

Incidence of Urinary Tract Infection among the Patients Visiting Western Regional Hospital, Pokhara, Nepal

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ABSTRACT

Urinary tract infection is a common medical problem; sometimes, leading to the number of deaths either from acute infection or from chronic renal failure. Study was performed in the laboratory of Western regional Hospital Pokhara from June 2009 to April 2010 that included 500 midstream urine samples from patients. Identification of the significant isolates and antibiotic susceptibility testing was done by standard microbiological techniques. Among 500 urine samples 116 (23.2%) showed significant growth while 384 (76.8%) samples showed non significant growth. Among 116 isolates ten different genera of bacteria identified were *Escherichia coli* (50%), *Staphylococcus aureus*, (13.79%) *Klebsiella spp* (10.34%), *Pseudomonas aeruginosa* (7.75%), *Enterobacter spp* (6.03%), *Proteus spp* (5.17%), *Citrobacter spp* (3.44%), *Morganella morganii* (1.72%) *Staphylococcus saprophyticus* (0.86%) and *Enterococcus spp* (0.8%). Among the antibiotics used for gram positive bacteria Ceftriaxone (66.6%) was found to be most effective followed by Gentamycin (61.1%) Ciprofloxacin (50%) Cotrimoxazole (38.8%) and Ampicillin (27.7%). Among the antibiotics used for gram negative uropathogens Nitrofurantoin (86.73%) was found to be most effective drug followed by Ceftriaxone (42.87%), Ciprofloxacin (41.87%), and Nalidixic acid (39.79%) Cotrimoxazole (37.75%) and Ampicillin (27.55%). Among ten types of uropathogens isolated *Pseudomonas spp* and *Morgenella morganii* were found to be (100%) multidrug resistant. A significant number of urinary isolates from UTI patients were MDR which can result in unavoidable treatment failure. Therefore, the rationale use of antibiotics is suggested.

Key words: *Urinary tract infection, Mid-stream urine, Multi-drug resistance, Pyuria*

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INTRODUCTION

Urinary tract infection (UTI) is a spectrum of disease caused by microbial invasion of the genitourinary (GU) tract that extends from the renal cortex of the kidney to the urethral meatus. It is a condition where one or more parts of the urinary system become infected. UTIs are the most common of all bacterial infections and can occur at any time in the life of an individual. During urinary tract infection, multiplication of the organisms takes place in urinary tract and there is the presence of more than a hundred thousand organisms in one ml of midstream urine sample.¹ Urinary tract infection (UTI) is the commonest bacterial infection prevalent to both male and female. Urinary tract infection is defined as the detection of both bacteriuria 10^5 cfu/ml and pyuria i.e.10 leucocytes/hpf.² Bacteriuria, which may lead to the infection of the prostate, epididymis or the testes are also included in the definition of UTI. Bacteriuria, which can be symptomatic or asymptomatic, is the presence of bacteria in the urine. Disease occurs when the multiplication of organisms in the urinary tract interferes with the normal function of the involved organ.³

Upper UTI involves the renal parenchyma (Pyelonephritis) or the ureters (ureteritis). Upper UTI is manifested by vomiting, toxemia and flank pain.⁴ Lower UTI involve bladder (cystitis), the urethra (urethritis) and, in male, the prostate (prostatitis). Lower UTI is common in females.⁴ Symptomatic UTI has

significant bacteria with symptoms like dysuria, frequency and urgency with or without fever and renal or flank pain. Symptomatic UTI involving lower urinary tract is frequently termed acute cystitis.⁴

METHODS

The study was conducted prospectively at Western regional hospital Pokhara from June 2009 to April 2010. A total 500 midstream urine samples were collected and observed macroscopically and microscopically. Identification of the significant isolates and antibiotic susceptibility testing was done by standard microbiological techniques.⁵ All the data were entered and analysed by using Statistical Package for Social Science (SPSS) software (Version 17.0). Chi-square test was used to determine significant association of dependable variables with cultural positivity.

RESULTS

Out of 500 UTI patients, 212 (42.4%) were males, while 288 (57.5%) were females. Among them, 116 patients were found to be suffering from UTI in which 35(30.17%) were male and 81(69.82%) were females.

Among 116 organisms isolated from growth positive urine samples of UTI patients, 98 isolates were Gram negative organisms and remaining 18 were gram positive organism.

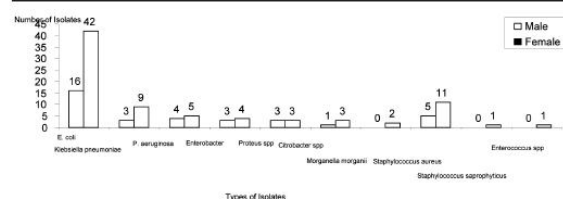


Figure 1: Pattern of different species of bacteria isolated from infected urine samples.

Among the isolates, *E. coli* was found to be the most predominant uropathogens causing UTI in both male and female patients, i.e. 13.79% in male and 36.20% in female patients. Similarly the most common microorganism isolated were *Staphylococcus aureus* 13.79% followed by *Klebsiella pneumoniae* 10.34%.

Table 1: Antibiotic susceptibility pattern of gram-positive

Antibiotics	Sensitive		Intermediate		Resistant		Total
	N	%	N	%	N	%	
Ampicillin	5	27.7	0	0.0	13	72.222	18
Ceftriaxone	12	66.6	1	5.5	4	22.2	18
Cotrimoxazole	7	38.8	0	0	11	61.1	18
Ciprofloxacin	9	50.0	0	0.0	9	50.0	18
Gentamycin	11	61.1	1	5.5	7	38.8	18

Among the 18 Gram positive isolates, most of them were susceptible to Ceftriaxone (66.6%) and Gentamycin (61.1%). Ciprofloxacin, Ampicillin and Cotrimoxazole were found to be less effective as less than nine (>50%) of the isolates were sensitive to these drugs.

Table 2: Antibiotic susceptibility pattern of Gram negative isolates

Antibiotic used	Sensitive	Intermediate	Resistant	Total
Ampicillin	27 27.55%	5 5.10%	67 68.36%	98
Ceftriaxone	42 42.87%	8 8.16	47 47.95	98
Cotrimoxazole	37 37.75	1 1.0	11 11.22	98
Ciprofloxacin	41 41.83	5 5.10	52 53.06	98
Nitrofurantoin	85 86.73	13 13.26	0 0.0	98
Nalidixic acid	39 39.79	11 11.22	50 51.02	98

Among the Gram negative isolates, Nitrofurantoin was the drug of choice as 86.73% isolated from the patients were found to be susceptible to the drug. Similarly Ceftriaxone was effective among 42.87 isolates and 41.87% isolates were susceptible to Ciprofloxacin, Cotrimoxazole, Nalidixic acid and Ampicillin were found to be less effective drugs.

Out of the 35 isolates from male samples, 34.28% isolates were resistant to >three drugs and 11.42 were found to be resistant to three drugs. Among these isolates *Pseudomonas spp* and *Morgenella spp* were found to be 100% MDR. *Klebsiella spp* and *Proteus spp* were found to be MDR (66.6%). Only 33.3% of *Enterobacter spp* and 31.25% of *E.coli* were identified as MDR strains isolates. Out of the 81 isolates from female samples, 41.97% isolates were resistant to more than 3 drugs and 14.81% were found to be resistant

to more than 3 drugs. Among these isolates, *Morgenella spp* and *Pseudomonas spp* were found to be 100% MDR followed by *Enterobacter spp* (75%) *Proteus spp* (66.6%), *Citrobacter spp* (66.6%), *Staphylococcus aureus* (55.5%), *E. coli*, (55.5%) and *Klebsiella spp* (22.2%).

DISCUSSION

Out of 500 samples, 212 samples were taken from male patients among which 35(30.17% samples showed growth positive result and out of 288 samples taken from female patients, 81(69.82%) samples showed significant result. In this way total growth positive results including male and female patient were found to be 116 (23.2%). From this result it is known that urinary tract infection is more common in females than in males. This result corresponds to the result obtained by Amin et al., In the study made by this team the prevalence of UTI was (68%) in case of females and only (37%) in case of males. The prevalence of UTI in a study made by Abubaker et al. was (54.3%) in case of females and (45.7%) in case of males. Also in a study done by Basnet et al., (23.3%) samples showed significant bacterial growth among which (71.5%) were from female patients and (28.4%) were from female patients. Similarly the prevalence of UTI in female was (19.6%) and in male it was (14.3%) in Kathmandu.^{6,7,8,9}

In this study when cultural positive results were compared with the total samples requested from different aged group in males, aged group 0-20 were found to be more susceptible to UTI than other age group. When cultural positive results were compared with total samples taken from different age groups of female aged group 21-40 were found to have maximum susceptibility to have UTI. Here sexually active young women are found to be suffering highly from UTI than other age groups. In study done by Amatya and Sharma females with age group 33±14.5 were found to be more susceptible to UTI.^{10,11} Among the significant bacteriuric cases, the highest number of cases i.e. six belonged to the age group 20-30 years where females of age group 20-30 were found to have significant bacteriuria in four cases and two in male cases.

Among the urinary isolates, *E. coli* (50%) was the most predominant uropathogens followed by *K. pneumoniae* (10.34%), *Pseudomonas aeruginosa* (7.75%) *Enterobacter spp.* (6.03%) *Proteus spp.* (5.17%) *Citrobacter spp* (3.44%) and *Morgenella morgani* (1.72%) in case of gram negative bacteria. Among Gram positive isolates *S aureus* (13.79%) was the predominant followed by *Enterococcus spp* and *Staphylococcus faecalis*. These results were in harmony with the results obtained by Mathai et al., Baral et al., Shrestha et al., Dhakal et al., Farrell et al., Gales et al., and Kahlmeter et al.,^{12,13,14,15,16,17,18}

In a similar study carried out by Dhakal et al., (84.2%) of urinary isolates were susceptible to Nitrofurantoin. Nitrofurantoin was found to be the most effective drug against urinary pathogens also in other similar studies by Shrestha et al.,^{14,15} Nitrofurantoin was the most effective oral drug in Gram negative bacteria in the study done by Basnet

et al., Among the common antibiotics used against all Gram negative isolates, Nitrofurantoin was the drug of choice as 10 (83.3%) uropathogens were found to be susceptible to this drug in a study done by Puri.^{8,19} Similar result was obtained in a study done by Savitha et al., where the result showed Nitrofurantoin to be the best drug for the treatment of antibiotics whereas Ampicillin was found to be less effective drug in the same study.²⁰

In this study out of the 35 isolates from male samples, 12 (34.28%) isolates were resistant to >3 drugs and 4 (11.42%) were found to be resistant to 3 different groups of drugs. Among these isolates *Pseudomonas* and *Morgenella spp* are found to be 100% MDR. *Klebsiella pneumoniae* and *Proteus spp* were found to be (66.6%) MDR. Only 33.3% of *Enterobacter spp* and 31.25% of *E.coli* were identified as MDR strains isolates. Out of the 81 isolates from female samples, 34 (41.97%) isolates were resistant to >3 drugs and 12 (14.8%) were found to be resistant to 3 drugs. Among these isolates, *Morgenella morgani* and *Pseudomonas spp* are found to be 100% MDR followed by *Enterobacter spp* (75%) *Proteus spp* (66.6%), *Citrobacter spp* (66.6%), *Staphylococcus aureus* (55.5%), *E. coli*, (55.5%) and *Klebsiella spp* (22.2%). In the study done by Poudyal⁹ 100% *Morgenella morgani* and 100%

of *Pseudomonas spp* isolated from males were found to be MDR. Similarly in his study 100% of *Morgenella morgani* and 75% of *Pseudomonas spp* were found to be MDR which were isolated from females. In a study done by Sharma all the isolates i.e. 100% of *Klebsiella pneumoniae*, *Pseudomonas aeruginosa*, *Staphylococcus aureus* and *Enterococcus spp* were found to be MDR strains whereas 87.50% of *Escherichia coli* were MDR strains but this study was done in the people undergoing heart surgery in Shaid Ganga Lal Hospital.¹¹

This indicates that the emergence of MDR strains is common in the UTI patients of Western region and this may be due to empirical treatment of UTI. In a developing country like Nepal less facility for the health care facility. They themselves take drugs without laboratory investigation and do not take appropriate dose of the drugs, which is the main cause of emergence of MDR strains. This study highlights the need for development of new generic drugs otherwise resistance to commonly used drugs will increase in near future. Hence, the study of urinary tract infection in the patients visiting Western regional hospital was accomplished. From the study it was found that the most common cause of UTI was *E.coli* followed by *S. aureus*, *Klebsiella*, *Pseudomonas aeruginosa* and *Enterobacter spp* in the patients of western region.

ACKNOWLEDGEMENT

The authors would like to acknowledge all staffs of microbiology department of Western regional hospital for their support to conduct this study.

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