



**A COMPARATIVE STUDY ON BACTERIOLOGICAL PROFILE OF URINARY TRACT INFECTION (UTI) IN DIABETIC AND NON-DIABETIC PATIENTS AND TO KNOW THEIR ANTIBIOTIC SUSCEPTIBILITY PATTERNS IN PATIENTS ATTENDING OPD AT A TERTIARY CARE TEACHING HOSPITAL IN SOLAPUR, MAHARASHTRA**

Anu Sharma<sup>1</sup>, Shaikh N.K<sup>2</sup> and Ravi Prakash Sharma<sup>3</sup>

<sup>1,2</sup>Microbiology Department, Dr. V.M. Govt. Medical College Solapur

<sup>3</sup>India Institute of Medical Sciences Jodhpur

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ABSTRACT

Urinary tract infections (UTI) refers to an inflammatory response of urothelium towards bacterial invasion which is associated with bacteruria and pyuria<sup>1</sup>. Aim of the present study is to compare bacteriological profile among diabetic and non-diabetic patients suffering from symptomatic urinary tract infection and to know the antibiotic sensitivity pattern. **Materials and Method:** Urine samples (midstream sample) was collected by clean catch technique in a sterile leak proof container from both diabetic and non-diabetic patients and after centrifugation, supernatant was discarded and sediments were used for gram staining and culture. After overnight incubation at 37° C, growth was noted and identification was done using standard procedures. Antibiotic sensitivity was done on Muller Hinton agar using Kirby bauer disk diffusion method and zone of inhibition were interpreted as per CLSI guidelines. **Result:** A total of 300 patients were included in the study, out of which 170 (57%) were diabetic while 130(43.3%) were non diabetic. Samples were taken from 300 patients from which 256(85.33%) were culture positive while 44(15%) were culture negative. Among both diabetic and non-diabetic patients females were most commonly suffering from UTI. Among diabetic patients female 94(69.62%) were more commonly suffering from UTI as compared to males 41(30.4%). Similarly females 75(62%) are more commonly affected by UTI among non-diabetic group as compared to males 46(38%). Urine culture from both diabetic and non-diabetic culture showed gram negative bacteria were more commonly responsible for UTI as compared to gram positive cocci. Gram negative bacteria accounted to 87.5% of the infections while 12.5% isolated were gram positive cocci. Most common organism responsible for UTI in both the group was *E. coli* 112(44%), followed by *Klebsiella species* 70 (27.34%), *Proteus species* (9%) while among gram positive cocci, *Enterococcus species* 16(7.81%) were most common followed by *Staphylococcus aureus* 10(4%) and *coagulase negative Staphylococcus aureus* 3(1.2%). Among diabetic patients most common age group affected with UTI was 51-60 years 75(55.5%) followed by 41-50 years 35(26%), 61-70years 15(11.11%) and 31-40 years 10 (7.4%) while in non-diabetic patients most common age group affected by UTI was 21-30 years 40(33.05%) followed by 31-40years 30(25%), 41-50 years 22(18.2%). No significant difference in antibiotic susceptibility pattern was seen among both the groups. In gram negative bacteria, maximum sensitivity was seen for imipenem 184(82%), Amikacin 168(75%), Piperacillin-tazobactam 168(75%), Ceftriaxone 139(62%) while least sensitive were Ciprofloxacin 56(25%) and Cotrimoxazole 34 (15%). Among gram positive isolates all were sensitive to Vancomycin and Linezolid. Least sensitivity was seen with Ciprofloxacin 8(25%), Erythromycin 24(75%), Cotrimoxazole 20 (62%).

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**INTRODUCTION**

Urinary tract infection is an inflammatory response of the urothelium against bacterial invasion which is usually associated with dysuria and pyuria<sup>1</sup>.

\*Corresponding author: Anu Sharma

Microbiology Department, Dr. V.M. Govt. Medical College Solapur

Urinary tract infection is the second most common infection occurring in community or as health care associated infection<sup>2</sup>. Diabetic patients are more prone to UTI as compared to non-diabetic due to various factors like impaired granulocyte function and cell mediated immunity. Patients with long standing diabetic may also develop diabetic neuropathy which may result in neurogenic bladder with incomplete voiding, urinary stasis and urinary retention.

The aim of the present study is to compare bacteriological profile in patients with UTI among diabetic and non-diabetic and to evaluate if there is any difference in bacteriological profile and antibiotic susceptibility pattern among the two groups for better patient management.

## MATERIAL AND METHOD

The study was conducted over a period of 6 months from August 2018 to Jan 2019. Prior to study permission was taken from concerned authority. Verbal as well as written consent was taken from the patients who were willing to participate in the study. Patients visiting OPD with complaints of fever, dysuria, urgency, frequency or flank pain/ abdomen pain with burning micturition were included in the study.

Before sample collection, patient was educated about the method of urine collection and a sterile leak proof container was given to the patient for collection of midstream urine by clean catch technique.

About 5ml of urine specimen was centrifuged at 2500 rpm for 10 minutes, supernatant was discarded and sediment were used for gram staining to see for presence of pus cells, gram positive or gram negative bacteria, epithelial cell, red cells and casts.

Urine specimen was inoculated on CLED (Cysteine lactose electrolyte deficient) medium using calibrated loop for semi quantitative analysis. Plate was incubated at 37° C for 18-24 hours. Specimen with >10<sup>5</sup> CFU/ ml was considered as significant bacteruria, however in case of gram positive cocci low counts were also considered significant. The isolates were identified based on colony characteristics on culture, gram staining and standard biochemical tests. Antibiotic susceptibility testing was done as per CLSI guidelines on Muller Hilton agar by Kirby bauer disc diffusion method. Growth of organism more than three types were not included in the study as it was considered as collection contamination.

## RESULT AND DISCUSSION

In the present study 300 patients were included from which 170(57%) were diabetic and 130 (43%) were non diabetic. From 300 patients 256 (85.33%) bacterial isolates were obtained.

Among positive urine culture single growth was seen in 142(55.5%) samples while polymicrobial (more than one pathogen) was seen in 114(44.53%) samples.

Overall among diabetic as well as non-diabetic patients, females 169(66.01%) were more commonly affected with UTI as compared to males 87(34%).

Among diabetic patients 94(69.62%) females were affected from UTI as compared to males 41(30.4%) while in non - diabetic patients also females 75(62%) were suffering from UTI as compared to males 46(38.01%). This can be attributed to short urethra, sexually active females are more prone to get UTI as compared to males. Studies done by Mario Bonadio *et al*<sup>7</sup> showed results similar to our study while study done by B. Natesan *et al*<sup>2</sup> showed results which were in contrast with our study.

Among diabetics most common age group affected with UTI were ranging 41-70 years which can be attributed to the fact that type II diabetic mellitus usually develops in this age group range. Also poor maintenance of plasma glucose levels may predispose these patients to UTI and renal complications and finally renal failure. As shown in table 1.

Among non-diabetic patients most common age group range affected is 21-50 years, in females there are many hormonal changes that occur in this age group, they are sexually active, pregnancy and even short length of urethra all predispose them to UTI.

**Table 1** Showing age-group distribution among diabetic and non-diabetic patients suffering from UTI

Age group (years)	Diabetic group(n=135)	Non -diabetic group(n=121)	Total
10-20	-	10(8.3%)	10(4%)
21-30	-	40(33.05%)	40(15.62%)
31-40	10(7.4%)	30(25%)	40(15.62%)
41-50	35(26%)	22(18.2%)	57(22.3%)
51-60	75(55.5%)	7(6%)	82(32.03%)
61-70	15(11.11%)	9(7.43%)	24(9.4%)
>70	-	3(2.5%)	3(1.2%)
Total	135	121	256

**Table2** Organism wise distribution among diabetic and non-diabetic patients suffering from UTI

Organism	Diabetic (n=135)	Non diabetic (n=121)	Total (n=256)
<i>E.coli</i>	50(37.03%)	62(51.23%)	112(44%)
<i>Klebsiella species</i>	40(29.62%)	30(25%)	70(27.34%)
<i>Proteus species</i>	10(7.4%)	13(10.74%)	23(9%)
<i>Enterococcus species</i>	12(9%)	4(3.30%)	16(7.8%)
<i>Pseudomonas species</i>	10(7.4%)	4(3.30%)	14(5.5%)
<i>Staphylococcus species</i>	6(4.44%)	4(3.3%)	10(4%)
CONS	2(1.5%)	1(0.82%)	3(1.2%)
<i>Acinetobacter species</i>	5(3.70%)	3(2.5%)	8(3.12%)
Total	135	121	256

Studies done by Mario, Bonadio *et al*<sup>7</sup>, Stapleton A *et al*<sup>8</sup>, Ronald A *et al*<sup>9</sup>, BonadioM *et al*<sup>10</sup> shows result similar to our finding where gram negative bacteria are more commonly seen in UTI as compared to gram positive cocci.

Also in the present study *E.coli* is most commonuropathogen responsible for UTI among both diabetic as well as non-diabetic patients followed by *Klebsiella species*. Our findings are similar to various studies mentioned in Mario, Bonadio*et al*<sup>7</sup>, Stapleton A *et al*<sup>8</sup>, Ronald A *et al*<sup>9</sup>, BonadioM *et al*<sup>10</sup>

Antibiotic sensitivity did not show any significant variation in their susceptibility pattern in both the groups. Both group show high sensitivity for Imipenem 184(82%) followed by 168 (75%), Piperacillin-tazobactam 168(75%), Ceftriaxone 139(62%).least sensitivity was seen for Ciprofloxacin 56(25%) and Cotrimoxazole 34(15%), this may be as these drugs are commonly prescribed in case of UTI and easy availability of these drugs has led to development of resistance for these drugs.

Among gram positive cocci 100 percent sensitivity was seen for Vancomycin and Linezolid followed by Erythromycin and Clindamycin which showed sensitivity to 24 (75 %) Least

sensitivity was seen for Ciprofloxacin 8(25%) and Cotrimoxazole 20 (62%).

## CONCLUSIONS

This is a hospital based study, so results should not be generalized. However the study points out that gramnegative bacteria are more commonly responsible to UTI as compared to their counter parts.

Easy availability of over the counter drugs, indiscriminate use of antibiotic has led to resistance to drugs which are routinely given by physician in case of UTI. There is need to use antibiotics judiciously and discourage misuse or overuse of such drugs. As resistance to these drugs results in prescription of higher drugs which are more costly, more toxic and associated with serious adverse effects.

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