the maximum number of isolates were from the gram negative isolates as compared to the gram positive isolates.

**Figure No.3: AST plate for *E.coli***

**against Antibiotics ; zones of growth inhibition for Meropenem referred > or = 14 (susceptible), 12-13 (intermediate) and < or = 11 (resistant) mm.**

## DISCUSSION

Urinary Tract Infection (UTI) is one of the most common infections encountered in clinical practice. Empirical treatment for both complicated and uncomplicated UTI has been practiced throughout the world because a failure in timely treatment might lead to increased morbidity and mortality [1- 3]. Urinary tract infection (UTI) is one of the most common infectious diseases worldwide. It is more prevalent among females with an incidence rate 50-fold higher among the 20–50 years age group.

UTI is a public health problem accounting for more than 15% of all the antibiotics prescriptions among outpatients [4]. Infections forming biofilm are associated with AMR and recurrent UTIs [5,6] both of which are currently increasing globally [7]. One of the most typical infections, particularly among women, is UTI. According to the National Ambulatory Medical Care Survey, UTI alone accounts for up to one million visits to hospital emergency rooms and roughly seven million outpatient department (OPD) visits, leading to approximately 100,000 inpatient stays [16].

In the present study the prevalence of UTI was found to be 40%. This finding was similar to the study performed by the other authors Ahmad S et al and Suhail A. et al., where the prevalence was found to be 20.54% and 32% respectively [17,18].

In the current study the maximum number of isolates were from the Females where the ratio of females 254 (63.5%) were more as compared to that of the males 146 (36.5%) . This study was similar to the study by Suhail A. et al, and Martin Odoki et al., in 2019 where the ratio of females was more as compared to the males [18, 19].

Higher prevalence of UTI among females is due to various factors that predispose women to UTI [20]. From the present study it was also noted that the age group of 31-40 (43%) years of age followed by 21-30 (24.5%) was affected the most. In the age group of 0-10 years and above 71

years was the least affected with the infection. This study was parallel to the study performed by author [19].

It was noted that the maximum number of isolates were from the gram negative isolates as compared to the gram positive isolates. It was observed that the maximum number of isolates were from the *E.coli* 150 (37%) followed by *Klebsiella pneumonia* 100 (25%), *Pseudomonas aeruginosa* 55 (13.7%), *Acinetobacter baumanii* 26 (6.5%) , and *Staphylococcus aureus* 30 (7.5%) for gram positive followed by *Proteus* 23 (5.75%) least for *Enterococcus* with 4%. Similar study was performed by the other research workers where among 206 bacterial isolates obtained from 417 urine samples, majority of the isolates (99%) were Gram negative bacteria which included *Escherichia coli* (56.79%), *Klebsiella sps* (19.9%), *Pseudomonas sps* (6.3%), *Pro- teus sps* (5.8%), *Enterobacter sps* (3.8%), *Citrobacter sps* (1.4%), *Enterococcus sps* (0.9%), and other *NFGNB* (4.8%) [21].

This finding is similar to other reports which suggest that gram negative bacteria, particularly *E. coli* was the commonest pathogens isolated from patients with UTI [22-24]. The incidence of *E. coli* in our study was higher when compared with the Nigerian studies reporting 42.10% [25] and 51% [26]. Most of the studies conducted in Africa and Arab countries showed less than 50% isolation of *E coli* from the UTI patients but re- ported a higher percentage (29%) of *S aureus* as second most frequently isolated bacteria from UTI cases.

In the present study it was found that antimicrobial resistance was seen both in Gram-positive and Gram-negative bacteria.

In the present study the resistant rate for Ampicillin was observed to be 92% and Imipenem and Nitrofurantoin were sensitive with (93%). It was noted that the maximum number of isolates were from the gram negative isolates as compared to the gram positive isolates. The high

resistance in trimethoprim/sulfamethoxazole susceptibility pattern may be due to non-judicious use and over-the-counter selling of this antibiotic [27].

The antibiotic susceptibility of uropathogenic bacteria is known to change with time and is inconsistent in different regions . Here, we have described the impact of the best antimicrobials with low resistance rate (overall resistance %) against the uropathogens in this study. The best antimicrobials for Gram-negative organisms was meropenem, amikacin , gentamicin , tobramycin , and cefepime and moderate resistance rate were ciprofloxacin , cefotaxime , cefoxitin , norfloxacin , ceftazidime , cefpodoxime , piperacillin/tazobactam ,

and cefuroxime. It was noteworthy that high resistance rate was found to be against cefuroxime ,trimethoprim/sulfamethoxazole , nitrofurantoin , amoxicillin/clavulanic acid piperacillin and ampicillin .

In contrast, the antimicrobial sensitivity pattern of antimicrobials for Gram-positive organisms linezolid , teicoplanin , vancomycin , cefalotin screen , moxifloxacin , nitrofurantoin , and levofloxacin ; however, the high resistance rate was found to be against erythromycin , trimethoprim/sulfamethoxazole , gentamicin , tobramycin , fosfomycin , clindamycin , oxacillin (tetracycline and benzylpenicillin (100%) resistance rate. Our finding was in supportr with study by the other authors [28,29].

**Table No. 10: The Comparison of days since fever distribution of the cases with the other studies**

| S.No. | Study | Place | Year | Results |
|---|---|---|---|---|
| 1. | Eshwarappa M etal. ,[30] | India | 2011 | The maximum number of days since fever was observed in 7-12 days. |
| 2. | Wagenlehner FME., [31] | Germany | 2020 | The maximum number of days since were lasting >7 days. |
| 3. | BM Lary., [32] | Florida | 2022 | The maximum number of days since fever was observed in 7-12 days. |

| | | | | |
|---|---|---|---|---|
| 4. | **In the present study** | **Tertiary Care** | **2022** | **Maximum number since days since fever was 4-7 days.** |

In general, any urinary tract infection that fails to resolve on first-line therapy or in a high-risk patient population should be considered a complicated UTI. Complicated UTI symptoms including fever, chills, flank pain, sepsis from a urological source, cystitis symptoms lasting >7 days, known multiple antibiotic resistance, permanent Foley or suprapubic catheters, acute mental status changes (especially in the elderly) and high-risk patient populations (pregnancy, immunocompromised state, renal transplant, abnormal urinary function as in patients with neurogenic or dysfunctional bladders, immediate post-urological surgery, renal failure, pediatrics, etc.) [32].

In the present study dysuria was the most common in case of UTI observed in female with 200 (78%) and in male 127 (86.9%) , the abdominal pain in female 188 (74%) followed by the chills with the same ratio of female 180 (70.8%). There were other studies which were similar to the present study where the common signs and symptoms include fever, dysuria, rigors, lower back pain,suprapubic pain/tenderness [32]. Another study by Wasson M Bono and JMwas also in supported to the present study where dysuria was most commonly observed [33,34].

It is essential to correctly identify the pathogen that is causing UTI in order to successfully treat the affected people. Failure to do so will not only cause the patient's illness to worsen and expose them to complications, but it will also encourage bacterial resistance because of the incorrect administration of antibiotics. Here, we've discussed how the top antibiotics with low overall resistance percentage (%R) affected the study's uropathogens. Additionally, community health education programmes should be run to lower disease prevalence and improve the quality of life for patients in low- and middle-income areas.

A few of the first-line empirical medications that are commonly used to treat UTIs are trimethoprim-sulfamethoxazole, gentamicin, and ampicillin [35]. In almost all cases of UTIs, empirical antibiotic treatment begins before the urine culture findings. Thus, overuse of

antibiotics leads to an increase in antibiotic resistance in uropathogens. A lot of studies highlight the importance of utilising antibiotics judiciously in order to address the problem of antibiotic resistance [36].

In the present study the resistant rate for Ampicillin was observed to be 92% and Imipenem and Nitrofurantoin were sensitive with (93%). It was noted that the maximum number of isolates were from the gram negative isolates as compared to the gram positive isolates. There was another study by Akter T., *et al.*,[37]where susceptibility of *Escherichia coli* was 89.19%, Azithromycin(89.19%), Ciprofloxacin (83.78%), which was higher than our findings and another study conducted by Bhuwan Khatri., *et al.* where found 52.4% susceptibility to Ciprofloxacin [38]. Study by Patel et al., was also similar to the present study where Imipenem 91,69%, Meropenem 91.89%, Nitrofurantoin 72.33%, Piperacillin+Tazobactam51.77% was observed in *E. coli* [39].

Both the aetiology of UTI-causing bacteria and their resistance to antibiotics are changing over time and between various nations.
It is advised that those who are hospitalised, have genitourinary tract abnormalities, have an indwelling catheter, have diabetes, are married, or are female receive routine UTI testing. The secret to managing UTI is conducting regular audits. Thus, it is important to adopt good infection control procedures, antibiotic stewardship, and hygiene practices in order to combat this resistance.

## CONCLUSION

The current study observed that beta-lactam antibiotics had limited efficacy in treating UTI in patients, perhaps due to the high prevalence of antibiotic resistance among *E. coli* in this region. The right measures may help to lower the risk of UTI infection because of these related factors, such as resistance, which may lead to an inaccurate antibiotic prescription, which may then select for new resistance genes.
It is noteworthy that multidrug resistance (MDR) is increasingly spreading globally. This is

alarming, since it indicates that we are quickly running out of options for treating simple bacterial infections. Educating practitioners on the high probability of multidrug resistance should be a priority. Hence, the emergence of MDR that our study revealed poses a major danger to the management of CAUTI patients.

**Declarations:**

**Conflicts of interest: There is no any conflict of interest associated with this study**

**Consent to participate:** There is consent to participate.

**Consent for publication:** There is consent for the publication of this paper.

**Authors' contributions: Author equally contributed the work.**

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